

A Minimalist Study of Complex Verb Formation: Cross-linguistic Patterns and Variation

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PhD First Year Report, June 2016

Abstract

This report investigates the cross-linguistic patterns and structural variation in complex verbs within a Minimalist and Distributed Morphology framework. Based on data from English, German, Hungarian, Chinese, and Japanese, three general mechanisms are proposed for complex verb formation, including Akt-licensing, “two-peaked” adjunction, and trans-workspace recategorization. The interaction of these mechanisms yields three levels of complex verb formation, i.e. Root level, verbalizer level, and beyond verbalizer level. In particular, the verbalizer (together with its Akt extension) is identified as the boundary between the word-internal and word-external domains of complex verbs. With these techniques, a unified analysis for the cohesion level, separability, component category, and semantic nature of complex verbs is tentatively presented.

1 Introduction¹

Complex verbs may be complex in form or meaning (or both). For example, *break* (an Accomplishment verb) is simple in form but complex in meaning (with two subevents), *understand* (a Stative verb) is complex in form but simple in meaning, and *get up* is complex in both form and meaning. This report is primarily based on formal complexity² but tries to fit meaning into the picture as well.

Complex verbs are cross-linguistically common. The above-mentioned *understand* and *get up* represent just two types: prefixed verb and phrasal verb. There are still other types of complex verb, such as compound verb (e.g. *stir-fry*). These are just descriptive terms, which I use for expository convenience. Two major issues concerning these different types of complex verb will be discussed: their internal cohesion and structural variation.

¹Abbreviations used in this report: CHI = Chinese, ENG = English, GER = German, HUN = Hungarian, JAP = Japanese, RUS = Russian, CJ = Chinese and Japanese, EGH = English, German, and Hungarian; DM = Distributed Morphology, DSP = Double Separable Particle, FS = Feature Sharing, LA = Labeling Algorithm, LCV = Lexical Compound Verb, SCV = Syntactic Compound Verb, STC = Spatio-Temporal Compound, VM = Verbal Modifier; COND = Conditional, HON = Honorific, INF = Infinitive, PST = Past, POT = Potential, PRES = Present; AKT = Aktionsart, ASP = Aspect, DIM = Diminutive, DELM = Delimitative, INCH = Inchoative, PFV = Perfective, RES = Resultative; NOM = Nominative, ACC = Accusative, ALL = Allative, DAT = Dative, INE = Inessive, LAT = Lative, OBL = Oblique, SUBL = Sublative, SUPE = Superessive. (Word count: 12, 751)

²This choice is partly because semantic complexity is not a stable standard in data delimitation. For example, *underscore* is decomposable in the meaning “draw a line underneath” but less clearly so in the meaning “emphasize”. By comparison, it is unequivocally complex in form, i.e. *under* + *score*.

In this report, I will follow the assumption that syntax is the single generative engine of the human language faculty, which is a fundamental idea of neo-constructionist theories like Distributed Morphology (Halle and Marantz 1993, *et seq.*). In such a view, the module termed “Lexicon” is merely a storehouse of pure primitives (e.g. features), while all “words” (simple or complex) are formed in the syntactic workspace(s).³ With the generative power of the Lexicon eliminated, issues about complex word formation need to be reformulated. This is not easy, as word formation is a highly language-specific area, whereas syntax (minimally Merge) is conceived to be universal. Thus, the study of complex word formation should ideally be reduced to the study of its manipulable primitives and their properties (a general view of the Minimalist Program, Chomsky 1995, *et seq.*).

Against such a background, complex verbs form a nice probe into theoretical questions, as they closely interact with clausal syntax. For instance, many complex verbs are separable. This is tricky in traditional approaches to word formation, which more or less all assume some version of the Lexical Integrity Hypothesis (Di Sciullo and Williams 1987). While single-engine approaches does not entertain this assumption, we do see old questions remaining and new ones emerging.

First, the intuitive distinction between words and *bona fide* phrases is still valid, and how a single engine can systematically generate two levels of unit is worth exploring. Second, the complexity of complex verbs seems to be constrained. Cross-linguistically, the majority of complex verbs involve two (or occasionally three) components, but not five or six. Take German as an example, while tripartite nouns like *das Jugend-schutz-gesetz* “youth-protecting-law” behave normally in the language, tripartite verbs often resist syntactic displacement (e.g. *vor-an-melden* “preregister”, see Section 2.1.2). Why there are such constraints and why they are category-specific are also intriguing questions. In addition, a more philosophical issue is why languages widely use complex verbs when verbal information can be encoded more compactly (e.g. “verb-framed” languages encode motion manner and path together, Talmy 1991). These and other questions make it worthwhile to investigate cross-linguistic patterns of complex verb formation at a more abstract level with the new theoretical techniques. Given the scope limit, in this report I will mainly explore the first question and only bring up the second and third questions where appropriate.

The rest of this report is organized as follows. Section 2 presents and compares data from five languages: English, German, Hungarian, Chinese, and Japanese. Section 3 lays out the theoretical framework of this study. Section 4 gives a unified analysis of complex verb formation across languages. Section 5 concludes.

2 Complex verbs across languages

In this section I will present data from five languages on three types of complex verbs, i.e. prefixed verbs, phrasal verbs, and compound verbs. For each language I will summarize the main syntactic and semantic patterns in its complex verb formation. The major aspects to be discussed are cohesion level, separability, meaning abstractness, and idiomaticity.

³I will set aside the question of whether and how non-primitive products are stored, since this often blurs the boundary between the linguistic lexicon and stored experience (Marantz 2013).

2.1 Prefixed verbs and phrasal verbs

2.1.1 English

Prefixed verbs across languages assume varying levels of cohesion. With morpheme status and separability as two parameters, I classify prefixed verbs into four subtypes.

	Prefix + base	Separability	Example
<i>i</i>	bound + bound	inseparable	ENG <i>conceive, attain, submit</i>
<i>ii</i>	bound + free	inseparable	ENG <i>redo, forgive, bedazzle</i>
<i>iii</i>	free + free	inseparable	ENG <i>under-stand</i> , RUS <i>do-čitat'</i> “to-read→read through”
<i>iv</i>	free + free	separable	GER <i>auf-stehen</i> “up-stand”, <i>ab-lehnen</i> “off-lean→reject”

Table 1: Four levels of cohesion in prefixed verbs

Adding phrasal verbs to the picture, we get a complete taxonomy of English complex verbs.

- | | | | |
|-----|----------|---------------------------|--|
| (1) | Type I | Bound prefix + bound base | <i>conceive, complete, attain, assume, submit</i> |
| | Type II | Bound prefix + free base | <i>redo, forgive, bedazzle, mislead, disconnect</i> |
| | Type III | Free prefix + free base | <i>understand, uprising, overrun, outreach, withhold</i> |
| | Type IV | Phrasal verb | <i>take away, get up, go on, give in, eat up</i> |

In Types I-III, cohesion level is reflected in morpheme status and inter-morphemic relation. Type I (mainly Latinate) verbs are the most tightly structured in both phonology (assimilation, e.g. *conceive* vs. *complete*) and semantics (-*ceive*, -*tain*, and -*mit* do not have clearly recognizable meaning). Thus, it is likely that Type I verbs actually involve “complex Roots”. Type II and Type III both have free bases and no phonological assimilation, which indicates that the prefix is attached to rather than part of the base verb. Finally, Type IV verbs are the most loosely structured, since their components do not form a single unit at all. There is a curious phenomenon in Type III and Type IV complex verbs. While Type III verbs can generally be converted into Type IV (though note the meaning change), only a limited number of Type IV verbs have correspondent Type III items, as in (2).

- | | | | | | | | |
|--------|-------------------|---|--------------------|----|------------------|---|-------------------|
| (2) a. | Type III | → | Type IV | b. | Type IV | → | Type III |
| | <i>understand</i> | | <i>stand under</i> | | <i>take away</i> | | * <i>awaytake</i> |
| | <i>uprise</i> | | <i>rise up</i> | | <i>get up</i> | | * <i>upget</i> |
| | <i>overrun</i> | | <i>run over</i> | | <i>go on</i> | | * <i>ongo</i> |
| | <i>offset</i> | | <i>set off</i> | | <i>run out</i> | | <i>outrun</i> |

We can summarize three points from the English data. First, the asymmetry in (2) shows that in Modern English phrasal verbs are more productive than prefixed verbs, which is partly due to the VO word order (Los et al. 2012). Second, while Type IV verbs can have completely transparent meaning, Type III verbs usually assume some meaning shift, e.g. *run out* can mean the concrete action of “running outward” whereas *outrun* cannot. Third, while Type III prefixes still keep their literal meaning, Type II prefixes are synchronically bleached.

2.1.2 German

German complex verbs are all prefixed verbs. German verbal prefixes can be separable (3a), inseparable (3b), or dual (3c).⁴

- (3) a. Separable: *ab-*, *an-*, *auf-*, *aus-*, *ein-*, *her-*, *hin-*, *mit-*, *vor-*, *weg-*, *weiter-*, *zu-*, etc.
 b. Inseparable: *be-*, *ent-*, *emp-*, *er-*, *ge-*, *miss-*, *ver-*, *zer-*, etc.
 c. Dual: *durch-*, *hinter-*, *unter-*, *um-*, *über-*, *wieder-*, etc.

(In)separability is mainly manifested in three syntactic contexts: *i*) V2 movement (4), *ii*) prefix topicalization (5), and *iii*) *zu* (INF) and *ge* (PFV) inflection (6).

- (4) a. Peter *steigt* in den Bus *ein*.
 Peter climbs in the bus in
 “Peter gets on the bus.”
 b. Peter *be-steigt* den Berg. /*Peter *steigt* den Berg *be*.
 Peter BE-climbs the mountain
 “Peter climbs the mountain.” (Zeller 2001, p. 55–56)
- (5) a. *Zu* hat er die Tür *gemacht*.
 closed has he the door made
 “He locked the door.” (ibid. p. 89)
 b. * *Be* hat Peter den Berg *steigt*.
 BE has Peter the mountain climbed
 Intended: “Peter has climbed up the mountain.”
- (6) a. *ein-steigen* “in-climb”, *ein zu steigen* “in to climb”, *ein-ge-steigt* “in-GE-climbed”
 b. *ent-gehen* “escape”, *zu ent-gehen* “to escape”, *ent-(ge-)gangen* “escaped”

These facts reveal that while inseparable prefixes form an X⁰ (or equivalent) constituent with the base verb, separable prefixes are out of it. So German inseparable verbs pattern with English Type I (complex Root) or Type II (Root-external)? I support the latter based on two reasons. First, most inseparable verbs have free-standing bases, as in (7).

(7)	Prefixed verb	Base	Prefixed verb	Base
	<i>verachten</i> “despise”	<i>achten</i> “respect”	<i>beäugen</i> “stare”	<i>äugen</i> “gaze”
	<i>verbauen</i> “obstruct”	<i>bauen</i> “construct”	<i>befolgen</i> “obey”	<i>folgen</i> “follow”
	<i>erarbeiten</i> “work out”	<i>arbeiten</i> “work”	<i>empfangen</i> “receive”	<i>fangen</i> “catch”
	<i>erfragen</i> “inquire”	<i>fragen</i> “ask”	<i>zerlegen</i> “disassemble”	<i>legen</i> “lay”

Second, some German inseparable prefixes are cognates with Type II prefixes in English (8).

(8)	German	English
	<i>ver-</i> <i>vergeben</i>	<i>for-</i> <i>forgive</i>
	<i>be-</i> <i>behalten</i>	<i>be-</i> <i>behold</i>
	<i>miss-</i> <i>misstrauen</i>	<i>mis-</i> <i>mistrust</i>

As for meaning, inseparable prefixes in German are more abstract than separable ones in a way similar to Type II and Type III prefixes in English. Note that semantic abstractness and idiomaticity are two relevant but distinct concepts in that abstractness is an intrinsic property

⁴For expository convenience I will consistently use the term “prefix” (instead of “particle”).

of the prefix morpheme, whereas idiomaticity is an extrinsic property assigned to the structure. Therefore, they do not always accompany each other. For instance, the complex verbs with *ver-* (abstract) and *ab-* (substantial) are both directly compositional in (9a)(10a), and both idiomatic in (9b)(10b)⁵.

- (9) a. Mit deiner Unnachgiebigkeit hast du ihn *ver-ärgert*.
with your intransigence have you him PFV-vexed
“You have irritated him with your intransigence.”
- b. Die Kranke hat eine ruhige Nacht *ver-bracht*.
the patient has a quite night VER-brought
“The patient has spent a quite night.”
- (10) a. Zur Begrüßung *stand* er vor der alten Dame *auf*.
to greet stood he in front of the old lady up
“He stood up to greet the old lady.”
- b. Ihre musikalische Begabung *fiel auf*.
her musical gift fell on
“Her musical gift is outstanding.”

Given such facts, I will not rely on idiomaticity as a main standard to differentiate structures.⁶ Finally, there are two more points about German prefixed verbs that are worth attention. First, prepositions are not the only material for verbal prefixes. Some adjectival/adverbial or even nominal elements are also possible candidates, as in (11).

(11)	Prefix	Example	Prefix	Example
	<i>empor</i>	<i>empor-blicken</i> “upward-look”	<i>heim</i>	<i>heim-kommen</i> “home-come”
	<i>fehl</i>	<i>fehl-gehen</i> “wrong-go→err”	<i>los</i>	<i>los-fahren</i> “away-drive”
	<i>fest</i>	<i>fest-legen</i> “firm-lay→establish”	<i>statt</i>	<i>statt-finden</i> “place-find→take place”

These verbs behave exactly like separable verbs. They can undergo V2 movement (12a) and prefix topicalization (12b) and allow the insertion of *zu* and *ge* (12c)⁷.

- (12) a. Der alte Adler *blickte* staunend und sehnsüchtig *empor*.
the old eagle looked astonishedly and yearningly upward
“The old eagle astonishedly and yearningly looked upward.”
- b. *Los* sollte es aber erst am Nachmittag *gehen*, aber...
away should it but only in afternoon go but
“One does not need to set off until the afternoon, but...”
- c. *heim zu kommen, heim-ge-kommt*

Second, there is restriction on the number (and type) of prefixes a verb can take, beyond which “weird” syntactic pattern might occur. For example, some complex verbs with double separable prefixes (henceforth DSP) are “immobile” (Haider 2010; Vikner 2005) in the sense that they cannot be used in V2 contexts at all, such as *vor-an-melden* “preregister” in (13).

⁵Source: Duden Dictionary Online (<http://www.duden.de>).

⁶As Goralach (2004, p. 2) points out: “relying on idiomaticity as a criterion makes the delimitation of [phrasal verbs] vague and complicated because idiomaticity itself is a highly gradable phenomenon.”

⁷Source: deTenTen [2013] Corpus, SketchEngine, (<https://the.sketchengine.co.uk>).

- (13) a. * Du *meldest uns voran*/ * *anmeldest uns vor*/ * *voranmeldest uns*.
 you register us pre-on on-register us pre pre-on-register us
 Intended: “You preregister us.”

- b. ... wenn du uns *voranmeldest*.
 if you us preregister
 “...if you preregister us.”

(Haider 2010, p. 60)

Similar verbs include *vor-an-kündigen* “pre-on-announce→preannounce”, *um-ein-teilen* “re-in-deal→reorganize”, *mit-ein-steigen* “with-in-step→get on together”, etc. Haider (2010) accounts for the peculiar behavior of DSP verbs by a “catch-22 situation”, i.e. both prefixes have stranding requirement, which cannot be satisfied simultaneously. However, the empirical facts are more complicated, for there are also mobile DSP verbs, such as *hin-ein-gehen* “thither-in-go” and *vor-an-bringen* “fore-on-bring→promote, advance” (14) (deTenTen).

- (14) a. Ich *ging* in das Schiff *hin-ein* und schloß die Tür.
 I went in the ship thither-in and shut the door
 “I went in the ship and shut the door.”
- b. Saturn im günstigen Winkel zu Pluto *bringt* viele Dinge langsam aber sicher *vor-an*.
 Saturn in favorable angel to Pluto brings many things slowly but surely fore-on
 “Saturn, in favorable angel to Pluto, slowly but surely advances many things.”

One may notice that type (13) and type (14) verbs have different segmentation (15).

- (15) a. [vor-[an-[melden]]], [um-[ein-[steigen]]], [mit-[ein-[steigen]]]
 b. [[hin-ein-][gehen]], [[vor-an-][bringen]]

But this is not the determining factor for the immobility of DSP verbs, either. For example, *mit-ein-be-ziehen* “with-in-BE-pull→incorporate” is bracketed on a par with (13) yet perfectly mobile, as in (16) (deTenTen).

- (16) a. [mit-[ein-[be-[ziehen]]]
 b. Alle relevanten Social-Media-Kanäle für Unternehmen *beziehen* wir hier *mit-ein*.
 all relevant social-media-channels for business BE-pull we here with-in
 “Here we incorporate all the relevant social media channels for business.”

2.1.3 Hungarian

Like in German, many verbal prefixes in Hungarian have adpositional source, though Hungarian verbal prefixes and adpositions are not always homophonous, e.g. the six oldest verbal prefixes are all reduced lative postpositions (17) (# = obsolete) (Pátrovics 2002).

- | | | | | |
|------|-----------------|------------------------|-----------------------|-------------------------|
| (17) | Prefix | Postposition | Prefix | Postposition |
| | <i>be</i> “in” | <i>belé</i> “inward” | <i>le</i> “down” | <i>#levé</i> “downward” |
| | <i>ki</i> “out” | <i>#kivé</i> “outward” | <i>el</i> (bleached) | <i>elé</i> “forward” |
| | <i>fel</i> “up” | <i>felé</i> “upward” | <i>meg</i> (bleached) | <i>megé</i> “backward” |

Younger adpositional prefixes still keep their inflectional endings (all in 3SG), as in (18a). Besides, some prefixes consist of a nominal plus a case marker (18b) or simply an inflected case marker (18c), and there are also purely adverbial prefixes (18d). It is not clear whether the inflections are real or remnant, though, as they are fixed in the prefixes and never change.

- (18) a. *alá* “beneath.LAT.3SG”, *melé* “beside.LAT.3SG”, *utána* “after.3SG”
 b. *agy-on* “brain-SUPE→to death”, *egy-be* “one-INE”, *elő-re* “front-SUBL→in advance”
 c. *hozzá* “ALL.3SG”, *neki* “DAT.3SG”, *rajta* “SUPE.3SG”, *rá* “SUBL.3SG”
 d. *haza* “(to) home”, *külön* “separately”, *össze* “together”, *szét* “apart”, etc.

Syntactically, all prefixed verbs in Hungarian are separable. They are stranded in non-neutral finite clauses (19a), can be topicalized (19b), and can appear alone in ellipsis (19c). These are evidence that Hungarian verbal prefixes do not form an X^0 with the base verb (É. Kiss 2002).

- (19) a. János **tegnap** *olvasta fel* a verseit. (É. Kiss 2002, p. 56)
 John yesterday read up his poems
 “John read out his poems **yesterday** (not today).”
 b. János *fel szeretné olvasni* a verseit.
 John up would love to read his poems
 “John would love to read out his poems.”
 c. – *Fel-olvasta* János a verseit? – Fel.
 up-read John his poems up
 “–Did John read out his poems? –He did.” (ibid. p. 57–59)

Semantically, Hungarian prefixed verbs can have transparent or idiomatic meaning (20a), and just like in German, many actually have both (20b).

- (20) a. Transparent Idiomatic
be-megy “in-go” *be-rúg* “in-kick→get drunk”
ki-fut “out-run” *ki-borul* “out-cloud→be psyched out”
le-üt “down-sit” *le-mond* “down-say→renounce, resign”
el-küld “away-send” *el-ad* “away-give→sell”
 b. Prefixed verb Transparent Idiomatic
be-vezet “in-lead” “take in, usher in” “introduce”
ki-ad “out-give” “give out, hand out” “surrender; publish”
le-néz “down-look” “look downward” “contempt”
el-néz “away-look” “look away” “excuse; overlook”

Besides, the Hungarian data also support the dissociation of semantic abstractness and idiomaticity. Sometimes the prefix assumes fixed abstract meaning, but the global meaning of the complex verb is still compositional, with little or no metaphorical shift (21).

- (21) Abstract Composition Meaning
be-jár “in” + “travel” “travel all over”
be-ken “in” + “spread” “spread all over”
ki-pihen “out” + “rest” “completely rest”
ki-fárad “out” + “get tired” “get completely tired”
fel-ismer “up” + “know” “recognize, realize”
fel-búg “up” + “sound” “(begin to) sound”
el-játszik “away” + “play” “play for a long (delimitated) time”
el-beszélget “away” + “chat” “chat for a long (delimitated) time”
meg-csinál PFV + “do” “do (and finish)”
meg-ír PFV + “write” “write (and finish)”

Theoretically, Hungarian verbal prefixes have been tied with lexical/situation aspect (or Aktionsart), e.g. *be* with total coverage, *ki* with exhaustion, *fel* with inchoation, *el* with temporal delimitation, *meg* with perfectivization, etc. (É. Kiss 2010; Kiefer 1997, 2010). However, these are somehow different from the more familiar Aktionsarten (qua event types, Vendler 1957). Admittedly, the complex verbs in (21) can also be classified into a Vendlerian event type, e.g. *bejár* “travel all over” is Accomplishment, but verbal prefixes do more than this. In fact, temporal aspect denotation is not even their main function, but more like a “side effect”. For instance, the base verb *ken* “spread, smear” can take a whole series of prefixes, all of which create an Accomplishment, but each prefix also has a specific fixed meaning, as in (22).

(22) Prefixed verb	Meaning
<i>be-ken</i> “in-spread”	“evenly spread all over”
<i>rá-ken</i> “unto-spread”	“thinly spread (and let stay)”
<i>szét-ken</i> “apart-spread”	“spread over”
<i>meg-ken</i> “PFV-spread”	“complete spreading, plaster”
<i>ki-ken</i> “out-spread”	“(emphasizing result) spread, grease”
<i>össze-ken</i> “together-spread”	“smear (to make dirty)”
<i>el-ken</i> “away-spread”	“evenly spread (with spreading material as object)”
<i>fel-ken</i> “up-spread”	“spread sth. onto, anoint”

Such modification is common at phrasal level, but that it can also be applied to the word level is interesting. First, the categorial status of verbal prefixes is not clear. They seem to lie somewhere between lexical and functional categories. Second, whatever their semantic contribution, all verbal prefixes behave alike in syntax. Thus, there should ideally be some common syntactic mechanism lying behind.

Finally, verbal prefixes are only a subset of the verb modifiers (VM, É. Kiss 2002) in Hungarian; others include bare nominals (NOM or ACC) (23a), adpositional phrases (location, goal or source) (23b), bare infinitives (23c), etc. Non-prefixal VMs are also stranded in non-neutral finite clauses (24a) and can also be topicalized (24b).

- (23) a. Mari *ebédet főz.* (bare nominal)
 Mary lunch cooks
 “Mary cooks lunch.”
- b. János *piacra ment.* (goal)
 John to market went
 “John went to the market.”
- c. János *úszni fog.* (bare infinitive)
 John swim.Lsmcpinf will
 “John will swim.”
- (24) a. Mari **a kedvünkért** főz *ebédet.*
 Mary for our sake cooks lunch
 “It is for our sake that Mary cooks lunch.”
- b. *Ebédet Mari főzött,* vacsorát pedig **Péter.**
 lunch Mary cooked dinner but Peter
 “Lunch was cooked by Mary, supper by Peter.” (É. Kiss 2002, pp. 67–68)

Nevertheless, it seems verbal prefixes and other VMs do have systematic differences. Syntactically, non-prefixal VMs cannot constituent elliptic sentences on their own (25) (compare 19c), which suggests they lack the sort of chain relation prefixes have with the base verbs.

- (25) – *Ebédet főzött* Mari? – **Ebédet*.
 lunch cooked Mary lunch
 Intended: “–Did Mary cook lunch? –She did.”

Semantically, verbal prefixes but not other VMs are lexicalized as part of the dictionary verb and frequently assume idiomatic meaning (26).

(26)	VM-V	Dict entry?	Meaning
	<i>be-megy</i> “in-go”	Y	Transparent
	<i>be-rúg</i> “in-kick→get drunk”	Y	Idiomatic
	<i>ebédet főz</i> “cook lunch”	N	Transparent
	<i>piacra megy</i> “go to the market”	N	Transparent

As such, verbal prefixes do have some special status among other VMs in Hungarian.

2.1.4 Interim Summary

Phrasal verbs in English and (separable) prefixed verbs in German and Hungarian are also called “particle verbs” or “verb particle constructions”. This denomination descriptively distinguishes complex verbs into two levels—word-internal (prefix) and word-external (particle)—with separability as the main dividing line. However, such a standard does not always hold cross-linguistically, especially when we consider the semantics of the “verbal particles”.

First, verbal prefixes of the same semantic class can be separable (“particle”) in one language but inseparable (“prefix”) in another. For example, German separable and inseparable prefixes respectively have inseparable and separable counterparts in Russian and Hungarian, despite the obvious semantic similarity, e.g. GER *auf-* (sep.) vs. RUS *na-* (insep.) “upon”, GER *ver-* (insep.) vs. HUN *meg-* (sep.) “PFV”. Second, complex verbs of the same semantic class may assume a single structural type in one language but not so in another. For example, the semantic counterparts of German and Hungarian particle verbs in English can be either phrasal or prefixed verbs (Type III), as in (27).

(27)	German	Hungarian	English
	<i>auf-stehen</i>	<i>fel-kel</i>	<i>stand up</i>
	<i>über-nehmen</i>	<i>át-vesz</i>	<i>take over</i>
	<i>hoch-laden</i>	<i>fel-tölt</i>	<i>up-load</i>
	<i>unter-streichen</i>	<i>alá-húz</i>	<i>under-score</i>

This is not simply a VO/OV difference, as words like *upload* are recently coined, well after English became a VO language. Besides, Modern Hungarian is a VO language as well (É. Kiss 2002). Hence, there seems to be some more general mechanism for prefixed verb formation in typologically different languages.

2.2 Compound verbs

2.2.1 Chinese

Chinese compound verbs systematically consist of two monosyllabic morphemes, which can assume various internal relation, as in Table 2. The same relations also hold on phrasal level (word structure–phrase structure isomorphism, Zhu 1982).

Structuring	Compound verb	Canonical phrase
Subject-Pred ⁸	<i>di-zhen</i> “earth-quake”	<i>di zai zhen</i> “earth is quaking”
Modifier-Head	<i>man-pao</i> “slowly-run”	<i>manman pao</i> “slowly-slowly run”
Coordination	<i>yue-du</i> “read-read”	<i>ting shuo du xie</i> “listen speak read write”
Pred-Comp	<i>ti-gao</i> “raise-high”	<i>xi ganjing</i> “wash clean”
Verb-Object	<i>chi-fan</i> “eat-meal”	<i>chi pingguo</i> “eat apple”
Serial Verbs	<i>feng-cun</i> “seal-store”	<i>qichuang shangxue</i> “get-up go-to-school”
Bi-functional ⁹	<i>bi-gong</i> “force-confess”	<i>bi ren zhaogong</i> “force people admit-confess”

Table 2: Traditional classification of Chinese compound verbs (cf. Zhang 2002)

The above classification involves three macro-types (28).

- (28) a. Verb & Argument: Subject-Predicate, Predicate-Object
 b. Verb & Adjunct: Modifier-Head
 c. Serial Verbs:
 i. Coordination: Coordination (no temporal order), Serial Verbs (temporal order)
 ii. Subordination: Predicate-Complement (resultative, directional), Bi-functional

(28) reveals two general facts about Chinese compound verbs. First, a predicate can form a compound verb with a wide range of clausal constituents. This indicates that syntax does not lay much restriction on complex verb formation. In fact, many compound verbs can be regarded as the direct condensation of larger constituents (29-34).

- (29) a. [*Di* [*zai* [*zhen*]]]. (S-V)
 earth ASP quake
 “The earth is quaking.”
 b. [*di-zhen*] “earth-quake”
- (30) a. *Wo meitiandou yanzhe hebian* [*man-man-de* [*pao yihuir*]]. (Adjunct-V)
 I everyday along river-side slow-slow-ADV run a while
 “I jog along the river for a while everyday.”
 b. [*man-pao*] “slowly-run”
- (31) a. [*Wo ti le ta yixia*, [*ta bian gao le*]]. (resultative)
 I raise ASP it one-CL it become high ASP
 “I gave it a raise, and (as a result) it became high(er).”
 b. [*ti-gao*] “raise-high”

⁸This is the traditional denomination, but the “subject” may actually be a topic. The main point is that it is externally rather than internally merged.

⁹A special type of serial verb construction, with the logical subject of V2 being the logical object of V1.

- (32) a. Wo *chi* le san-wan *fan*. (V-O)
 I eat ASP three-CL rice
 “I ate three bowls of rice.”
 b. *chi-fan* “eat-meal”
- (33) a. Wo ba shiwu [*feng-qilai*] [*cun-hao*]. (serial verbs)
 I BA food seal-up store-good
 “I seal up the food and store it well.”
 b. [*feng*]-[*cun*] “seal-store”
- (34) a. Jingcha [*bi fanren_i* [*t_i* [*gong-chu le shiqing*]]]. (bi-functional)
 police force criminal confess-out ASP truth
 “The police extorted a confession from the criminal.”
 b. [*bi*-[*gong*]] “force-confess”

The above bracketing clearly shows that structural configuration is preserved in the condensation from clause to complex verb. Furthermore, what is preserved seems to be the base-generated configuration. If we try to change it, the resulting complex verb becomes unacceptable. For example, in (35) the object *fan* “meal” is topicalized. While the clause in (35a) is well-formed, the complex verb in (35b) is not.

- (35) a. [_{TOP} *Fan_i* [wo [_{VP} *chi t_i le*]]]. (topicalized object)
 meal I eat ASP
 “Meal, I have eaten.”
 b. * [*fan_i*-[*chi t_i*]] “meal-eat”

In sum, there may be such a restriction on compound verb formation in Chinese as in (36).

- (36) **No Additional Manipulation:** Chinese compound verbs can be formed via the direct condensation of a larger phrase with the original (base-generated) structural configuration preserved and with no additional manipulation (displacement).

Second, the English, German, and Hungarian complex verbs mainly correspond to two subtypes of compound verbs in Chinese, i.e. Adjunct-V and V-Comp, as in (37). This is another evidence that complex verbs of the same semantic class may have different structural distribution in different languages.

- | | | | | |
|------|----------------------------|-----------------------|-----------------------|-------------------|
| (37) | Chinese | English | German | Hungarian |
| | <i>xia-zai</i> (Adjunct-V) | <i>down-load</i> | <i>herunter-laden</i> | <i>le-tölt</i> |
| | <i>di-gu</i> (Adjunct-V) | <i>under-estimate</i> | <i>unter-schätzen</i> | <i>alá-becsül</i> |
| | <i>chi-wan</i> (V-Comp) | <i>eat up</i> | <i>auf-essen</i> | <i>meg-eszi</i> |
| | <i>xiang-chu</i> (V-Comp) | <i>think out</i> | <i>aus-denken</i> | <i>ki-gondol</i> |

A closer comparison of the four languages reveals two points. First, while Chinese V-Comp (mainly resultative and directional) verbs generally have complex verb counterparts in the other three languages, it is often difficult to find counterparts for Adjunct-V compounds, e.g. *hen-da* “ruthlessly-hit”, *tong-ku* “painfully-cry”, *jian-mai* “cheaply-sell”, etc. Second, the selection restriction between the component morphemes is much weaker in Chinese. For example, *bian* “all over” can be used in a large number of Adjunct-V compounds in Chinese (38a), whereas its Hungarian counterpart *be* can only form a few complex verbs (38b).

- (38) a. *bian-xun* “search all over”, *bian-fang* “travel all over”, *bian-lan* “appreciate all over”,
bian-wen “ask all over”, *bian-mai* “buy all over”, *bian-mo* “spread all over”, etc.
 b. *be-jár* “travel all over”, *be-ken* “spread all over”

Like in the other languages, there also exist some (semi-)grammaticalized compound verb building elements in Chinese, a systematic group of which are the “event phasal” complements (EPC) (Chao 1968). These are originally resultative complements and have now developed aspectual (Aktionsart) meanings (Shi 2003), as in (39).

(39)	EPC	Literal	Functional	Example
	<i>wan</i>	“finish”	PFV	<i>xie-wan</i> “write up”
	<i>shang</i>	“ascend, up”	total consumption	<i>chi-shang</i> “eat up”
			INCH	<i>yong-shang</i> “(finally) gain the chance to use”
	<i>zhe</i>	“touch”	PFV	<i>dong-zhe</i> “get frozen (and sick)”
	<i>guo</i>	“pass”	PFV (success)	<i>bei-guo</i> “manage to memorize”
	<i>jian</i>	“see”	PFV	<i>zhao-jian</i> “(search and)find”

Semantically, Chinese compound verbs are seldom idiomatic. That is, idiomatic complex verbs like ENG *give in*, GER *ein-laden* “in-load→invite”, HUN *el-ad* “away-give→sell” are very few in Chinese; morphemes with the exact literal meaning are used instead, e.g. *tou-xiang* “throw-surrender”, *yao-qing* “invite-invite”, *shou-mai* “retail-sell”, etc. In short, word-phrase isomorphism, high productivity, and non-idiomatic composition all support the view that Chinese compound verbs are formed in syntax.

As for separability, only two subtypes of Chinese compound verbs are systematically separable, i.e. V-Comp and V-O. The former (e.g. *chi-wan* “eat-finish”) can be separated in the *de/bu* “get/not→can/cannot” potential constructions (40a), and the latter (e.g. *chi-fan* “eat-meal”) can be separated by various elements (40b).

- (40) a. San-wan fan wo *chi* de/bu wan.
 three-CL rice I eat can/cannot finish
 “Three bowl of rice, I can/cannot eat up.”
 b. Ta qing wo *chi* le dun fan.
 he invite me eat ASP CL meal
 “He treated me to a meal.”

Nevertheless, it is not clear if such separability is real (as in German and Hungarian). After all, given that most compounding components in Chinese are free-standing morphemes, it may well be the case that the same morphemes are directly used in different contexts.

So far I have left out one type of compound verbs, i.e. coordination with no temporal order (“pure coordination”, Song 2015), such as *yong-bao* “embrace-hug”, *qiao-da* “knock-hit→warn”, *ti-ba* “raise-pluck→promote”, etc. The component parts are mostly synonymous and together contribute their core meaning. Compared with other Chinese complex verbs, this type is more often idiomatic. We can further divide the pure coordination compounds into two subtypes, one with fixed ordering (41a), the other with flexible ordering (41b).¹⁰

- (41) a. Fixed: *yong-bao* “hug”, *qiao-da* “knock-hit”, *ti-ba* “raise-pluck”

¹⁰However, a quick online search reveals that verbs in (41a) are not totally fixed either, but only have a predominant order. For native speakers (p.c.) the ordering of pure coordination compounds is more flexible in poems and lyrics than in spoken language.

- b. Flexible: *dai-ti/ti-dai* “replace-replace”, *ji-du/du-ji* “envy-envy”, *yan-jiang/jiang-yan* “perform-speak/speak-perform → deliver a speech”

2.2.2 Japanese

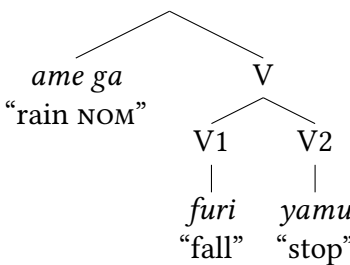
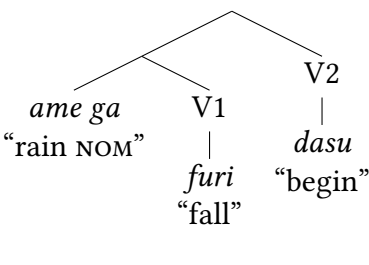
The most often discussed Japanese compound verbs are V-V compounds, where V1 is in its combining form¹¹, and V2 carries clausal inflection, as in (42)¹².

- (42) a. V1 + V2 =Compound verb (LCV)
osu “push” → *oshi* *akeru* “open (vt.)” *oshi-akeru* “push-open”
aruku “walk” → *aruki* *tsukareru* “get tired” *aruki-tsukareru* “walk-get tired”
kiku “listen” → *kiki* *komu* “enter” *kiki-komu* “listen carefully”
arau “wash” → *arai* *ageru* “raise” *arai-ageru* “wash up (ready)”
- b. *oshi-akeru* (PRES), *oshi-aketa* (PST), *oshi-akenai* (NEG), *oshi-aketara* (COND)

The above examples are all “lexical compound verbs” (LCVs), which are in contrast with “syntactic compound verbs” (SCVs) (Kageyama 1993). SCVs are also formed by the combining form of V1 plus an inflected V2, but they are much more productive (43).

- (43) a. V1 + V2 =Compound verb (SCV)
taberu “eat” → *tabe* *hajimeru* “begin” *tabe-hajimeru* “begin to eat”
taberu *owaru* “finish” *tabe-owaru* “finish eating”
taberu *tsuzukeru* “continue” *tabe-tsuzukeru* “continue eating”
taberu *nokosu* “leave (behind)” *tabe-nokosu* “leave partially eaten”
taberu *sugiru* “pass (over)” *tabe-sugiru* “eat too much”
- b. *tabe-hajimeru* (PRES), *tabe-hajimeta* (PST), *tabe-hajimenai* (NEG), *tabe-hajimetara* (COND)

Semantically, V2 in both LCV and SCV can be substantial or abstract, but generally speaking only LCV can be idiomatic. If we take Voice (Kratzer 1996) to be the boundary between compositional and (semi-)idiomatic meaning (Harley 2014), this could mean that LCVs are formed below Voice, and SCVs above it. Indeed, two different structures have been proposed for LCV and SCV, as in (44) (adapted from Kageyama 2016, p. 281).

- (44) a. 
- b. 

SCVs are accessible to phrasal operations that may separate V1 and V2, whereas LCVs are not, as in honorification (45) and “do so” substitution (46). Besides, SCV but not LCV can have a *suru* “do” verb (involving an overt verbalizer) as V1 (47) (Kageyama 2016, p. 278).

- (45) Honorification:

¹¹*Renyoukei*, lit. “predicate-combining form”. There are debates concerning its exact identity and function. Some treat it as an infinitive marker, others treat it as phonological epenthesis (cf. Nishiyama 2016).

¹²Source: “Compound Verb Lexicon” Online Database (<http://vlexicon.ninjal.ac.jp/en/>).

- a. *utai-hajimeru* “sing-begin” → *o-utai-ni-nari-hajimeru* “sing.HON-begin” (SCV)
 b. *uke-toru* “get-take→receive” → **o-uke-ni-nari-toru* (LCV)
- (46) “Do so” substitution:
 a. *kaki-oeru* “write-finish” → *soo shi-oeru* “do so-finish” (SCV)
 b. *naki-sakebu* “cry-scream” → **soo shi-sakebu* “do so-scream” (LCV)
- (47) *Suru* V1:
 a. *benkyoo-shi-hajimeru* “study-DO-begin” (SCV)
 b. **gekitotsu-shi-taosu* “clash-DO-topple” vs. *tsuki-taosu* “thrust-topple” (LCV)

In order to maintain the (morphological) wordhood of SCV, previous studies have assumed various additional operations (cf. Kageyama 2016). I leave out the details and only cite the main conclusion that SCVs are larger syntactic chunks than LCVs despite their surface similarity. Given this division, it has been argued that SCVs are formed in syntax and LCVs in the Lexicon. There have recently been syntactic analyses for LCVs as well. For example, Akimoto (2014) (within DM) reduces the morphosyntactic and semantic distinction between SCV and LCV to one of compounding level. He distinguishes LCV and SCV by directly merging two Roots (R1-R2) for the former and merging R2 with a categorized V1 for the latter. Nishiyama and Ogawa (2014), on the other hand, differentiate three subtypes for LCV. Subtype I corresponds to Matsumoto’s (1996) “adverbial” compound, where V2 modifies V1 like an adverb (48) (cf. Takebe 1953).

- (48) *kiki-nagasu* “hear-let flow→listen and forget” *yomi-kiru* “read-cut→finish reading”
moe-sakaru “burn-reach a peak→burn briskly” *kaki-morasu* “write-let leak→leave out”
akire-kaeru “be shocked-return→totally shocked” *shikari-tsukeru* “scold-attach→scold harshly”
chidimi-agaru “shrink-rise→shrink intensively” *kaki-naguru* “write-hit→write quickly”

Here the V2 items contribute Aktionsart meanings similar to those expressed by verbal prefixes in Hungarian. Nishiyama and Ogawa (2014) derive them by merging V1 with an auxiliary V2 (before merging with *v*). Subtype II LCVs consist of two literal components (49). The authors derive them by directly merging two verbal Roots¹³.

- (49) *arai-otosu* “wash-let drop→wash off” *naki-sakebu* “cry-scream→cry and scream”
furi-mazeru “shake-mix→shake up” *asobi-tsukareru* “play-get tired→play and get tired”
oshi-taosu “push-topple→push down” *uke-toru* “receive-take→receive, accept”
nakuri-korosu “hit-kill→hit dead” *kachi-agaru* “win-rise→win and proceed”
oshi-akeru “push-open (vt.)→push open” *koi-shitau* “love-adore→love and adore”

Subtype III are what the authors call “spatio-temporal” compounds (henceforth STC), which involve a spatial or temporal V2 (literal or aspectual) (50).

- (50) *mochi-aruku* “hold-walk→carry around” *tabe-aruku* “eat-walk→eat all over”
fuityooshi-aruku “boast-walk→boast around” *oki-saru* “put-leave→abandon”
mochi-saru “hold-leave→take away” *wasure-saru* “forget-leave→completely forget”
tobi-oriru “jump-descend→jump down” *naki-akasu* “cry-spend the night→cry all night”

Nishiyama and Ogawa (2014) argue that these verbs have Head-Complement instead of Head-Head structure (contra Kageyama 1993). Leaving out the technical details, their conclusion

¹³It is not exactly clear what the authors’ conception of Root is. On one hand, they mention the DM hypothesis that Roots are uncategorized. On the other hand, they let Root take categorized complement and project an “extended projection” (both of which need a category). Here I only follow their intuition on the Japanese data.

is that STCs are somewhere between LCVs and SCVs. To summarize Akimoto (2014) and Nishiyama and Ogawa (2014), the difference between Japanese SCV and LCV can be reformulated as one of complement size (e.g. Root, V, VP). That is, both can be derived in syntax.

Finally, there are two lesser discussed types of compound verb in Japanese. One involves a main verb (V2) and a “prefix” (V1) (Kageyama 1993), as in (51). The prefixes are a closed group, verbal in origin, and completely bleached. They are mainly used to strengthen the verbal event expressed in V2, sometimes with phonological assimilation (e.g. gemination, nasalization) and global idiomaticity (cf. Liu 2012).

(51) Verbal prefix	Example
<i>sashi</i> “put”	<i>sashi-semaru</i> “SASHI-come close → be imminent” <i>sashi-dasu</i> “SASHI-give out → present, submit, preoffer”
<i>tori</i> “take”	<i>tori/tott-tsuku</i> “TORI-attach → cling to, be obsessed” <i>tori-tsukurou</i> “TORI-repair → repair, smooth over”
<i>hiki</i> “pull”	<i>hiki-tomeru</i> “HIKI-stop → detain, restrain” <i>hin-mageru</i> “HIKI-bend → bend, distort”
<i>buchi</i> “hit”	<i>buchi-makeru</i> “BUCHI-lose, give in → spill one’s guts” <i>butt-taosu</i> “BUCHI-topple → violently topple”

The other lesser mentioned type(s) are the non-V-V compound verbs, as in (52). They are usually of the form X-V, where X is a noun or an adjective/adverb, and V is the main verb. There is often phonological assimilation as well, such as initial voicing in V, e.g. *tsuku* → *zuku*, *sameru* → *zameru* (cf. Leng 2010; Liu 2013).

(52) N-V	ADJ/ADV-V
<i>iro-zuku</i> “color-attach (vi.) → change color”	<i>chika-zuku</i> “near-attach (vi.) → get near”
<i>na-zukeru</i> “name-attach (vt.) → give a name”	<i>waka-gaeru</i> “young-return → rejuvenate”
<i>se-ou</i> “back-carry → carry on back”	<i>bedo-tsuku</i> “sticky-attach (vi.) → get sticky”

In fact, if we add in the correspondent case particles, N-V compounds generally become well-formed phrases, e.g. *iro-ga tsuku* “color-NOM attach (vi.)”, *na-o tsukeru* “name-ACC attach (vt.)”, *se-ni ou* “back-OBL carry”. This is reminiscent of the compound verb formation mechanism used in Chinese, i.e. direct condensation of a larger constituent.

2.3 Summary: A cross-linguistic comparison

To sum up, Chinese and Japanese compound verbs have three common characteristics: *i*) they both have three macro-types of compound verb, i.e. V-Argument, V-Adjunct, and V-V; *ii*) they both abound in serial-compounds; *iii*) they both have compound-internal aspectual auxiliaries. Following is a comparison of Chinese, Japanese (henceforth CJ) and English, German, Hungarian (henceforth EGH) in these respects.

To begin with, CJ and EGH differ in their predominant complex verb types (V-V and prefixed/phrasal verbs). Meanwhile, there are two lines of similarity shared by CJ and EGH complex verbs. First, they all have different levels of internal cohesion, which is reflected in surface separability. Separability is not surprising in a single-engine framework like ours; instead, what needs explanation is inseparability. If words and phrases are all generated in syntax, what gives rise to the inseparable compound verbs? Second, although CJ and EGH

have different complex verb building materials (adpositional, adverbial, verbal), they all converge in the possibility of Aktionsart meaning expression. This seems to suggest that cross-linguistically there are certain intrinsic properties of event that tend to be fixed in morphology. When the fixation achieves such a degree that a morpheme becomes a dedicated marker, it is conceivable that some category F may be established (e.g. Aux in Nishiyama and Ogawa 2014). F (if existent) is different from Asp (inner or outer) because *a*) Asp is defined in the temporal dimension whereas F has non-temporal flavors, and *b*) Asp is an inflectional category with only a few exponent items, whereas F is very much lexical and involves many more items. These two lines of cross-linguistic similarity in complex verb formation, i.e. varying cohesion level and Aktionsart marking, will be the bases for the theory to be developed in Section 3.

3 Theoretical Framework

In this section, I will lay out the theoretical assumptions and proposals of this report. I will first revisit the notion of Aktionsart and identify it as an extended projection of the verbalizer (3.1), then review a recent theory of adjunction based on Chomsky’s (2013) Labeling Algorithm (3.2), and finally make a proposal on trans-workspace derivation (3.3).

3.1 Revisiting Aktionsart

In the copious literature on Aktionsart (German: “kind of action”, Comrie 1976, p. 6), it is always equated with lexical or situation aspect. For instance, Smith (1991, p. 1) uses the term for “temporal properties of situations or situation types”, and Travis (2010, p. 1) states “situation aspect refers to Aktionsart or aspectual verb classes”. Indeed, studies of Aktionsarten have mostly focused on how to get them, e.g. lexicalist approaches encode them as part of the lexical verb (qua event types, Vendler 1957, *et seq.*), while constructionist approaches derive them from syntactic configuration (e.g. Ramchand 2008). Yet in these different approaches the notion of Aktionsart remains the same, i.e. as the temporal organization of event situation. Such consistency is also reflected in works coining numerous new Aktionsarten (cf. É. Kiss 2010 for Hungarian and Kageyama 2016 for Japanese), since these authors tend to define their research topic as “morphological Aktionsart” and classify their new Aktionsarten into one of the four Vendlerian types (State, Activity, Accomplishment, Achievement).

The standard definition of Aktionsart as a type of aspect (which in turn is defined as the temporal classification or perspectivization of event¹⁴) is well understandable because time is a most important domain in human language. However, as our data in Section 2 reveal, what tends to be fixed in the “morphological Aktionsarten” is more than temporal information. For example, among the eight Hungarian verbal prefixes combining with the verb *ken* “spread, smear” in (22) (repeated in 53), only *meg* fixes nothing but temporal information¹⁵.

¹⁴The two terms are borrowed from Wiltschko (2014).

¹⁵Here I am referring to fixed abstract rather than literal information, e.g. TOTAL for *be* “into”.

(53)	Hungarian prefixed verb	Meaning
	<i>be-ken</i> “in-spread”	“evenly spread all over”
	<i>rá-ken</i> “unto-spread”	“thinly spread (and let stay)”
	<i>szét-ken</i> “apart-spread”	“spread over”
	<i>meg-ken</i> “PFV-spread”	“complete spreading, plaster”
	<i>ki-ken</i> “out-spread”	“(emphasizing result) spread, grease”
	<i>össze-ken</i> “together-spread”	“smear (to make dirty)”
	<i>el-ken</i> “away-spread”	“evenly spread (with spreading material as object)”
	<i>fel-ken</i> “up-spread”	“spread sth. onto, anoint”

Similarly, Kageyama (2016, p. 297) lists eleven Aktionsarten for Japanese compound verbs, among which quite a few do not concern time, as in(54).

(54)	Japanese Aktionsart ¹⁶	Example
	Completive	<i>kaki-ageru</i> “write-raise→finish writing”
	Incompletive	<i>ii-sasu</i> “speak-stop→stop speaking halfway”
	Intensive result	<i>ne-komu</i> “sleep-enter→fall sound asleep”
	Inception	<i>saki-someru</i> “bloom-commence→begin to bloom”
	Continuative	<i>naki-kurase</i> “cry-live→cry all day”
	Iterative	<i>tate-kaeru</i> “build-return→rebuild”
	Intensive action	<i>home-chigiru</i> “praise-tear to pieces→highly praise”
	Ineffective	<i>kiki-chigau</i> “hear-be wrong→hear wrongly”
	Reciprocal	<i>i-awaseru</i> “be-combine→happen to be at the same place”
	Spatial	<i>naguri-kakaru</i> “hit-hang→hit at”
	Social	<i>mooshi-ageru</i> “say-raise→say to a respectable person”

Although these authors do not explicitly tell, their classifications already involve certain deviation from the standard definition of Aktionsart, as not only temporal, but also non-temporal event properties are included. Actually, if we subscribe to Ramchand’s (2008) reformulation, we can even exclude the Vendlerian properties altogether from lexical information, as they can be syntactically derived. Thus, if we are to give “Aktionsart” an irreducible definition, we should focus on its unique contribution. In the current framework, I treat Aktionsart as a semantic property of word-building morphology and redefine it as follows:

- (55) **Aktionsart (redefined):** lexically fixed abstract extension or modification to intrinsic properties of event situations (mainly used to form complex verbs).

In the following I will further distinguish Aktionsart meaning ([AKT]), Aktionsart meaning bearing morpheme in general ([AKT]-item), Aktionsart meaning bearing morpheme that needs extra licensing (Akt-item), and the functional head that realizes this licensing (Akt). But before the details, let me first specify the differences between situation aspect and Aktionsart:

- (56) a. Situation aspect is decomposable; Aktionsart is not;
 b. Situation aspect is formed in the entire VoiceP; Aktionsart only in the lexical verb;
 c. Situation aspect is temporal; Aktionsart can but does not have to be temporal.

Given these differences, Vendlerian event types are situation aspects, as they are decomposable, temporal, and scope over the entire VoiceP. They may interact with Aktionsarten, but the part of the lexical verb participating in situation aspect calculation is not necessarily the Ak-

¹⁶Some Aktionsarten listed here are quite literal, e.g. INCEPTION *someru* “commence” and INEFFECTIVE *chigau* “be wrong”. Kageyama’s (2016) main point is that these V2 items are used to modify V1.

tionsart bearing part, e.g. JAP *home-chigiru* “praise-INTENSIVE” is an Activity, but this property comes from the base verb *home* “praise” instead of the Aktionsart morpheme *chigiru*.

Two caveats need to be mentioned here. First, although Aktionsart can be used to form complex verbs, not all complex verbs contain Aktionsart, because complex verbs have other types as well. Second, the distinction between Aktionsart and (situation) aspect is more of a structural one; semantically they may overlap. For example, telicity can be expressed by a quantified object (e.g. ENG *eat three apples*), a resultative item (e.g. ENG *eat up*), or an Aktionsart morpheme (e.g. HUN *meg-eszi* “PFV-eat”). In the first two cases PFV is structurally encoded as situation aspect, whereas in the third case it is lexically encoded as Aktionsart. As such, Aktionsart can be alternatively termed “word-internal (i.e. in the categorization domain¹⁷) lexical (i.e. non-inflectional¹⁸) aspect in multiple (i.e. not limited to temporal) dimensions”.

Aktionsart items are not inflectional morphemes but have their own meanings (literal, abstract, or both). In DM terms, they have their own Roots. This is reflected in that they are never fully productive, and that many of them can be used as independent lexical items of various categories. For example, many German and Hungarian verbal prefixes are also used as adpositions. Nevertheless, when these otherwise free-standing morphemes are used as Aktionsart items, they all “suppress” their original categories and serve as modifiers of the base verbs. Based on these properties of Aktionsart items, we can summarize two conditions for them to interact with syntax: *a*) they must have some pre-linked¹⁹ Aktionsart feature; *b*) there must be some syntactic mechanism that can turn lexical items into modifiers. How are these conditions met in a single-engine theory for word formation, without the aid of lexical rules?

Consider a simple event “eating”. It first of all has a conceptual core \sqrt{EAT} (Root), outside of which the meaning cannot be recognized as “eating”²⁰. However, the Root itself does not make an event; eventuality is introduced by the category defining feature [V], which is an *f*-morpheme *v* (verbalizer) in DM. Importantly, the Root by itself is not an eligible syntactic object (SO), as it “does not qualify as a label” (Chomsky 2013, p. 47). Marantz (2013, p. 157) treats Root as an event modifier adjoined to *v* (also see Harley 2005; Mateu 2002; McIntyre 2004). Thus, the center of the categorization domain is the categorizer instead of the Root, which nicely opens the door for the idea that *v* (in its local domain) heads a minimal and maximal projection made up of itself and its modifiers. Since these modifiers are adjuncts, they do not affect the proceeding of spine derivation.

The next question is how many modifiers a verbalizer can take. A first impression is that adjunction has no upper limit. A *v*P or VoiceP may take as many adjuncts as it likes, e.g. GER *in der Küche neben dem Tisch auf dem Boden unter einem Tuch fand er es* “in the kitchen besides the table on the floor under a cloth he found it” (Haumann 2007, p. 98). Nevertheless, for reasons to be discussed in Section 3.2, not all adjuncts can take part in spine derivation. In order to do so, they must be licensed into the main derivational “plane” (Chomsky’s 2004 term). At phrasal level, this usually needs no more than a Labeling Algorithm that can label {XP, YP} (e.g. Feature Sharing, Chomsky 2013). However, at the verbalizer level there is often only one category ([V]), so in order for FS to work the adjoined modifier must also have [V] as its most salient feature. But as we have seen, this is unlikely in many complex verbs, such

¹⁷I further split VoiceP into a categorization (word-building) domain and a classification (event-building) domain.

¹⁸This property differentiates Aktionsart from Travis’s (2010) Inner Aspect, which is an inflectional category.

¹⁹“Linking” in the sense that various features of a lexical item are interrelated (presumably via Root).

²⁰The exact content of Root concept is notoriously difficult to define (cf. Elbourne 2011, p. 1–5). I only assume that there should be such a core that links up the various extensional/intensional features of a concept.

as those with prepositional or adverbial prefixes.

I propose that the verbalizer can take two types of modifier on the spine. One is the verbal Root; the other is an Aktionsart item X of some category $[X]$, which, when used as a modifier, must somehow suppress its original category. DM offers a mechanism for this effect, i.e. it could simply be that the Aktionsart item is not categorized at all but merged as Root. But then the question becomes what licenses the Root and ties it to the base verb. I see two scenarios: i) the Root is licensed by another v (not necessarily the flavor canonically accompanying it); ii) it is licensed by a non- v categorizer. The first scenario gives us V-V complex verbs where one V is an auxiliary-like sister of the other, as in the case of Japanese “adverbial” LCVs. The second scenario gives us complex verbs with a base verb and a “non-verbal” modifier, such as a prepositional prefix. In either case there should involve a semantic categorial feature $[AKT]$ ²¹. (interpretable); the second scenario further needs an f -morpheme (call it Akt) to license X as a v modifier on the primary plane. \sqrt{X} is prelinked to a fixed $[AKT]$ value, e.g. $[AKT: TOTAL/EXHAUSTIVE]$. Thus, X has a feature bundle like $\{\Pi, \Sigma, [AKT]\}$, e.g. HUN *be* is $\{/b\epsilon/, \text{“into”}, [AKT: TOTAL]\}$. Akt , on the other hand, has a default feature bundle $\{[V], [AKT: __]\}$.

The possible values of $[AKT]$ are also the possible event properties that can be fixed. If we imagine an event as an entity taking up some space on the time axis, as in Figure 1, this entity should have three basic properties: shape, time (point or duration), and amplitude (or volume). These correspond to three dimensions of intrinsic event properties that can be modified: i) concept, ii) aspect, and iii) “strength”.

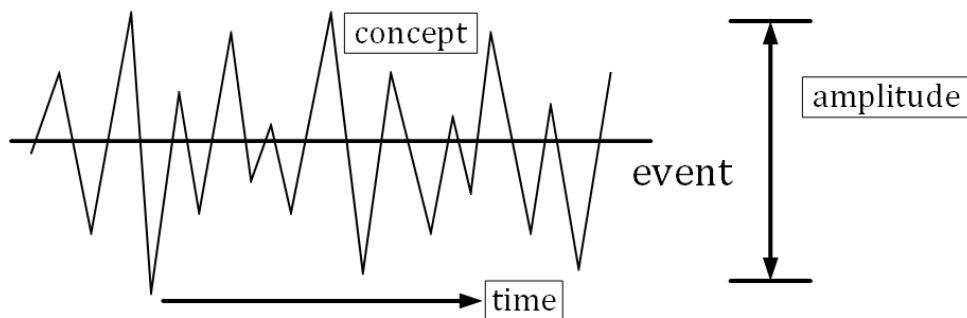


Figure 1: Three dimensions of modifiable event properties

The first dimension (concept) is simply Root modification. If we change the Root we change the event. The second dimension (time) is the one along which aspect is standardly defined. The third dimension (amplitude) concerns the “strength”, intensity, or (non-temporal) degree of an event. Note that the properties in Figure 1 are ontological ones, which can be instantiated by various means, such as $[AKT]$ -items and various situation aspect modifiers. The exact $[AKT]$ values are a language-specific issue. For instance, some of the Aktionsarten in Hungarian and Japanese are reclassified as follows (cf. É. Kiss 2010; Kageyama 2016; Kiefer 2010).

²¹I divide categorial features into syntactic ones and semantic ones. Syntactic categorial features are purely formal categories like $[V, N]$ (a very small group). Semantic categorial features are semantic distinctions fixed in language-specific ways, e.g. $[T, Asp, Prn, Num]$ (non-universal, cf. Wiltschko 2014)

(57) D2 (Time) COMPLETIVE/PFV (JAP <i>-ageru</i> ; HUN <i>meg-</i>) INCOMPLETIVE (JAP <i>-sasu</i>) INCEPTIVE/INCH (JAP <i>-someru</i> ; HUN <i>el-, fel-</i>) CONTINUATIVE (JAP <i>-kurasu</i>) ITERATIVE (JAP <i>-kaeru</i> ; HUN <i>-gAt, X-X-</i>) DELIMITATIVE (HUN <i>el-</i>)	D3 (Amplitude) INTENSIVE (JAP <i>-chigiru</i> ; HUN <i>agyon-</i>) TOTAL (HUN <i>be-</i>) EXHAUSTIVE (HUN <i>agyon-</i>) IMMERSIVE (HUN <i>be-</i>) SATURATIVE (HUN <i>ki-</i>) DIMINUTIVE (HUN <i>-gAt</i>)
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To recapitulate, in this subsection I have redefined Aktionsart as the lexical fixing of intrinsic event properties. Semantically, while situation aspect (and aspect more generally) only concerns the temporal dimension, Aktionsart concerns all the three dimensions of event properties (concept, time, amplitude). Formally, while aspect is often either inflectionally realized or not overtly realized at all, Aktionsart is always overtly and lexically realized as part of the complex verb. Aktionsart and complex verb formation are syntactically related by Akt and [AKT]. [AKT] is part of the feature bundle of [AKT]-items; Akt is a structural mediator that joins Akt-items as ν modifiers on the primary plane.

As described above, Akt-items are a subset of [AKT]-items; that is, [AKT] is not limited to [-V] materials, but can also be bundled in [+V] materials. The combination [+V, +AKT] appears in two places: ν -head and Akt-head. A [+AKT] ν head is a light-verb-like auxiliary as in Japanese “adverbial” LCVs; a [+V] Akt head is a “(semi-)grammaticalized”²² Akt-item, e.g. German inseparable prefixes. (Semi-)grammaticalized Akt-items have feature bundles like {II, [AKT], [V]}; that is, they do not need an extra Akt but can directly merge with ν and be labeled correctly. In fact, by comparing the feature bundle of the default Akt-head ({[V], [AKT:___]}) and that of a semi-grammaticalized Akt-head-item (e.g. *ver* {/fɛv/, [V], [AKT:PFV]}), we find that the latter is exactly the former plus a deficient Root (linked to {/fɛv/, [AKT:PFV]}). As such, we can conveniently say that semi-grammaticalized Akt-items are merged as Akt-heads, while non-grammaticalized ones are merged as specifiers of a null Akt operator. Finally, how can we distinguish Akt heads and auxiliary ν heads, given that they are both [+V, +AKT (valued)]? A possible answer lies in feature interpretability. Akt, as an extended projection of ν , has an uninterpretable [uV], whereas ν , as a verbalizer, has an interpretable [iV].

3.2 “Two-peaked” adjunction and binary Merge

In the last subsection I proposed that a single verbalizer can take two modifiers (a Root and an Akt-item) on the primary plane. In addition, it may also take a third one on another plane. Theoretically, this modifier (being a true adjunct) should have a wider range of candidate than Akt-items, as no [AKT] fixing is needed. This is born out in Chinese Adjunct-V compound verbs. For example, in (58), the adjunct modifier *tong* “painfully, bitterly, deeply” and the base verb *ku* “cry” can both freely combine with other items and yield well-formed compound verbs.

²²At the categorization level there is still no canonical grammaticalization, since the Root is still present even for the (semi-)grammaticalized Akt items. I conceive these as “deficient Roots” which are still linked to formal (List 1) and phonological (List 2) features but already delinked from substantial semantic (List 3) features. Only when the Root itself is delinked and a direct link is established between the formal and phonological features can we say a morpheme is “truly” grammaticalized, e.g. ENG *-s* for [3SG.PRES].

- | | | |
|------|-----------------------------------|--------------------------------|
| (58) | Adjunct-V | Adjunct-V |
| | <i>tong-ku</i> “bitterly-cry” | <i>bei-ku</i> “sadly-cry” |
| | <i>tong-ma</i> “bitterly-scold” | <i>zui-ku</i> “drunkly-cry” |
| | <i>tong-wu</i> “deeply-detest” | <i>ai-ku</i> “sorrowfully-cry” |
| | <i>tong-dao</i> “deeply-mourn” | <i>hao-ku</i> “wildly-cry” |
| | <i>tong-ji</i> “painfully-strike” | <i>da-ku</i> “hugely-cry” |
| | <i>tong-jiu</i> “deeply-regret” | <i>chang-ku</i> “long-cry” |
| | <i>tong-hen</i> “deeply-hate” | <i>gan-ku</i> “dryly-cry” |
| | <i>tong-da</i> “painfully-hit” | <i>tou-ku</i> “secretly-cry” |

The differences between Akt-items and adjunct modifiers can be summarized as follows:

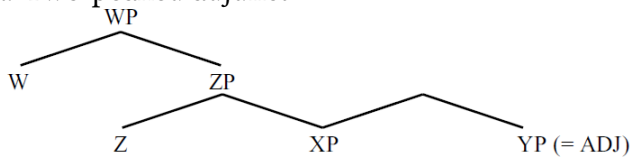
- (59) a. Akt-items show category-suppression effect; adjunct modifiers do not;
 b. Akt-items can sometimes be separable/extractable; adjunct modifiers cannot;
 c. Akt-items may change the verb’s argument structure; adjunct modifiers cannot.²³

Typical Akt-items are Aktionsart prefixes in Hungarian, and typical adjunct modifiers are those in Chinese Adjunct-V compounds. Interestingly, the differences in (59a-b) are also seen in two types of phrase-level adjuncts, i.e. those that are islands (60) and those that are not (61).

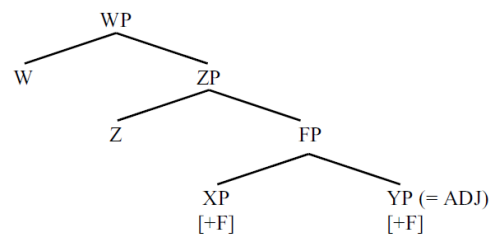
- (60) a. Who cried after John hit Mary?
 b. *Who_i did Mary cry [after John hit t_i]? (Huang 1998, p. 358)
- (61) a. What_i did John arrive [whistling t_i]? (Borgonovo and Neeleman 2000, p. 200)
 b. What_i did John drive Mary crazy [trying to fix t_i]? (Truswell 2007, p. 1356)

Oseki (2015) refers to (60) and (61) as “two-peaked” and “one-peaked” adjuncts.²⁴ Two-peaked adjuncts are not labeled and thus appear to be on a separate plane, whereas one-peaked adjuncts are labeled on the primary plane (via Feature Sharing). As such, the former are syntactically invisible and cannot be input to further Merge, whereas the latter are not subject to this restriction. The two types of adjunct are illustrated as follows (Oseki 2015).

- (62) a. Two-peaked adjunct



- b. One-peaked adjunct



While Oseki (2015) focuses more on the (non-)island property of adjuncts, here I pay more attention to the category-suppression effect of one-peaked adjuncts which is reminiscent of Akt-items. The point is that the adjuncts in (61) are independently clauses (63), but they lose this status when used as secondary predicates.

- (63) a. John arrived. John whistled what?
 b. John drove Mary crazy. John tried to fix what?

According to Truswell (2007, p. 1374), the adjuncts in (61) are “identified with an event position in the matrix predicate”, which he dubs as either CAUSE or THEN. I identify these relations as

²³I will return to this point in Section 3.4.

²⁴Similar to Hornstein and Nunes’s (2008) “dangling-off” and “dangling-on” adjuncts.

subevental v flavors (*à la* Ramchand 2008). As such, from (63) to (61) the adjunct’s label changes from [T] to [V]. What is revealed here is a two-step adjunction, i.e. Merge via $v_{\text{CAUSE/THEN}}$ plus Labeling via FS. This is not a new idea. For instance, there is the general consensus that arguments are introduced into the predicate via separate functional heads as mediators, e.g. Voice (Kratzer 1996), Appl (Pylkkänen 2008), and the all-in-one i^* as recently proposed in Wood and Marantz (2015). On the other hand, these semantically distinguished heads themselves are identified as subparts of the predicate via their shared syntactic category [iV], which can be conceived as a more abstract mediator. In short, the general mechanism lying behind is that whatever wants to join the (primary-plane) derivation has to do so via functional mediation. Akt just extends this to the categorization (word-internal) domain.

Complex verb formation not only follows general syntactic mechanisms, but also obeys general syntactic restriction. For instance, although a complex verb may contain an Akt-item or a Comp-item²⁵, cross-linguistically these two types do not co-occur. In English, we either have prefixed verbs like *uprise*, *undertake* (Akt-V)²⁶, or phrasal verbs like *take up*, *run out* (V-Comp). However, we do not see “prefixed phrasal verbs” like **undertake up*, **uprise over*, etc. Similarly, in Hungarian we either see Akt-prefixes (e.g. *el-vez* “away-take”) or non-prefixal VMs (e.g. *részt vesz* “part-take”) but never both (e.g. **részt-el-vez*).²⁷ Note that this is not a restriction on component number, as a complex verb may well contain more items of the same type, e.g. GER *hin-ein-gehen* “thither-in-go” (Akt-Akt-V), CHI *gua-shang-qu* “hang-up-thither” (V-Comp-Comp), HUN *el-el-olvas* “PFV-PFV-read→read through now and then” (Akt-Akt-V). Instead, the observed restriction is one on component type.

A relevant observation is that there is no problem for adjunct modifiers and Comp-items to co-appear.²⁸ For example, Chinese has many quasi-compound-verbs²⁹ with a preverbal (adjunct) modifier plus a postverbal (resultative or directional) complement, e.g. *tong-ku-si* “bitterly-cry-die→bitterly cry to death” and *kong-xiang-chu* “voidly-think-out→vainly think out”. I assume that the above patterns actually reflect the restriction of binary Merge. Akt and Comp do not co-exist because they both merge with v^0 , and since they are both on the primary plane, such a merger is doomed to be trinary. In contrast, although adjunct and Comp also both merge with v^0 , they merge on different planes, which do not result in trinary Merge.

3.3 Recategorization and trans-workspace derivation

As we have seen, both complex verbs with Akt-items and those with adjunct modifiers can be inseparable. Inseparable Akt-items (e.g. GER *ver-achten* “despise”) are merged as Akt-heads and assume a higher cohesion level. Adjunct modifiers (e.g. CHI *hen-da* “violently hit”) appear inseparable when the verb stays in situ. As such, Akt-items and adjunct modifiers involve two different types of inseparability: one “real”, the other “apparent”. Whether adjunct modifiers can assume “real” inseparability is unclear, as Chinese does not have verb movement phenomenon high enough to test this, like the V-to-T movement in French (64).

- (64) a. French: *Jean embrasse souvent Marie.*
 b. English: *John often kisses Mary.* (Pollock 1989, p. 367)

²⁵A complement of $v(-\sqrt{\quad})$, such as an object, a preposition, or a small clause.

²⁶I will return to the language-specific complex verb structures in Section 4.

²⁷É. Kiss (2002) also notices this restriction.

²⁸Theoretically adjuncts and Akt-items can also co-appear, but this is not attested in our data.

²⁹They are probably syntactically but not phonologically well-formed compound verbs.

Nevertheless, we do see evidence that Adjunct-V compounds are more tightly structured than normal adjunct-verb phrases. For example, while an applicative instrument can be inserted between an adjunct-verb phrase (65a), it cannot be inserted into an Adjunct-V compound (65b); instead, the instrument has to be merged with the compound verb as a whole, as in (65c).

- (65) a. Ta henhende yong-shu da-le wo.
 he violently use-book hit-ASP wo
 “He violently hit me with a book.”
- b. * Ta *hen* yong-shu *da-le* wo.
 he violently use-book hit-ASP wo
 “He violently hit me with a book.”
- c. Ta yong-shu *hen-da-le* wo.
 he use-book violently-hit-ASP me
 “He violently-hit me with a book.”

The above pattern indicates that in (65c) *hen-da* is used as a single unit. A similar phenomenon exists in Subject-V compound verbs, which also seem to be used as single units in various clausal positions (66), in spite of their complex internal structure.

- (66) a. Tian hai meiyou *ri-chu*. (after negation)
 sky still not-have sun-rise
 Lit. “The sky has not yet sun-rised.”
- b. Ni shoushang, ta hui *xin-teng*. (after modal)
 you get hurt he will heart-ache
 Lit. “If you get hurt, he will heart-ache.”

While the compound verbs in (66) are clearly atomic, there lurks a further complication. Most Chinese morphemes can be freely (re)used in multiple contexts. The consequence of this for complex verb formation is that, given the word-phrase structural isomorphism (Section 2.2.1), the same string can have two “versions”: a “word” version and a “phrase” version. While this has always been attributed to different places of formation (Lexicon vs. syntax) in the literature, there has hardly been a fully satisfactory account to distinguish which compound verbs are words and which are phrases (cf. Song 2015). With the single-engine assumption, I make the least costly hypothesis that they are all phrases unless being “atomized”³⁰ by extra operation. As such, while the Adjunct-V and Subject-V compounds are used as atoms in (65-66), it is easy to find cases where they are “separated” like phrases (67).

- (67) a. Fuxiao, *ri* jiang *chu*.
 dawn sun will rise
 “At dawn, the sun is about to rise.”
- b. Ni shoushang, ta *xin* hui *teng*.
 you get hurt he heart will ache
 “If you get hurt, he_{TOP}, heart will ache.”

Building on the “one-peaked” adjunction theory in the last subsection, I assume that what is involved here is also the atomization of preassembled phrase markers (via a verbalizer), with the difference being that in this case the atomized strings are systematically disyllabic (which

³⁰A term borrowed from Fowlie (2013).

should have its separate reasons). Following the DM idea that what categorizers do is “categorization”, and considering that these atomized SOs already have phrase-level categories³¹, we can describe this operation as “recategorization”.

Recategorization is like a syntactic reformulation of the Lexical Integrity Hypothesis (Di Sciullo and Williams 1987), as the recategorized units in effect become syntactic atoms, just like the initially categorized Roots. A remaining question is the motivation of recategorization. If initial categorization is motivated by the licensing requirement of Roots, then recategorization may be motivated by the licensing requirement of some complex SO to become a “complex atom” in the main derivational workspace (cf. Fowlie 2013 for a similar idea). I regard recategorization as a necessary operation accompanying trans-workspace derivation, which resembles the relation between phase heads and Multiple Spell-Out (cf. Uriagereka 2012). A trans-workspace word-formation model is advantageous because while attributing all word-formation to syntax, it is also able to differentiate two “versions” of the same word-like string, i.e. those that are true atoms (with recategorization) and those that are only separately adjacent (without recategorization).

3.4 Summary

In this section, I have discussed three syntactic mechanisms for complex verb formation: *i*) Akt-licensing, *ii*) “two-peaked” adjunction, and *iii*) trans-workspace recategorization. What I did not bring up is the (equally common) mechanism of “head-merger”, i.e. the direct Merge of two head-like items. In our data, this further subsumes v - v merger and Root-Root merger. I will return to these points in Section 4.

Before closing this section, I want to further clarify two points about Akt, which is a central innovation of this report. First, the core function of Akt is to let v take one more Root. In principle, one v can only license (categorize) one Root, but complex verbs have more than one Root. How to combine two Roots in syntax and not lose the observed structural variation is a challenge for syntactic theories of word formation. By defining Akt as an extended projection of v , I provide a tentative solution for this challenge.

Second, since Akt is an extension of v , theoretically every v flavor can have an Akt layer. This suggests that in a neo-constructionist VoiceP, Akt-items can attach to different subevental levels and interact with argument structure. This presumably provides an explanation for verbal prefixes that apparently change the argument structure of the base verb, e.g. ENG *out-rank* (vt.), GER *er-arbeiten* “work out” (vt.), HUN *be-jár* “go all over” (vt.), etc. The idea here is that what changes the argument structure is not the prefix, but the nature of the v it attaches to. Given that many prefixes “license” an affected object, I follow Siddiqi’s (2009) idea that there should be a TRANS flavor of v . For example, in *er-arbeiten* it is not \sqrt{ARBEIT} that changes from intransitive to transitive, but essentially the verbalizer cluster \sqrt{ER} attaches to (via Akt) that changes from v_{DO} to $v_{DO+TRANS}$. The Akt conception simultaneously supports the hypothesis that Roots are modifiers of categorizers (Marantz 2013) and accommodates the observation that verbal prefixes are by themselves not “verbal” (i.e. not directly v modifiers).

³¹That is, they are beyond word-level, which differentiates them from the derivational categorial change discussed in Arad (2003), e.g. $[[[loc]_{\sqrt{-al}}]_A-ity]_N$.

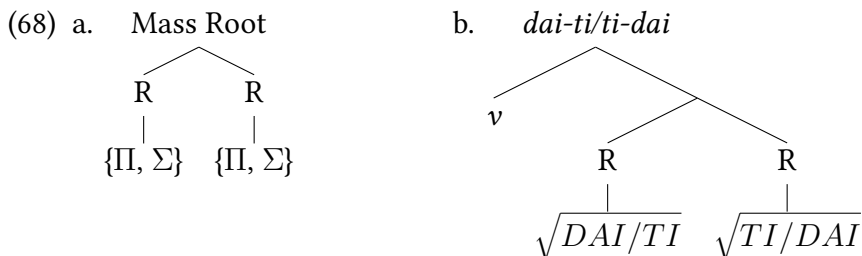
4 Towards a Unified Analysis of Complex Verb Formation

In this section, I will use concrete examples to illustrate how the theory developed in Section 3 can account for the cross-linguistic patterns and variation in complex verbs. The discussion is divided into three subsections, corresponding to the three levels of complex verb formation.

4.1 Root level: Two ways to merge Roots

In this report I follow the naked Root view (Ramchand’s 2008 term) and treat Roots as radically underspecified objects that do not have categories and cannot head or project (Acquaviva 2009; Alexiadou 2014; Belder 2011; Borer 2009, 2014). I have further assumed in the last section that one categorizer can only take one Root. However, this does not rule out the possibility of complex Root. There are two scenarios for Root-Root merger: homogeneous vs. heterogeneous. Both happen before categorization, and their difference only lies in the type of feature linked to the Root (which will be activated at the interface).

In homogeneous Root merger, the two Roots are pre-linked³² to the same sort of features, i.e. $\{\Pi, \Sigma, [\pm F]\}$,³³ as in (68a). A consequence of homogeneous Root merger is the lack of endocentricity (a point already discussed in Zhang 2007) plus no fixed ordering, since what Spell-Out sees and linearizes at phase level are only categorial labels, while Roots (simple or complex) are just (mass) label modifiers. As such, the internal ordering of complex Roots is not governed by syntax whatsoever, but more of a phonological issue.³⁴ This is the case for the pure coordination compounds in Chinese, e.g. *dai-ti/ti-dai* “replace-replace→replace” (68b).



Heterogeneous Root merger, on the other hand, involves two Roots of different nature. Suppose that at least one Root must be pre-linked to $[\Sigma]$ —as semantic modification is the defining function of Root—we can further specify the nature of the other Root. Given the feature-linking template above, we have a whole matrix of combinatorial possibilities among $\{[\pm\Pi], [\pm\Sigma], [\pm F]\}$. But in reality there is only one legitimate choice, i.e. $\{[+\Pi], [-\Sigma]\}$ (69a), because without phonological feature there is no way to justify the existence of Root (again [F] does not matter). This is a Root pre-linked to a phonological feature but lacking semantic feature, i.e. the “deficient Root” mentioned in Section 3.1. As such, although we still have a mass Root attached to a single categorizer, in this case the two Roots (qua indices) will have interpretational difference at the interface. This might give rise to Akt-like Roots and Root-level “Akt-configuration”, as the deficient Root (call it R_{DEF}) can be pre-linked to some [AKT] feature³⁵. As such, we may have a root-level prefixed verb, or “prefixed Root”. A major distinc-

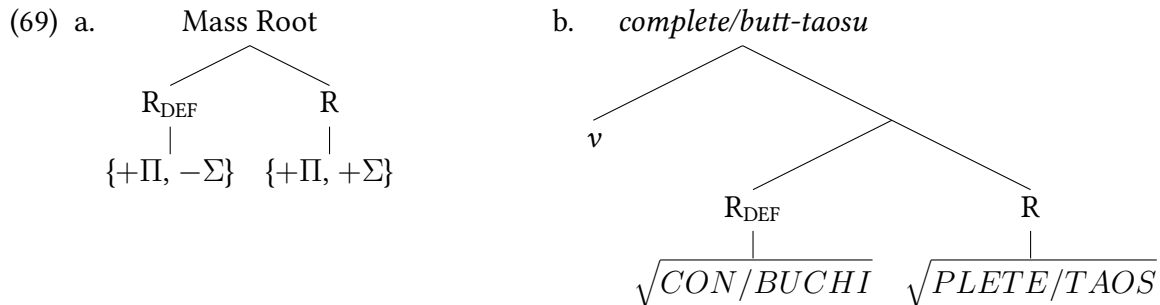
³²NB pre-linking does not equal pre-bundling. Roots may be index bearing objects instead (Harley 2014).

³³Whether [F] is linked does not matter. I only include it for the theoretical possibility.

³⁴This also explains why such complex verbs do not change meaning in the reversed order even when they do have a predominant phonological order, e.g. *ti-ba/?ba-ti* “promote” and *yong-bao/?bao-yong* “hug”.

³⁵Roots may be pre-linked to all sorts of semantic category [F]. I only discuss the one situation in our data.

tion between root-level and ν -level prefixed verbs is phonological assimilation. Theoretically only root-level prefixed verbs can have phonological assimilation, because Root (in the phase domain of ν) and Akt (at the Edge of ν) are not spelled-out together. Examples of prefixed Roots include English Type I prefixed verbs (e.g. *com-plete*) and Japanese prefixed LCVs (e.g. *butt-taosu* “BUCHI-topple→violently topple”), as in (69b). The prefixes in these complex verbs indeed seem to have [AKT] meanings (mostly INTENSIVE).

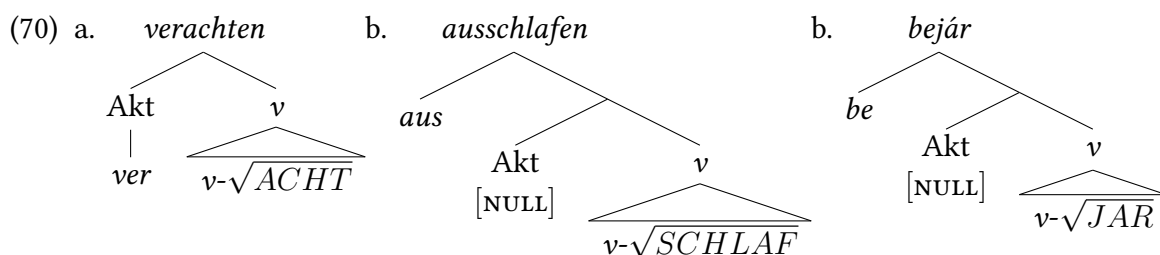


4.2 ν level

At the ν level, i.e. after the first verbalizer has merged in, complex verbs can be formed by adding an additional modifier to $\nu(-R)$ or by adding another ν , which would then form a “ ν -cluster” and may further have its own modifiers. In the current framework, ν -modifiers are Akt-items, and additional ν s also entail additional predication.

4.2.1 Akt modification: German and Hungarian prefixed verbs

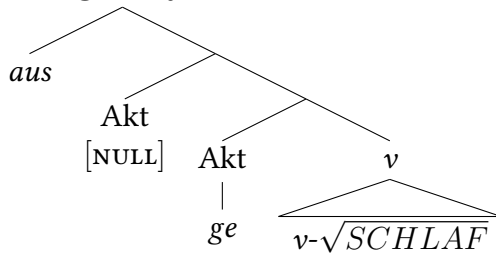
Akt is either a fully specified head or a phonologically null operator (which has to be valued by a separate lexical item), respectively yielding an inseparable and a separable prefix in German, e.g. *verachten* “despise” (70a) and (*sich*) *aus-schlafen* “sleep one’s fill” (70b). The situation in Hungarian is simpler, where all verbal prefixes are separable³⁶, e.g. *be-ár* “travel all over” (70c).



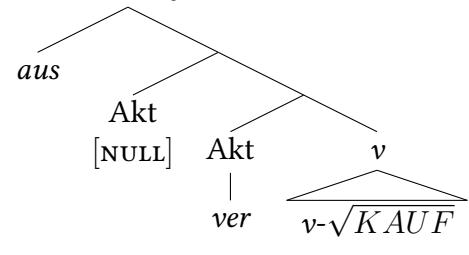
Akt can stack, which in German is most obvious in the past participles of separable verbs, as in *aus-ge-schlafen* (71a), where *ge* is introduced as a PFV Akt-head on the first layer and *aus* via a null Akt-head on the second (as 72 reveals, there may be more inter-layer details). Similar cases are double-prefixed verbs like *aus-ver-kaufen* “out-PFV-buy→sell out” (71b).

³⁶This may be because Hungarian verbal prefixes all have literal counterparts, including the most bleached *meg* PFV, e.g. *mögött* “in the back”, *mögül*, “from the back”, *mö/egé* “to the back”; the last one is the origin of *meg*.

(71) a. *ausgeschlafen*

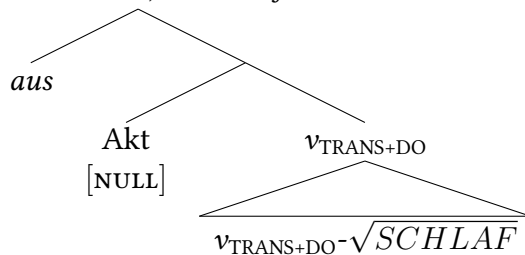


b. *ausverkaufen*

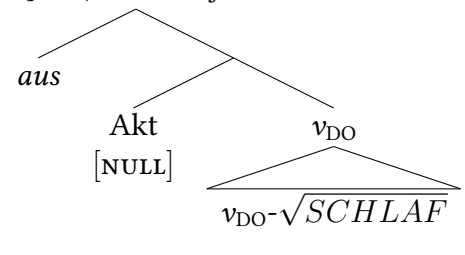


Akt can merge with different flavors of *v*, yielding different argument structures, e.g. *seinen Rausch aus-schlafen*_{vt} “sleep away his drunkenness” (72a) vs. *hast du jetzt aus-geschlafen*_{vi} “have you had enough sleep?” (72b).

(72) a. *(seinen Rausch) ausschlafen*

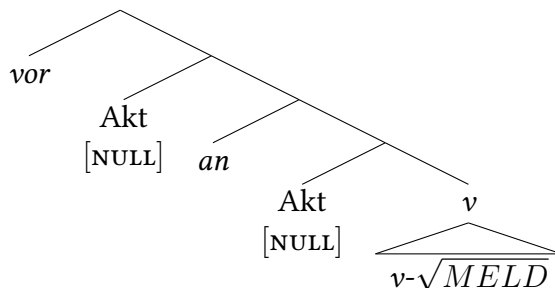


b. *(jetzt) ausschlafen*

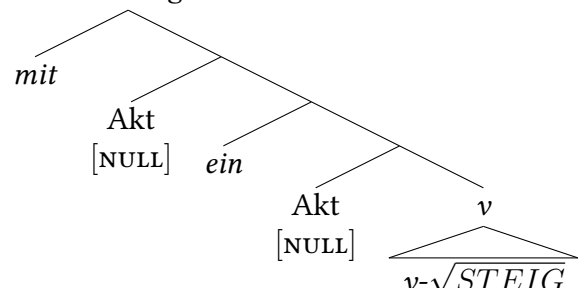


However, the stacking of Akt seems to be constrained. If we stack two separable prefixes (i.e. DSP verbs in Section 2.1.2), e.g. *vor-an-melden* “preregister”, *mit-ein-steigen* “get on (vehicle) together”, the resulting complex verb is “immobile” in that it is blocked in situ and cannot undergo externally (e.g. V2) conditioned movement. I leave the exact nature of this restriction to future research (cf. Song 2016), and only present the general structure here in (73).

(73) a. *voranmelden*

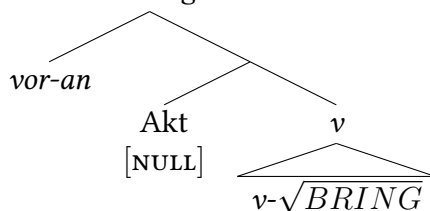


b. *miteinsteigen*

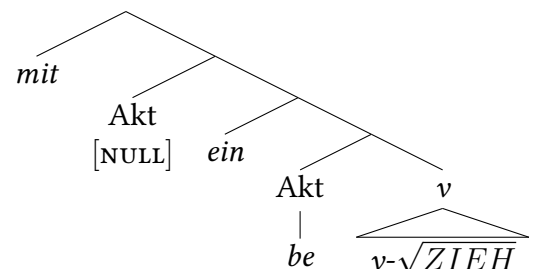


The peculiarity of the immobile DSP verbs is also reflected in contrast with other mobile DSP verbs, e.g. *hin-ein-steigen* “get on (vehicle) there”, *vor-an-bringen* “bring forward”, and occasionally triple-prefixed verbs, e.g. *mit-ein-be-ziehen* “incorporate together” (see Section 2.1.2 for illustration). They differ from the immobile DSP verbs in that the two prefixes are either introduced by a single Akt-head (74a) or introduced by two Akt-heads of different nature (74b).

(74) a. *voranbringenn*



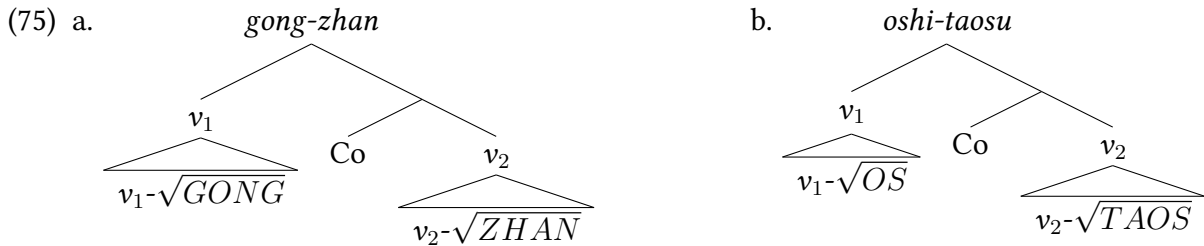
b. *miteinbeziehen*



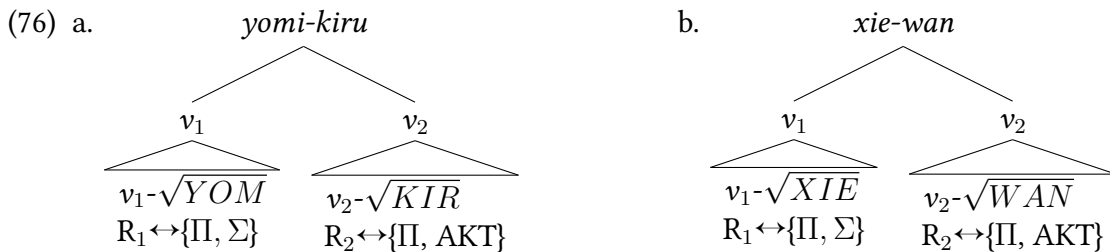
4.2.2 Overt additional predication: Chinese and Japanese V-V compounds

In the last subsection, we have seen null additional predication (qua v) accompanying Akt modifiers. On the other hand, overt additional predication is commonly seen in Chinese and Japanese V-V compounds. I discuss three scenarios based on the type of additional predication, i.e. non-pure coordination, auxiliiation, and quasi-subordination.

Non-pure coordination is the real coordination of two verbs, which involves clear temporal precedence. Following the idea that conjunction (like Root) is invisible to LA (Chomsky 2013), I analyze such compounds with an “invisible” Coordination Phrase (CoP). Below I use CHI *gong-zhan* “attack-occupy” (75a) and JAP *oshi-taosu* “push-topple” (75b) as examples. In the former, “attacking” precedes “occupying”; in the latter, “pushing” precedes “toppling”.³⁷



Auxiliiation is the scenario where one verbal Root modifies the other as an [AKT]-item, such as Japanese adverbial/spatio-temporal compounds (e.g. *yomi-kiru* “read-cut→finish reading”, 76a) and Chinese event-phasal compounds (e.g. *xie-wan* “write-finish→finish writing”, 76b). They are semantically similar to Akt-prefixes. For example, JAP *yomi-kiru* and CHI *xie-wan* can be translated into Hungarian as *el-olvas* “away-read” and *meg-ír* “PFV-write”.

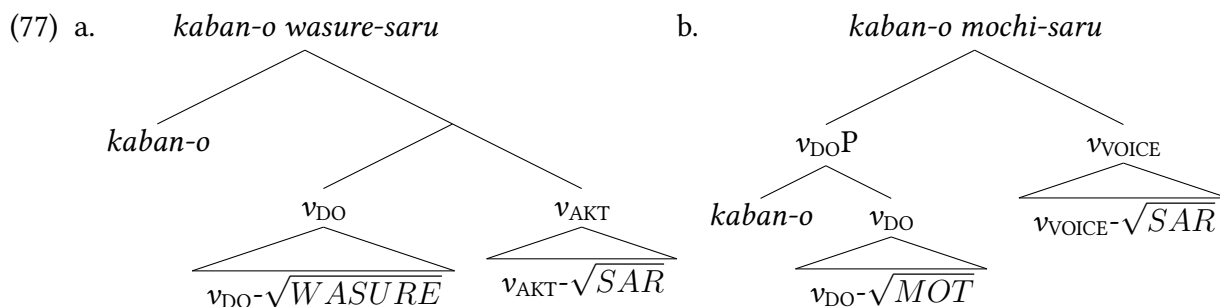


As introduced in Section 2.2.2, spatio-temporal compounds (STCs) are verbs like *mochi-saru* “hold-leave→carry away” and *wasure-saru* “forget-leave→completely forget”. I analyze *saru* in *wasure-saru* as an [AKT]-bearing v -R similar to *kiru* above. As for the more substantial STCs like *mochi-saru* and *mochi-aruku* “hold-walk→carry around”, I follow Nishiyama and Ogawa’s (2014) idea that these are grammaticalized motion verbs like ENG *go occupy the land* (at Voice) and regard this as another case of v -flavor based variation.³⁸ In particular, while the object of *wasure-saru* belongs to v_1 - v_2 as a whole, that of *mochi-saru* only belongs to v_1 .³⁹ In (77) I use *kaban-o wasure-saru* “bag-ACC forget-leave→completely forget the bag” and *kaban-o mochi-saru* “bag-ACC hold-leave→leave holding the bag” to illustrate this variation.

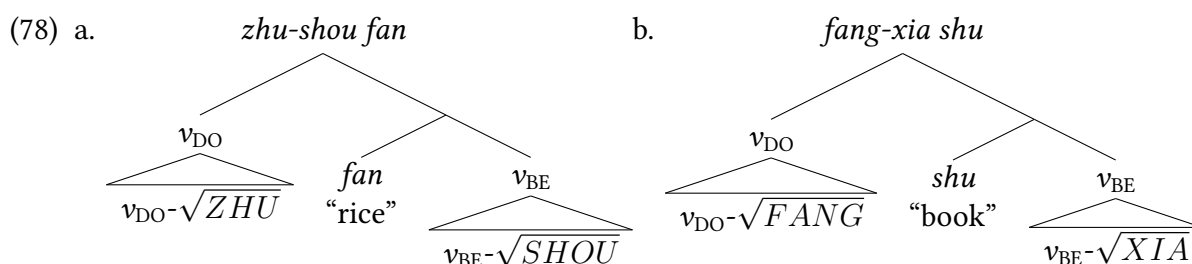
³⁷I do not analyze *oshi-taosu* as Root-Root because the result of Root merger should be flexible in ordering without meaning change, but LCVs like *oshi-taosu* have fixed ordering and change meaning if reversed.

³⁸Roots *saru* “leave” and *aruku* “walk” may well be attached to $v_{DO/TRANS}$ and used as ordinary Activity verbs, as in *tookyo-o saru* “leave Tokyo” and *watashi-wa aruku* “I walk”.

³⁹This bipartition simultaneously bears out Nishiyama and Ogawa’s (2014) intuition that some STCs pattern with SCV and preserves Kageyama’s (1993) observation that some others pattern with LCV.



The third scenario for additional predication involves a quasi-subordination configuration like that in resultative constructions, i.e. a resultative small clause⁴⁰ of category [V] (e.g. v_{BE} , cf. Kan 2007). Indeed, such complex verbs in our data (Chinese resultatives and directionals) can generally take an object that functions as the small clause subject, as in *zhu-shou* “boil-cooked” and *fang-xia* “put-down” (78). The two *vs* are later joined via head movement.



Chinese resultatives are true resultatives with no [AKT] meaning. For example, *shou* in *zhu-shou* “boil-cooked” only contributes its literal meaning of “cooked” (the resultative reading is syntactically derived rather than lexically fixed). Nevertheless, when resultative items grammaticalize (cf. Shi 2003), their first “target” is v_{AKT} , e.g. *xie-wan* “write-finish”, *chi-shang* “eat-up; finally have sth. to eat”.

In sum, overt additional predication has two possible templates vR -Co- vR and vR - vR . The three scenarios are yielded by the different semantic categorial features (e.g. [BE, DO, AKT]) pre-bundled/linked to v or the Root.

4.3 Beyond v level: Adjacent vs. atomized

Categorization is complete after a v has taken all its modifiers (Root, Akt). The result of such a categorization process is in effect an underspecified version of the traditional big V (with category and category-modifier but no argument structure). As such, among the complex verb types we have discussed so far, only the Root-level (4.1) and the Akt-modification (4.2.1) types are really “word-internal”, while all the other types are “word-external”. The difference between the two domains is reflected in cohesion level. While word-internal complex verbs are inherently tightly structured, word-external ones only gain tight cohesion via extra operation.

A special case are the “grey-zone” Akt-items, i.e. the externally merged Akt-Roots. On one hand, they are part of the categorization process in that they must provide an [AKT] value to Akt-head. This makes them more tightly joined to the base verb than other types of VMs (e.g. those in É. Kiss 2002). On the other hand, since they are complete Roots linked to both

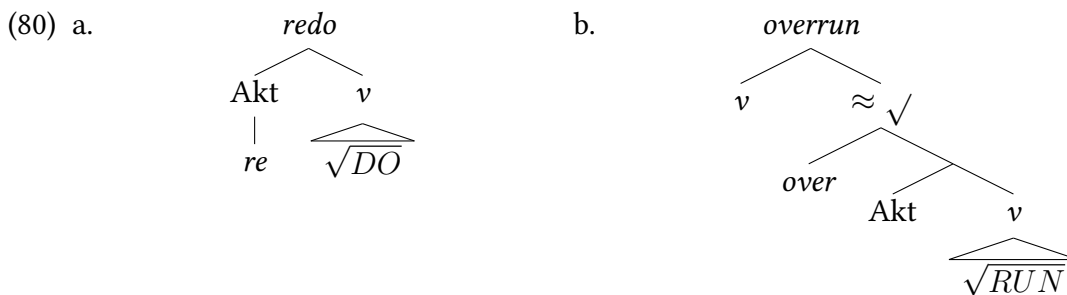
⁴⁰There is abundant literature on resultative small clauses since the 1980s, which I will not review in details, cf. i.a. Hoekstra (1988, 1992), Hoekstra and Sybesma (2004) for Dutch, Wurmbrand (2000) for German, Huang (1992), Sybesma (1999), Sybesma and Shen (2006) for Chinese, and Larsen (2014) for a recent overview.

phonological and semantic features and are essentially at the categorizer phase edge, after “discharging” the [AKT] value they become syntactically free yet licensed SOs that can move to other positions. As such, they are prone to undergo various discourse-driven movement like topicalization and focalization.⁴¹

One extra operation that can give word-external complex verbs tight cohesion is the invisible CoP; another one is the trans-workspace recategorization discussed in Section 3.3. These operations are frequently used in Chinese, a language that does not have Akt-modifiers of the EGH type. Unlike word-internal complex verbs, word-external ones are by default separable. For example, Chinese resultatives ($v_{DO}+v_{BE}$) and event-phasals ($v_{DO}+v_{AKT}$) can be separated by a POTENTIAL light verb *de* “get” (and its negative form *bu* “not”) scoping over the second sub-predicate, as in *zhu-de/bu-shou* “boil-can/not-cooked” and *chi-de/bu-wan* “eat-can/not-finished”, and V-O compounds can be separated by even more elements, e.g. *chi-fan* “eat-meal” vs. *chi-le yi-dun fan* “eat-ASP one-CL meal→had a meal”. In the current framework, we need not assume conversion from one to the other, but can simply treat them as independently derived structures. That is, *zhu-shou*, *chi-wan* and *chi-fan* are not syntactic atoms but merely separately adjacent strings. This said, however, there are also word-external complex verbs that are frequently atomized, such as the Subject-V compounds (79) (=66) discussed in Section 3.3. I assume these atomized compounds as being derived in a separate workspace and then transferred to the main workspace via recategorization.

- (79) a. Tian hai meiyou *ri-chu*. (after negation)
 sky still not-have sun-rise
 Lit. “The sky has not yet sun-rised.”
- b. Ni shoushang, ta hui *xin-teng*. (after modal)
 you get hurt he will heart-ache
 Lit. “If you get hurt, he will heart-ache.”

Apart from Subject-V compounds, recategorized complex verbs are not common. Most word-external complex verbs are simply derived in the main workspace, such as English phrasal verbs. Another candidate for trans-workspace recategorization are the “grey-zone” Akt-Roots, as they are partially word-external. I assume this to be the case for English Type III prefixed verbs (above Root level), e.g. *overrun*, *undertake*, *outrank*, etc. Thus, I derive Type II (e.g. *redo*, *mislead*, *forgive*) and Type III prefixed verbs in English in different ways, with the former involving directly merged Akt-heads like their German counterparts (80a) and the latter involving externally merged Akt-Roots plus recategorization (80b). Consequently, they become inseparable atoms in the main workspace.



⁴¹Not because they carry such discourse features, but because they have compatible semantic features.

5 Conclusion

In this report, I have taken a syntactic (Minimalist+DM) approach to complex verb formation. Starting with the assumption that syntax (minimally Merge) is the single generative engine of the human language faculty, I have formulated and tentatively answered a number of questions, e.g. 1) what are complex verbs? 2) what kinds of complex verb are there? 3) what general patterns exist cross-linguistically? 4) what syntactic mechanisms underlie the observed patterns and variation? 5) how to retain the wordhood intuition of complex verbs in a single-engine theory?

In Section 1, I have defined complex verbs as formally decomposable or analyzable verbal units. In Section 2, I have presented and compared complex verbs in five languages: English, German, Hungarian, Chinese, and Japanese. Three types of complex verb exist in these languages, i.e. prefixed verbs (English, German, Hungarian, Japanese), phrasal verbs (English), and compound verbs (Chinese, Japanese). They assume different patterns in terms of cohesion level, separability, component category, and semantic nature. Contrary to general expectation, these aspects of complex verbs are largely independent of one another. For instance, although *redo* and *overrun* are both inseparable, the former assumes higher cohesion. As it turns out, semantic nature (especially idiomaticity) is not an ideal standard for data delimitation. Therefore, in Section 3 I have mainly used cohesion level and lexical decomposition (especially neo-constructionist event semantics) as heuristics to develop my theoretical model.

In 3.1, I redefined Aktionsart as the (multi-dimensional) lexical fixing of intrinsic event properties and proposed Akt as a categorial mediator to join Aktionsart denoting items to the verbalizer. In 3.2, I reviewed Oseki's (2015) adjunction theory and made an analogy between Akt-items (mainly verbal prefixes) with "one-peaked" adjuncts, both of which are "originally" not part of the spine derivation but made into primary-plane objects by functional mediation. In 3.3, I further explored why some complex verbs (e.g. *overrun*) do not have high cohesion but are inseparable. My conception was that syntactic objects can be assembled in one workspace and then transferred to another via recategorization (qua atomization), which is an instantiation of the phase-based Multiple Spell-Out model as developed in Uriagereka (1999, 2012).

Finally, in Section 4 I have applied the theory developed in Section 3 to the data in Section 2 and analyzed complex verb formation with three levels, i.e. Root level, v level, and beyond v level. Importantly, I have identified the "word-internal/external" boundary in a categorization cycle as the phase head v (and its extension Akt). Things inside this boundary (i.e. verbal Root, v -Akt) form a naturally indivisible unit, while things out of it (e.g. complete Akt-Root, things outside the categorization domain) are by default not part of the V^0 unit and have to resort to extra operation (e.g. CoP, recategorization) to achieve atomic effect.

Due to the limited scope, many issues have been inevitably omitted or only tangentially mentioned, such as the constraints and other possible mechanisms of complex verb formation, why languages use complex verbs, etc. Meanwhile, I have also left out some technical issues, e.g. the correlation and distinction between PP and Akt, the first dimension (concept) of Akt modification, the correlation (and possible conversion) between verbal prefixes and other (word-external) verb modifiers, etc. I leave these and other questions to future research.

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