Opacity in the lexicon: a generative lexicon approach to Korean VV compounds

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Abstract

This paper aims at providing a formal description of three types of Korean compounds made up of two verbs (VV compounds) in the Generative Lexicon framework. I will first discuss several properties commonly ascribed to VV compounds and address the problem of identifying lexical VV compounds as opposed to SVCs and similar constructions. I will then argue that the complex semantic structure and the syntactic behaviour of VV compounds in Korean can in some cases be accounted for by performing elementary unification (SIMPLE_UNIFY) of Generative Lexicon Entries (GLEs). For cases in which SIMPLE_UNIFY is not applicable, I will propose two additional unification operations – MANNER_UNIFY and METAPHOR_UNIFY – and discuss their functioning in detail. In this context, it will be suggested that enriching a verb's QUALIA with specifications for CONST facilitates the resolution of issues brought along by verbs with partially psychological meaning. Finally, it will be argued that the three unification operations can be regarded as instances of opaque interactions in the lexicon since the motivation for overwriting and restructuring that takes place during unification is obscured in the resulting compound GLEs.

1. Introduction

Although compounding is a productive means of word formation in most languages of the world, research on compounding has focused mainly on compounds with at least one nominal element and has mostly neglected VV compounds (cf. Lieber and Štekauer 2009). While discussions of *verbal compounds* (or similarly coined terms) are in fact not uncommon in the literature, they often refer to compounds with *one* verbal element. Thus, Roeper and Siegel (1978) use the term *verbal compound* to refer to English compounds such as *oven-cleaner* (this type is also known as *synthetic compound*, e.g. Bauer

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2008), *fast-acting* or *church-goer*, i.e. to a class of compounds that are built after the highly productive pattern 'argument/adjunct + verb (+ conversion affix)' in English. Scalise and Bisetto (2009) try to resolve the confusion that the ambiguous term *verbal compound* brings about by using the term *verbal-nexus compound* for classifying mono-verbal compounds such as the endocentric *taxi driver* and the exocentric *lavapiatti* (Italian, 'dish-washer').

This paper is concerned with yet another type of verbal compounds, viz. compounds consisting of *two* verbal elements. Examples of such VV compounds are Japanese *kami-kiru* (bite-cut) 'to bite through' (Gamerschlag 2005: 11) or Korean *ttwi-nolda* (jump/run-play) 'to frolic'. However, it is important to note that not every construction involving two verbs is to be considered a VV compound. Thus, many serial verb constructions (SVCs) resemble VV compounds in the way meaning is built up and the component verbs' arguments are handled (Li 1990, Collins 1997, Nishiyama 1998). In some languages, certain SVCs can also be very frequent in use, which further obfuscates the distinction between constructions with delexicalised verbs, SVCs with two full verbs, and quasi-lexical idiomatic constructions (e.g. Zavala 2006: 287-289). This means that it is often far from self-evident where to draw the line between complex predicates that are constructed at some (later) level in the syntactic derivation and "true" VV compounds that are stored in and drawn directly from the lexicon. Therefore, any attempt to address the problem of compositional building of VV compounds from a lexicalist point of view should provide arguments for why the constructions under discussion are to be treated as lexical units.

This paper is structured as follows. In chapter 2, I will discuss a number of criteria relevant for distinguishing lexical VV compounds from other constructions involving two (or more) verbs. Chapter 3 then presents the major morphological classes of compounds in Korean and discusses several types of verbal compounds. In chapter 4, an analysis of the semantic compositionality of three Korean VV compounds belonging to the stem-stem class is given. The analysis is carried out in the Generative Lexicon (Pustejovsky 1995), a framework developed for deriving the semantics of complex structures by drawing mainly on lexical resources.

2. VV compounds and multi-verb constructions

There is considerable disagreement in the literature concerning the question which constructions with more than one verbal element are to be considered compounds. In the following, I will discuss some of the features that are typically associated with VV compounds, although it must be stated right at the beginning that it is probably impossible to define a set of criteria by which VV compounds are to be identified beyond doubt in all cases. As there will always be individual cases in which classification is difficult, the features under discussion are rather to be considered parameters contributing to either the lexical or grammatical status of a specific construction (cf. the more general lexicon-grammar-continuum debate, e.g. Bybee 2007).

Throughout the article, I will use the term *multi-verb construction* (MVC) to refer to any construction in which two (or more) verbs are involved. Such constructions can be VV compounds, or SVCs, or other similar constructions that resemble VV compounds with respect to one or more of the features that will be discussed below. The term *VV compound* will be used to refer to a single compound verb. For a multi-verb construction to qualify as *VV compound*, there are numberous syntactic (see chapter 2.1), morphological (see chapter 2.2) and lexical (see chaper 2.3) indications[1] that can be consulted. As I will present an analysis for VV compounds in a lexicalist framework later on, emphasis will be put on the latter set of criteria.[2]

2.1. Syntactic structure

VV compounds by their very nature possess some kind of internal structure, a property shared with any (non-lexical) multi-verb construction. Thus, in (1), a sequence of three verbs (the last two separated by the conjunction *zu* 'to'), all marked for infinitive, is used to express a dual modal modification of *lesen* 'read', which in turn is governed by a *verbum cogitandi* in the matrix clause.

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[1] In general, phonological features can be expected to be relevant to this question, too. To my knowledge, there are no (morpho-)phonological processes involved in Korean VV compounds (unlike /s/-affixation in some Korean noun compounds, see Lee and Ramsey 2000: 110-112), and therefore phonological criteria will be omitted in the following discussion.

[2] In this context, it would be interesting to pursue the idea of refining a feature catalogue and surveying cross-linguistic variation of VV compounds in order to examine what predictions can be made for universalist typology (e.g. Dryer and Haspelmath 2013) or canonical typology (Corbett 2005).

(1) Standard High German

Er dachte, das Buch lesen können zu müssen
he thought the book read.INF can.INF to must.INF

'He thought he had to be able to read the book.' (Salzmann 2013: 73)

There are a number of reasons for not considering this construction a VV compound. From a syntactic point of view, the fact that each of the three verbs freely combines with other verbs in an infinite number of possible constructions strongly speaks in favor of a non-lexical account. Also, the modal auxiliaries *können* 'can' and *müssen* 'must' are best described as taking exactly one phrasal argument marked by the infinitive, which already presupposes a complex phrasal structure for (1). [3] Next, the morphological marking on the verbs also suggests a certain degree of autonomy of the individual verbs. Finally, from a semantic point of view, the lexical meaning of the main verb lesen '*read*' in the subordinate clause is not altered by the two auxiliaries but enriched by modal restrictions (this is probably even more true for *müssen* than for *können*).

Let us now turn to cases in which the syntactic arguments are more subtle and not always as conclusive. A wide range of multi-verb constructions involving one complex predicate have been subsumed under the cover term *Serial Verb Constructions* (SVCs) (e.g. Aikhenvald 2006). SVCs are found predominantly in the languages of West Africa, South America, Southeast Asia and Oceania. Bowern (2008) lists four properties commonly associated with SVCs: one single intonation contour, full lexical verbs, at least one shared argument, and single tense, aspect and polarity marking. While these criteria are well suited to differentiate between SVCs and other syntactic phenomena such as clause-chaining (Foley 1986, Good 2003, see the example in (2)), it is more difficult to employ them for the identification of VV compounds: Since VV compounds are considered to form one lexical unit, they necessarily share the same TAM and polarity marking and intonation contour. The importance of the full lexical status of the verbs will be stressed further below in section 2.3. Argument sharing, finally, can sometimes be one domain in which VV compounds differ from SVCs, as lexical processes can directly access the argument structure of a VV compound (see Li 1990 and section 4); however, this criterion on its own cannot suffice for a clear distinction.

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[3] Note, however, that in some syntactic approaches such as nanosyntax (Starke 2009, 2011, Caha 2009) arguments for assuming structure encompassing several phrases may not count as evidence against 'lexicalness': If one proposes syntactic tree structure and units at the level of the lexicon, one can no longer rely on such criteria to distinguish between constructions produced by the lexicon and the grammar.

(2) Chechen
Maliika, tykana ’a jaghna, zhejna ’a iecna, c’a je’ara.
Malika store.DAT & J:go:CVB book & buy:CVB home J:come:WP
‘Malika went to the store, bought a book, and came back home.’
(Good 2003)[4]

Because compounds form one single morphological word, a decisive property of compounds in general is their impermeability for argument NPs (or other syntactic material). Compare the two sentences in (3). In the Japanese example, the two verbs are adjacent, and they denote a telic action with V1 bearing the main meaning and V2 contributing a resultative reading. In the Akan example, on the other hand, the verbs are separated by the direct object of first (and second) verb. The differences in syntactic structure can be seen as reflections of event conceptualisation in an iconic way: While ‘putting the baby on the bed’ in Akan is conceptualised as two events, viz. ‘taking the baby’ and ‘putting the baby on the bed’, the accomplishment ‘biting the rope until it is cut through’ is envisioned as one event which consists of the two just mentioned subevents.

(3) a. Japanese: VV compound
inu-ga roopu-o kami-kit-ta
dog-NOM rope-ACC bite-cut-PST
‘The dog bit the rope through.’ (Gamerschlag 2005: 11)

b. Akan: SVC
mààmé nó dè àbòfŕábá nó tó-ò ḿpá nó dó
woman DEF take baby DEF put-COMP bed DEF on
‘The woman put the baby on the bed.’ (Osam 2008: 58)

Further examples of SVCs are given in (4). Even among the languages in the small sample, considerable variation as to whether and which objects can be placed between two verbs in an SVC is found, and languages are usually not restrained to one of the three types illustrated. Thus, SVCs in Edo are also attested with core and no arguments intervening (Agheyisi 1986). In

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[4] J: gender prefix, WP: witnessed past, & : preverbal conjunctive

Chinese, the VV pattern is very common and productive, which makes it difficult to decide which multi-verb constructions are lexical and which are purely syntactic.

Lastly, the classification of the Mian construction in (4c) as SVC and not as a VV compound relies in fact solely on morphosyntactic criteria and will possibly be subject to reanalysis once more data become available: "the current analysis of verb suprasegmentals is not fine-grained enough" (Fedden 2011: 382).

In sum, syntactic criteria alone do not reliably reveal the status of a MVC: If there are elements such as NPs between the verbs, the construction is not a VV compound, but if there are no such elements, we cannot be sure how to classify the construction.

(4) a. Chinese: core argument intervening
Lisi kǎn chái shāo.
Lisi chop wood burn
'Lisi chops wood in order to burn it.'
(Luo 1999, cited in Gamerschlag 2005: 174)

b. Edo: inherent argument intervening
òzó řulɛ́ le èʋàɽé ɽē
Ozo quickly.PST cook food eat
'Ozo quickly cooked and ate.' (Agheyisi 1986: 270)

c. Mian: no argument intervening
no=i
marsupials=PL.AN
ya-l(o)-eb-n-e=ta
PL.AN.O-kill.PFV-take-PFV-SS.SEQ-3SG.M.SBJ=MED
'He killed and took the marsupials and then he …'
(Fedden 2011: 382-383)

2.2. Morphological marking

The languages of the world vary considerably as to whether and how compounds (as a whole and with respect to their components) are marked morphologically (Bauer (2009)). In general, it seems reasonable to assume that the less morphological marking a (potential compound) construction has, the higher the probability that the construction is indeed a lexical compound. Such a prediction is, at least at the present stage, of course tentative due to the lack of thorough and sound typological studies addressing this particular question.

I will nevertheless discuss some examples of how morphological marking and compound status can be related to each other. Consider the examples in (5). Both Vietnamese (Austroasiatic) and Hmong Njua (Hmong-Mien) are highly isolating languages, and the absence of morphological marking in the multi-verb constructions in (5) is what one would expect for such languages. However, while (5a) presents an example of a VV compound (see also chapter 2.3.4), the construction in (5b) is an instance of a SVC (or a *verb concatenation* in Harriehausen-Mühlbauer's terminology).

(5) a. Vietnamese: VV compound
Họ mua bán đồ cũ.
3PL buy sell items old
'They trade old items.'

b. Hmong Njua: SVC
Puav dlha tawm moog.
3PL run leave go
'They ran out (away from the speaker).'
(Harriehausen-Mühlbauer 1992: 402)

In morphologically richer languages, on the other hand, the morphological criterion sometimes proves more helpful. As the examples in (6) demonstrate, Korean is one such language. Note that in some cases, the V1 in Korean VV compounds has to be marked, either by a suffix or by choice of a specific stem, while in other cases, compounding is achieved by bare stem concatenation.

(6) Korean:

a. clausal coordination, marking (V1-ko)
I kə-n iss-ko kɯ kə-n obs-ta.
this thing-TOP exist-COOR that thing-TOP not.exist-FIN
'This thing exists and that thing does not exist.'

b. clausal subordination, marking (V1-sə)
tɕip-e toraoa-sə kɯ-rɯl manna-ss-ta.
home return-SEQ/CAUS 3SG-DO meet-PST-FIN
'I met him when/because (I) returned home.'

c. SVC, marking (V1-ta)
Sagwa- rɯl mək- ta tɕa-ss-ta.
apple- DO eat- ISEQ sleep-PST-FIN
'(He) fell asleep immediately after eating an apple.'

d. SVC~compounding, marking (V1-ko)
t^{h}a- ko- na- ta
get- KO- be.born- INF
'to be born with'

e. compounding,
marking (V1.CVB)
ara- tɯt ta
know.CVB- hear- INF
'to understand sth. said'

f. compounding,
no marking (V1 = stem)
kulm- tɕuri- ta
hunger- starve- INF
'to starve'

Korean displays morphological marking in coordination and subordination of larger phrases, in SVCs and also in some VV compounds. What is interesting about the Korean verbal suffix (and postposition) system is not only the abundance of markers, but also the fact that some markers have a wide array of functions (for a general overview, see Ihm et al. 2001). Thus, *-sə* in (6b) can express both temporal sequentiality and causality. The *-ko* that is used for coordinating two matrix clauses in (6a) is also used in t^{h}*a-ko-na-ta* in (6d). This complex verb is ambiguous as to its compound status: t^{h}*a* 'get' has completely lost its lexical meaning and has only a valency-increasing function in that it licenses an oblique argument that is marked with the direct object marker /-(r)ɯl/, a feature inherited from the original V1. While these properties are usually found in SVCs rather than in VV compounds, which typically preserve the lexical meanings of both component verbs, this particular combination also displays a high degree of autonomy, and the pattern t^{h}*a* + *ko* + V is not productive in Korean (t^{h}*a-ko-na-ta* is the only such construction listed in Minjung 2009). Finally, *-ta* is not only the ending for a verb's dictionary form (glossed INF), but also appears as a closing element in a number of contexts in some of the more formal registers (glossed FIN here). In SVCs, *-ta* signals immediate sequentiality (glossed ISEQ); only in this function, it has an allomorph /-taga/.

2.3. Lexical properties

In this section, I will discuss four types of modifications which are often found in multi-verb constructions in various languages: *aktionsart/aspect*, *causatives*, *movement verbs* and *converses*. It will be argued that only one type, *converses*, is likely to form VV compounds, whereas the remaining modification types are more likely to hint at SVCs. I will base my argumentation in lexical semantics, with the common denominator for all types being their 'lexicalness'. Therefore, the notion of *lexicalisation* will be discussed separately at the end of this chapter.

Let us begin with the simple (but non-trivial) observation that the semantic structure of VV compounds can - just like that of nominal compounds - be described in terms of their head-modifier relation. Thus, Lieber (2009: 100-102) distinguishes between three types of VV compounds in Japanese:

(7) a. coordinative, 2 heads
naki- saken
cry- scream
'to cry and scream'

b. causative, 1 head
odori- tukare
dance- get.tired
'to get tired from dancing'

c. manner, 1 head
ture- sat
take- leave
'to leave taking sth.'

In these examples, the semantic structure strongly depends on the lexical properties of the verbs. In (7a), the two verbs *naki* 'to cry' and *saken* 'to scream' are coordinated to form a 2-head coordinative structure, which denotes an event characterised by one person both crying and screaming. Note that *naki* and *saken* have a non-empty intersection, which often facilitates coordinative compounding. The two components in (7b), however, are heterogeneous with respect to meaning and aktionsart, and their relation is interpreted as modificational: a person's action of V1 causes that person to experience V2. A similar account holds for (7c): The semantics of V2 is getting enriched by the semantics of V1 in that V1 specifies how V2 is done.

2.3.1. *Aktionsart/aspect*

The first group of special multi-verb constructions comprises constructions in which one verb modifies the other with respect to aspect or aktionsart. Languages can express such modifications either syntactically, e.g. by special verbs that denote the way another verb is modified and do not have a lexical meaning on their own (as in English *he began to worry*), or morphologically, e.g. by affixation (as in Russian *vsʲo srazu za-rabotalo* (all at.once INCH.PFV-worked) 'everything started working at once'), or lexically (compare English *he read the newspaper* with a default telic interpretation as opposed to *he always read the newspaper* with a habitual interpretation added by the adverb *always*). Whichever strategy a language relies on, the sketched modifications do not affect the lexical meaning of a verb but rather highlight a phase inherently present in the verb's meaning. Furthermore, as the examples below demonstrate, aspect-changing multi-verb constructions do not involve two full verbs, as the modifier is often grammaticalised to a certain degree. Accordingly, I will not regard such constructions as VV compounds. And in fact, cross-linguistic evidence shows that this type of modification is very common among the SVCs in the world's languages (cf. Aikhenvald and Dixon 2006).

Languages with aspect-changing SVCs differ as to which verbs have been grammaticalised; some examples are given in (8). In Savosavo, an unmarked verb *alu* originally meaning 'stand' has acquired inchoative meaning in the SVC illustrated in (8a). The aspectual modifier comes right before the fully inflected lexical verb in sentence-final position. In Kannada, completion is expressed by a verb with the original meaning 'leave', as seen in (8b). Note that in Kannada, it is the main verb that comes before the aspectual modifier. In Bangla, the verb *poɽ* 'fall' is used to highlight the beginning of an activity verb, i.e. it has been delexicalised and now contributes inchoative meaning. Note that the construction in (8c) resembles its English counterpart *to fall asleep* in which the same two lexical items are employed. The similarity to the English light verb construction and the participial marking of V1 raise the question of how to classify the construction in (8c). On the one hand, at least for the English construction it can be said that *fall* has undergone some delexicalisation and acquired an inchoative meaning. On the other hand, the use of *fall* in this sense highly idiomatic and restricted to few constructions such as *fall in love* and possibly *fall victim to*. Therefore, *fall asleep* can be said to be a lexicalised construction contatining a grammaticalised verb *fall* to a certain degree.

(8) a. Savosavo
bo sara tulolo to-va kama alu gore-ɰɻu=e
go reach then 3DU-GEN.M already stand dig-NMLZ=EMPH
'Arrived there and then they started digging.'
(Wegener 2008: 192)

b. Kannada
naanu ella haalənnu kuɖɭdu biɖutt eene
1SG all milk drink leave:FUT:PFV
'I'll drink up all the milk.' (Abbi and Gopalakrishnan 1991: 171)

c. Bangla
ritu gʱum-ije poɽ-l-o
Ritu sleep-PTCP fall-3-PST
'Ritu fell asleep.' (Paul 2003: 5)

2.3.2. *Causatives*

Causativisation, like aspect-modification, is another process that can be expressed by different lexical and grammatical means in the world's languages, including in some languages multi-verb constructions which are sometimes taken for VV compounds. As was the case with aspect-modifying verbs, this is problematic from two perspectives: Firstly, the verb bearing the causative meaning usually does not contribute its original, full lexical meaning to the construction, which means that it underwent grammaticalisation. Secondly, causativisation is a pattern frequently observed in SVCs. The following examples illustrate the use of causativising verbs in SVCs in various languages.

(9) a. Akan
Araba dè ǹtàr̀ nó sèǹ-sɛ́ǹ-ǹ àhómá nó mú
Araba take dresses DEF hang-hang-COMPL rope DEF in
'Araba hung the dresses on the line.' (Osam 2008: 59)

b. Olutec
min=wop-tiʔkx-u peːʔan
A2(ERG)=hit-snap-COMPL.INDEP broom
'You broke the broom.' (Zavala 2006: 285)

c. Olutec
yak-ʔix-nax-küx
CAUS(<‘give’)-see-cross-3PL
‘teach to read’ (Zavala 2006: 287)

d. Savosavo
lo=la=ze te bome
3SG.M=LOC.M=3PL.NOM EMPH shoot.2/3PL
z-ave-mi-zu
3PL.O-kill-3PL.O-PST.IPFV
‘With that, they shot them dead.’ (Wegener 2008: 187)

e. Tariana
du-enipe-nuku duɾa du-hña-pidana
3SG.F-children-TOP 3SG.F-order 3SG.F-eat-PST
‘She ordered her children to eat.’ (Aikhenvald 2006: 182)

The Akan SVC in (9a) describes a situation in which the valency of an intransitive verb ‘to hang’ is increased by adding a causer role. The causative verb with the original meaning ‘to take’ and the main verb (reduplication is an exponent of plural agreement and not relevant to the discussion here) are ordered iconically and the semantic motivation for the causative verb is still transparent: In order to make something hang, one first has to take it into one’s hands and bring it to a position where hanging is possible. In the Olutec example in (9b), the valency modification is similar to the Akan example, but the causative relation between the two verbs is not as straightforward, as the construction ‘hit + snap’ can also acquire a resultative interpretation, depending on which part of the denoted complex situation is the prominent one. Note that the composition of both verbs in (9b) is relatively transparent (unless we assume a purely *violent manner* reading for V1 or a perfective reading for V2). This and the verbs’ immediate adjacency make this construction a possible candidate for a VV compound. One last remark concerning Olutec has to be made. Olutec has a causative marker *yak-* which stems from a full verb meaning ‘offer, give away’ but has by now completely grammaticalised into a causative (and passive) prefix (Zavala 2006: 289-290), as illustrated in (9c). This shows that there can be a high degree of variation as to how strongly verbs in causative constructions can be delexicalised and also how much they resemble lexical compounds.

The example from Savosavo in (9d) displays a curious instance of ambiguity with respect to how the relation between the two verbs ‘shoot’ and ‘kill’ is best interpreted, as there are (at least) three possible ways to describe the relations: *temporal* (V1 ≫ V2), *causal* (V1 → V2), and *manner* (V2(…, V1). Finally, in the Tariana data in (9e), an example of a SVC (note the marking asymmetry) with one verb (V1) bearing lexical causative function is given.

2.3.3. Movement verbs

Movement verbs are abundant among multi-verb constructions. Consider the data in (10). In (10a), a V2 meaning 'go' adds a deictic specification to V1 which is specified only for the manner of motion, 'fly'. The use of verbs corresponding to 'go' and 'come' with basic deictic meaning to specify movement away from or towards a speaker's location is a very common pattern in MVCs involving verbs of movement. (10b) illustrates another domain of movement verbs: in Meithei, the verb *thə-* 'to fall' is used to add a directional component (a downward movement) to the full verb *pa-* 'splash'. Thus, we have seen three semantic and functional blocks involved in movement constructions: *manner* of motion, including manner of transportation (running, creeping, climbing, flying, driving), *directionality* (up, down, to, in; also referred to as *path*), and *deixis* (towards or away from a specific location, usually the speaker's).[5] Hmong Njua is a language that allows for multi-verb constructions with more than two verbs and that can specify a movement for all theses three relevant components (cf. (10c)).

(10) a. Bangla
pakhi-ra ur-e gee-l-o
bird-CLF fly-PTCP go-3-PST
'The bird flew away.' (Paul 2003: 1)

b. Meithei
isiŋ ədu pa-thə-re
water that splash-fall-PFV
'The water is splashing down.'(Abbi and Gopalakrishnan 1991: 176)

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[5] Extensive cross-linguistic research been done on the composition of movement events. For a more extensive discussion, the reader is referred to Talmy (1985) and subsequent work as well as Croft et al. (2010) and references therein.

c. Hmong Njua (= (5b))
Puav dlha tawm moog.
3PL run(=MOT) leave(=DIR) go(=DEICT)
'They ran out (away from the speaker).'
(Harriehausen-Mühlbauer 1992: 402)

Integrating verbs denoting deixis or directionality into VV compounds poses the same problems as the cases discussed earlier: their usage is often productive, they can be freely combined with a large set of verbs, and they often display a high degree of grammaticalisation.[6]

Below, examples from two more languages are presented. The SVCs in (11) are enlightning because they show that multi-verb constructions can be subject to contact-induced language change (Krasovitsky and Sappok 2004: 88-95). In Contemporary Standard Russian, such constructions under one single intonation contour are not possible (or strongly marked stylistically), whereas they have become a productive and frequently used pattern in several Siberian (and also some North) Russian dialects. Finally, the example in (12) demonstrates that grammaticalised movement verbs can also fulfill aspectual functions (see also Tenny 1995).

(11) a. Mezen' region (North Russia): no intervening element
Tolʲko vot ryb-u ezd-jat lov-jat.
only PART fish-ACC go-3PL catch-3PL
'They only catch fish.' (Russian Regional speech database, www.rureg.de, code MEZ1-02-27-a)

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[6] English is perhaps not so well-suited to explain the notion of *grammaticalisation* in the sense of a decrease in lexical specification, as English is satellite-framed and the most basic English movement verb *go* as only deictic meaning, being underspecified for directionality and manner of transportation (with moderate-pace on-foot-movement as default interpretation). For that reason, it is completely grammatical (and even more idiomatic) to say *to go by bus* instead of *to drive by bus*. In other languages, however, basic movement verbs can have richer representations. Thus, Polish *iść* 'go' is specified for deixis and manner of motion (and also for the determinate/indeterminate distinction typical of Slavic motion verbs), and therefore, only *jechać pociągiem* (drive train:INS) 'to go by train' is grammatical, whereas **iść pociągiem* (go train:INS) is not.

b. Russkoe Ust'e region (Siberia): PP intervening
A ja sid-ju v narte ed-u.
and 1SG sit-1SG in sledge ride-1SG
'And I sit in the sledge and ride.'
(Russian Regional speech database,
www.rureg.de, code RUS1-03-23-a)

(12) Thai
bàːi níː pʰŏm djàʔ pai sɯ́ː kʰɔɔŋ
afternoon this 1SG.M FUT go buy things

'I will go shopping today in the afternoon.'

2.3.4. *Converses*

One semantic property found among VV compounds in some languages is a converse relation between the component verbs. A converse relation holds when two entities specify the direction relative to each other along some axis (*below/above*, *before/after*; axes can be metaphorically extended, e.g. in *master/servant*) or two events logically entail each other, as in *buy/sell* or *teach/learn* (Cruse 1986: 231-240). This type of relation in multi-verb constructions seems to be especially widespread in the Southeast Asian area. Thus, in the verbs in (13), both *hū-xī* 'to breathe' and *mua bán* 'to trade' can be seen as actions that consist of two antithetical (converse) subactivities: *breathing* involves both *inhaling* and *exhaling*, and *trading* usually involves at least one person *selling* and another person *buying* goods.

(13) a. Mandarin Chinese
hū-xī
inhale-exhale
'to breathe' (Ralli 2009: 51)

b. Vietnamese (see (5a))
mua-bán
buy-sell
'to trade'

There are two reasons for assuming most converse MVCs are VV compounds and not SVCs. Firstly, the combinations are highly restricted: for each verb that qualifies as converse, there is only one corresponding verb to form a compound with (not considering synonyms), and the respective counterpart is selected on genuinely semantic grounds. Secondly, it is safe to assume that converses are conceptualised as one event and not as multiple events. One indication for this assumption is that languages lacking such constructions usually have a single lexeme corresponding to the converse compounds, for instance English *trade* for (13b) and *breathe* for (13a)[7].

Converse VV compounds can be seen as a special instance of coordinative dvandva compounds (Bauer 2009). It is unclear, however, if they can be further classified as belonging to Bauer's 'additive' group or 'co-hyponymic' group. While it is true that *buy* and *sell* are co-hyponymic with respect to *trade*, so are *bargain* and *negotiate*, but to my knowledge no language has a VV compound consisting of two such verbal elements and denoting 'trade'.

2.3.5. Lexicalisation

If we accept that compounding results in the creation of new lexemes, it is reasonable to assume the same criteria associated with lexicalisation in general (transparency, productivity, autonomy, etc.; see Brinton and Traugott 2005 for a detailed discussion) to be applicable to the task of identifying VV compounds. Take the examples in (14). Obviously, both verbal nexus compounds do not have transparent meaning: For a non-native speaker of German who is confronted with (14a) or (14b) for the first time, any of the suggested readings may seem plausible at first. Therefore (and for obvious other morphological reasons), these words can well be argued to be stored in a speaker's lexicon as one unit and are unlikely to be decomposed during processing.

(14) German:
a. Hell- seh- er
bright- see- NMLZ
'clairvoyant' / 'someone who is only capable of seeing in a well illuminated environment'

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[7] Curiously, in the original outline of the Generative Lexicon framework, converses are formalised as $e_1{}^* \; R_\alpha \; e_2{}^*$, i.e. as denoting two equally prominent events (Pustejovsky 1995: 73). In my view, this is problematic given Pustejovsky's two example verbs *give* and *marry*: in Pustejovsky's account, the difference between the event structures of these verbs lies solely in their temporal alignment, with e_1 preceding e_2 in *give*, and e_1 taking place simultaneously with e_2 in *marry*. However, to me, the crucial difference is in *head* rather than in temporal structure: *give* highlights the giver's part in a transaction event, whereas *marry* has no internal preference (though in sentences like *John married Sue* the subject will be more salient simply by virtue of semantic role hierarchy (Keenan and Comrie 1977)) .

b. Fern- seh- er
far- see- NMLZ
'television set' / 'someone who stares into the distance'

However, a large amount of *verbal compounds* discussed in the literature are lexicalised to a substantially lower degree, and in fact, the data discussed in section 2.3 has provided some examples of grammaticalised verbal material in various MVCs.[8] Throughout the preceding sections, it has been argued that only converses are likely to pose instances of lexicalised VV compounds. While the reasoning has been predominantly semantic, it should not be forgotten that grammatical and phonetic criteria must ultimately complement lexical criteria. Thus, in Edo, evidence for the lexicalisation of the V + particle construction comes from the ability to combine these constructions with vowel prefixes to form derived nouns, in the same way that nouns can be derived from simple monosyllabic (CV) verbs: *ɔ́fùré* 'peace' < ɔ́ 'NMLZ' + fùré < fù 'be calm, peaceful' + ré 'PART' (Agheyisi 1986: 278). Finally, it should be noted that several types of grammaticalised verb meanings in MVCs such as benefactive, emphasis, abruptness or psychological senses have not been mentioned in the preceding chapters for the sake of brevity. At this point, the reader is referred to Abbi and Gopalakrishnan (1991) for a survey of such functions in Indian and South Asian languages.

2.4. Conclusion

This section discussed some of the criteria that can be helpful for identifying VV compounds as opposed to other multi-verb constructions. It was observed that among the semantic factors, functional shifts associated with grammaticalisation are a strong indicator for a non-lexical status. The discussion in this section bears relevance to the present study because it argues for a distinction between syntactic and lexical multi-verb units and thus justifies the use of lexicalist models to treat those MVCs that qualify as lexical VV compounds.

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[8] Brinton and Traugott (2005: 122-129) present a subtle debate on the lexical status of phrasal and prepositional verbs in English. Phrasal verbs (e.g. *fall down* 'collapse', *grind sb. down* 'oppress sb.') are analysed as consisting of a lexical verb and one out of a limited set of phrasal particles with aspect function that evolved out of spatial meaning predominant in OE. They are therefore argued to represent an instance of grammaticalisation (though the authors acknowledge a certain "gradience in grammaticality"; consider also the high token frequency of some phrasal verb combinations such as *pick up* and *write down*). Prepositional verbs such as *frown on* 'disapprove' or *take sth. for* 'regard', on the other hand, are argued to be lexicalised. Since syntactic tests such as fronting and passivisation yield ambiguous bracketing of [NP V Prep NP] sequences, the authors point out a high degree of idiomatisation and unpredictability of such sequences, and propose a diachronic account that sees prepositional verbs as functional replacement for obsolete prefixed verbs.

3. VV compounds in Korean

Composition is a highly productive means of word formation in Korean. Based on which part of speech the resulting compound belongs to, the four major groups of compounds in (15) can be identified (Lee and Ramsey 2000: 108-116). (15b) is a rather heterogeneous group and comprises at least six sub-types which are given in (16) (Lee and Ramsey 2000: 109).

(15) a. nominal compounds
son- mok
hand- neck
'wrist'

b. verbal compounds (cf. (16))
p^ha- ko- tɯl -ta
dig- KO- raise- INF
'to investigate'

c. adjectival compounds
kəm- pulk- ɯn
black- red- PTCP
'dark red'

d. adverbial compounds
pam- nas
night- day
'day and night'

(16) a. N + V (SBJ + PRED)
him- tɯl- ta
strength- take- INF
'to be difficult'

b. N + V (OBJ + PRED)
him- ssɯ- ta
strength- use- INF
'to try hard'

c. N + V (ADV + PRED)
kəul- sam- ta
mirror- take as- INF
'to take as an example'

d. V_{infl} + V (=(6e))
ara- tɯt- ta
know.CVB- hear- INF
'to understand sth. said'

e. V_{stem} + V (=(6f))
kulm- tɕuri- ta
hunger- starve- INF
'to starve'

f. ADV + V
tɕal- toe- ta
well- become- INF
'to turn out well'

Note that (16a-c), (16d-e) and (16f) differ from one another with regard to which part of speech the first constituent belongs to and that the distinction of (16d) from (16e) is the only one where morphological marking comes into play: two verbs can be combined to form a compound either by adding a stem to an inflected verb form (16d) or by bare stem concatenation (16e), as discussed in chapter 2.2. Note further that the six verbs in (16) differ from one another considerably as far as their semantic transparency is concerned: while (16e–f) display a transparent semantic make-up (the details concerning the semantics of (16e) will be discussed in chapter 4.1), the case is more ambiguous with (16a–b). Albeit the respective meanings are well derivable from the two elements of the synthetic compound, the two expressions are lexicalised and highly idiomatic. In (16d), the participants' structure is not represented in the compound, which also hints at a certain degree of lexicalisation. (16c), finally, represents a clear case of metaphoricity: *take a mirror* in the sense of *take as an example* implies a metaphoric relation between 'mirror' and 'example' with a conceptual link to 'visibility' and 'pictoriality'. This implies that metaphoricity in compounding is not restricted to phrasal and appositive nominal compounds like *punch-in-the-stomach-effect* or *mushroom cloud* discussed in Scalise and Bisetto (2009) but can also be employed for word formation in NV compounds. In fact, it will be argued later on that metaphoric compounding is possible for VV compounds, too.

4. Korean VV compounds in the generative lexicon

This section presents an analysis of three Korean VV compounds in the Generative Lexicon framework (Pustejovsky 1991, 1995, Pustejovsky et al. 2013). As stated earlier, the analysis will be limited to stem-concatenating compounds. In all three compounds, both component verbs contribute lexical (and not grammatical) meaning, and neither of them allow intervening material, which in sum justifies the claim that they are indeed true VV compounds. It will be argued that three lexical operations are necessary to derive the semantics of the three compounds *kulmtɕurida* 'to hunger (involuntarily), to yearn', *ttwinolda* 'to frolic', and *purɯtɕitta* 'to demand, to protest loudly' (Lee and Ramsey 2000: 109): SIMPLE_UNIFY, which unifies two GLEs with compatible argument structures (ARGS) and QUALIA structures; MANNER_UNIFY, which can be applied to GLEs with incompatible QUALIA structures; and METAPHOR_UNIFY, which provides a means to unify GLEs with incompatible entries in the ARGS.

4.1. Simple unify

The first operation, SIMPLE_UNIFY, applies to VV compounds whose components are semantically similar in that they share certain semantic features in all three major domains of their GLEs.

When structure, entries and values in one GLE are fully identical to those of another GLE or a subset thereof, two GLEs can be unified without having to define any further steps. However, unification is also possible when there is only partial agreement between two GLEs, provided the most crucial parameters in ARGS are identical: for each of the obligatory arguments of one GLE, there must be an identical entry with the same index included in the other GLE's obligatory arguments or no entry at all, but not two entries with different types. For instance, two GLEs with one obligatory argument ARG1 each, the first one specified for **human** and the second one specified for **artifact**, cannot undergo simple unification, as some sort of controlling mechanism (rule, constraint etc.) is required to determine which of the argument specifications are to be inherited by the compound's ARGS. Likewise, if the mismatch was to be resolved by passing both arguments to the compound's GLE separately, one would need to somehow discern how the arguments are ordered and how they relate to the two originally intransitive verb meanings.

Optional arguments (D-ARG), however, are not affected by this restriction, as they do not belong to a verb's core arguments. D-ARG type clashes are resolved by serialising the D-ARG entries, i.e. creating a list L containing all D-ARG entries of V1 and appending all D-ARG entries of V2 to L, adding n(D-ARG(V1)) to every index of *d-arg* in V2.

Consider the sentences in (17)–(23). The compound *kulmtɕurida* 'to hunger (involuntarily), to yearn' is composed of the verbs *kulmda* 'to not eat, to hunger, to fast' and *tɕurida* 'to hunger; to yearn'. While both components share the meaning 'to not eat', *kulmda* is not specified for voluntariness and lacks the second meaning 'to yearn' which is present in *tɕurida*. V2, however, is not only richer with respect to sense number, it is also more specific, as it is specified for involuntariness for the first sense 'to not eat': *tɕurida* can only be used to express a situation in which a living being is forced to hunger against its will. In the examples below, both the arguments of V1 (food in (17) and (23)) and V2 (abstract nouns in (19) and (21)) are included in the argument structure of the VV compound ((21)–(23)).[9] In addition, the polysemous state of V1 regarding the voluntariness of the actions explicated in the QUALIA (see (17) and (18)) has been resolved in favor of the negative reading from V2 (cf. (19) and (20)). Finally, note that the inherent argument of V2 denoting the affected body part in (20) is also present in the lexical representation of the VV compound (see (26)), although the usage of *kulmtɕurida* with its shadow argument seems to be not so common and the number of actual occurrences is rather low (therefore, this argument-verb combination is missing in the examples).

(17) Sora-ka muge ttaemune i il tɕənjək kulm-nɯnda.
Sora-SBJ weight because.of two day dinner not.eat-PRS
'Because of her weight Sora abstains from dinner for two days.'

(18) Kamum ttaemune saram-tɯl-i kulm-nɯnda.
drought because.of person-PL-SBJ not.eat-PRS
'Because of the drought people hunger.'

(19) Kɯ-nɯn tɕisik-e tɕuri-nda.
3-TOP knowledge-IO yearn-PRS
'He yearns for knowledge.'

(20) Pjəŋsa-ka pae-rɯl tɕuri-n saram-tɕʰərəm poi-nda.
soldier-SBJ belly-DO not.eat-PTCP person-like look-PRS
'The soldier appears to be starving.'

(21) tɕən-i saraŋ-e kulm+tɕuri-ko issta.
John-SBJ love-IO yearn-PROG PRS
'John yearns for love.'

(22) Kulm+tɕuri-n tasəs ai-tɯl-ɯl məkjə sal-ljə-yaman han-ta.
not.eat-PTCP five child-PL-DO feed live-CAUS-NEC do-PRS
'(He) has to feed five hungry children.'

(23) Sora-ka i il tɕənjək kulm+tɕuri-nɯnda.
Sora-SBJ two day dinner not.eat-PRS
'Sora has to leave out dinner for two days.'

---

[9] Note that the sole D-ARG in V1 gets the direct object marker and the sole D-ARG in V2 is marked by the indirect object marker while the S-ARG in V2 is marked for direct object. These syntactic properties are fully inherited by the VV compound. As the syntactic behaviour of VV compounds is not subject to the present study, this and similar issues regarding the GL-syntax interface will have to be neglected in the following discussion.

The respective GLEs are given in (24)–(26). The first component, *kulmda*, is specified for one obligatory argument (a living being that does not eat food) and one optional argument (the type of food that the living being does not eat). The fact that *kulmda* can be used regardless of whether or not the animate being voluntarily chooses to abstain from eating is captured by underspecification of voluntariness in the QUALIA of (24).

tɕurida, on the other hand, is specified for voluntariness in order to account for the differences in meaning exemplified in (17) and (20). Therefore, a CONST key with the required specification has been included in (25). It is important to bear in mind that the original idea behind the CONST mode (Pustejovsky 1991, 1995) was to define the relation between an object and the parts that constitute it, or, to put it in a more simple fashion, what an object is made of. It is obvious that CONST can easily be stated for concrete nouns like *beer*, but it becomes more difficult to handle with more complex concepts like *despair*. Since verbs are usually considered to have a high degree of abstractness, the question arises how a CONST specification can fit into a verb's QUALIA. A survey of recent papers on the Generative Lexion framework (Pustejovsky et al. 2013) reveals that the CONST mode is hardly ever used in the GLEs of verbs. But this probably does not imply that CONST is inapplicable for verbal QUALIA structures in general, although, to my knowledge, this issue has not been addressed explicitly in the literature as of yet. Rather, it is more likely that languages simply tend to prefer making use of other lexical resources in the course of generative lexical processes.

In the case of the Korean verbs *kulmda* and *tɕurida*, however, it is the "psychological state" or "constitution" of one of the participants that is the crucial semantic component, and CONST appears to be the best mode to place such a representation. While psychological states have been argued to be located in the FORMAL quale for adjectives (or derived nouns) which denote a psychological experience like *angry* or *anger* (Pustejovsky 1995: 211), the difference with the Korean verbs lies in the fact that they primarily denote events that on their own are not related to any psychological states, which is why FORMAL in *tɕurida* is already occupied and therefore inaccessible for a voluntariness specification. Further support for resorting to CONST comes from the fact that a "psychological background" implies a temporal relation in which some event is preceded by this background. In fact, in many cases CONST and TELIC also allow for a temporal interpretation apart from their canonical interpretation: CONST refers to entities or events in the past, while

TELIC points to something in the future. Thus, a GLE of *beer* will have a CONST mode containing a list of ingredients (water, malt, etc.), while its TELIC mode will contain a predication of the type **drink_act(e,x,...)**. This exactly replicates the temporal relation that holds between production, the product itself and consumption: CONST ≫ FORMAL ≫ TELIC.[10] Returning to the Korean verbs, what this means is that a deliberate decision for or against abstinence from nutrition is usually made *before* (or at the very beginning of) the process in question. Therefore, integration of the concept of "involuntariness" into the GLE structure by making use of a CONST key can be argued to be a viable analysis.

The event structure of *tɕurida* in (25) and the associated QUALIA specifications require some comments. The 'yearning' sense of *tɕurida* is represented as state ($\mathbf{e}_2$) and referenced in FORMAL. This **state** is not to be confused with the CONST value **involuntary_state**, as the latter is linked to another event, $\mathbf{e}_1$, that is associated with the verb's first sense 'to hunger'.

(24)

$$\begin{bmatrix} \textbf{KULMDA} & \text{`to hunger, to not eat (}\pm\text{voluntarily)'} \\ \text{ARGS} & \begin{bmatrix} \text{ARG1} & \textbf{x:anim\_indef} \\ \text{D-ARG1} & \boxed{1} \begin{bmatrix} \textbf{food} & \\ \text{FORMAL} & \textbf{entity} \end{bmatrix} \end{bmatrix} \\ \text{EVENTS} & \begin{bmatrix} \text{E1} & \mathbf{e_1}\textbf{:process} \end{bmatrix} \\ \text{QUALIA} & \begin{bmatrix} \text{AGENTIVE} & \textbf{not-eat\_act}(\mathbf{e_1,x_1,}\boxed{1}) \end{bmatrix} \end{bmatrix}$$

---

[10] The relationship between FORMAL and AGENTIVE possibly allows for an aspectual reinterpretation: AGENTIVE seems to be often associated with imperfective readings, whereas FORMAL attracts perfective (resultative, in particular) readings.

(25)
$$\left[\begin{array}{ll}
\textbf{TɕURIDA} & \text{‘to hunger (-voluntarily), to yearn’} \\
\textsc{args} & \left[\begin{array}{lll}
\textsc{arg1} & \multicolumn{2}{l}{\textbf{x:anim\_indef}} \\
\textsc{d-arg1} & \boxed{1} & \left[\begin{array}{ll} \multicolumn{2}{l}{\textbf{abstract}} \\ \textsc{formal} & \textbf{entity} \end{array}\right] \\
\textsc{s-arg1} & \multicolumn{2}{l}{\textbf{y:body\_part}}
\end{array}\right] \\
\textsc{events} & \left[\begin{array}{ll}
\textsc{e1} & \mathbf{e_1\text{:process}} \\
\textsc{e2} & \mathbf{e_2\text{:state}}
\end{array}\right] \\
\textsc{qualia} & \left[\begin{array}{ll}
\textsc{agentive} & \mathbf{\text{not-eat\_act}(e_1,x,y)} \\
\textsc{formal} & \mathbf{\text{want}(e_2,x,\boxed{1})} \\
\textsc{const} & \mathbf{\text{involuntary\_state}(e_1,x,y)}
\end{array}\right]
\end{array}\right]$$

(26)
$$\left[\begin{array}{ll}
\textbf{KULMTɕURIDA} & \text{‘to hunger (-voluntarily), to yearn’} \\
\textsc{args} & \left[\begin{array}{lll}
\textsc{arg1} & \multicolumn{2}{l}{\textbf{x:anim\_indef}} \\
\textsc{d-arg2} & \boxed{1} & \left[\begin{array}{ll} \multicolumn{2}{l}{\textbf{food}} \\ \textsc{formal} & \textbf{entity} \end{array}\right] \\
\textsc{d-arg1} & \boxed{2} & \left[\begin{array}{ll} \multicolumn{2}{l}{\textbf{abstract}} \\ \textsc{formal} & \textbf{entity} \end{array}\right] \\
\textsc{s-arg1} & \multicolumn{2}{l}{\textbf{y:body\_part}}
\end{array}\right] \\
\textsc{events} & \left[\begin{array}{ll}
\textsc{e1} & \mathbf{e_1\text{:process}} \\
\textsc{e2} & \mathbf{e_2\text{:state}}
\end{array}\right] \\
\textsc{qualia} & \left[\begin{array}{ll}
\textsc{agentive} & \mathbf{\text{not-eat\_act}(e_1,x,\boxed{1},y)} \\
\textsc{formal} & \mathbf{\text{want}(e_2,x,\boxed{1},\boxed{2})} \\
\textsc{const} & \mathbf{\text{involuntary\_state}(e_1,x,\boxed{1},y)}
\end{array}\right]
\end{array}\right]$$

The VV compound GLE in (26) results from combining the two verbs’ GLEs according to a set of unification rules given in (27). Note that the only obstacle to plain unification is the handling of the D-ARG entries in ARGS, for which an appending procedure is employed.

(27) Let GLE$_1$ and GLE$_2$ be lexicon entries of V$_1$ and V$_2$ and let V$_1$ and V$_2$ form a VV compound with GLE$_3$ being its lexicon entry and let L$_{1\ldots n}$ be lists of all D-ARG entries in V$_{1\ldots n}$, then the following holds for GLE$_3$, provided $\tau(\text{ARG}_i(\text{ARGS}(\text{GLE}_1))) = \tau(\text{ARG}_i(\text{ARGS}(\text{GLE}_2)))$ for all i and $\pi(\text{j}(\text{QUALIA}(\text{GLE}_1))) = \pi(\text{j}(\text{QUALIA}(\text{GLE}_2)))$ for all j in GLE1:
$L_3 = L_1 + L_2$,
$\text{ARGS}(\text{GLE}_3) = (\text{ARGS}(\text{GLE}_1) - L_1) \cup (\text{ARGS}(\text{GLE}_2) - L_2) \cup L_3$,
$\text{EVENTS}(\text{GLE}_3) = \text{EVENTS}(\text{GLE}_1) \cup \text{EVENTS}(\text{GLE}_2)$,
$\text{QUALIA}(\text{GLE}_3) = \text{QUALIA}(\text{GLE}_1) \cup \text{QUALIA}(\text{GLE}_2)$.

4.2. Manner unify

When one or more components of the two verbs' GLEs (EVENTS, QUALIA or core arguments in ARGS) do not agree, we need to state explicitly how the substructures of the verbs' GLE are to be unified in order for unification to succeed. This means that it becomes necessary to specify routines of how to restructure, alter or delete certain parts of the GLE structure.

I will now discuss a case in which distinct QUALIA prohibit simple unification, and argue that feature preservation by restructuring yields the correct semantics of the resulting compound, which exhibits manner modification. The verb under discussion is *ttwinolda* 'to frolic', which contains the stems *ttwi-* 'run; jump, hop and *nol-* 'play'. Examples of these three verbs are given in (28)–(32).

(28) tɕən-i mom təpʰi-rjəgo ttwiə-ssta.
John-SBJ body warm.up-FIN jump-PST
'John jumped around to warm up.'

(29) Mulgogi-ka naesmul wiro ttwiə-ssta.
fish-SBJ stream over jump-PST
'Fish jumped over the stream.'

(30) Kɯ-nɯn tɕip-kkatɕi ttwiə ka-ssta.
3-TOP house-LIM run.CVB go-PST
'He ran all the way to his home.'

(31) Ai-tɯl-i pakk-esə nol-ko issta.
child-PL-SBJ outside play-PROG PRS
'The children are playing outside.'

(32) Oraettoŋan pakk-esə ttwi+nol-assta.
long.time outside frolic-PST
'(They) frolicked around for a long time outside.'

The semantic relation between *ttwinolda* 'to frolic' and its second component, *nolda* 'to play', resembles that of endocentric nominal compounds: 'frolicking' can be considered a hyponym of 'playing', with an additional semantic component of 'running and jumping around' provided by *ttwida*. Such manner modifications are not uncommon for VV compounds in the Southeast Asian area (see Lieber 2009: 103 for a discussion of manner modification in Japanese VV compounds). What is special for Korean *ttwinolda*, however, is that it combines both readings of *ttwida* 'to run; to jump'. While the two readings can be argued to be linked conceptually (both denote actions involving movement, especially in a sportive context), we nevertheless have to assume that we are dealing with two different homonymous lexemes with the corresponding GLEs given in (34) and (33). The fact that the resulting compound draws upon both the **run** and the **jump** senses suggests that some kind of semantic merging must have taken place. More precisely, the relations specified in the verbs' AGENTIVE quale must have been merged while fully retaining both individual actions associated with them in the event structure.

(33)
$$\begin{bmatrix} \textbf{\textsc{ttwida-2}} & \text{`to run'} \\ \textsc{args} & \begin{bmatrix} \textsc{arg1} & \textbf{x:anim\_indef} \end{bmatrix} \\ \textsc{events} & [\ \mathbf{e_1}\textbf{:process}\ ] \\ \textsc{qualia} & \begin{bmatrix} \textsc{agentive} & \textbf{run\_act(}\mathbf{e_1}\textbf{,x)} \end{bmatrix} \end{bmatrix}$$

(34)
$$\begin{bmatrix} \textbf{\textsc{ttwida-1}} & \text{`to jump, to hop'} \\ \textsc{args} & \begin{bmatrix} \textsc{arg1} & \textbf{x:anim\_indef} \end{bmatrix} \\ \textsc{events} & [\ \mathbf{e_1}\textbf{:process}\ ] \\ \textsc{qualia} & \begin{bmatrix} \textsc{agentive} & \textbf{jump\_act(}\mathbf{e_1}\textbf{,x)} \end{bmatrix} \end{bmatrix}$$

In (35), a definition of a procedure that merges the two GLEs and fuses the actions specified in AGENTIVE is given. Merging works in a way similar but not identical to the Merge operation in Minimalist Syntax (Chomsky 1995). The relevant fragment of the merged GLE is given in (36).

(35) HOMONYMIC MERGING: GLEs of conceptually related homonyms which differ in QUALIA key specifications and which have only one entry in EVENTS can be merged by overwriting EVENTS with a list containing the

events in V1 and V2 and a specification for $\mathbf{e}_1\ \mathbf{o}_\alpha\ \mathbf{e}_2$ and by *&*-conjoining the respective qualia relations.

(36)
$$\begin{bmatrix} \text{EVENTS} & \begin{bmatrix} \boxed{1} & \begin{bmatrix} \mathbf{e_1{:}process} \\ \mathbf{e_2{:}process} \\ \mathbf{e_1\ o_\alpha\ e_2} \end{bmatrix} \end{bmatrix} \\ \text{QUALIA} & \begin{bmatrix} \text{AGENTIVE} & \mathbf{jump\&run\_act}(\boxed{1}) \end{bmatrix} \end{bmatrix}$$

Returning to the problem of VV composition, the issue of the ununifiable qualia is still unresolved. The semantics of *ttwinolda* can be described as 'playing while jumping and running around' or 'playing by moving around in a manner that involves jumping and running'. To derive such semantics from the two component verbs, we have to assume a process that makes the compound take the second verb as its semantic head and the first verb as its modifier. A unification process therefore has to deal with two tasks at once:

(37) a. Modifier Task: The internal structure of the compound has to include a specification of the head-modifier relation of V1 and V2.
b. Manner Task: The representation of the compound has to include a manner modification relation between V1 an V2.

In the Generative Lexicon, the tasks (37) can be completed as follows. Since the two args are identical, unification of this component does not pose a problem. The two events are both being integrated into the compound's GLE and remain separate events. The relation of V1 and V2 is being stated as simultaneous and the event of V2 is assigned head status (thus fulfilling the Modifier Task). qualia, finally, is being created with an empty formal and an empty agentive structure. The complete qualia of V1 is inserted into the compound's agentive and the complete qualia of V2 is inserted into the compound's formal, which solves the Manner Task.

Note that manner_unify has the exact opposite effect as collapse, a process transforming the complete qualia of V1 into the compound's formal and the complete qualia of V2 into the compound's agentive, that has been suggested for Japanese verb concatenations like *mite kita* 'to see and come' (Nakatani 2013).

Below, the GLEs of the two component verbs and the VV compound are given; a formal definition of MANNER_UNIFY is given in (41).[11] Note that D-ARG items are not relevant to the current discussion and are therefore not included in the GLEs.

(38)

$$\begin{bmatrix} \textbf{TTWIDA-1\&2} & \text{`to hop, to run'} \\ \text{ARGS} & \begin{bmatrix} \text{ARG1} & \textbf{x:anim\_indef} \end{bmatrix} \\ \text{EVENTS} & \begin{bmatrix} \boxed{1} & \begin{bmatrix} \mathbf{e_1{:}process} \\ \mathbf{e_2{:}process} \\ \mathbf{e_1 \ o_\alpha \ e_2} \end{bmatrix} \end{bmatrix} \\ \text{QUALIA} & \begin{bmatrix} \text{AGENTIVE} & \textbf{jump\&run\_act(}\boxed{1}\textbf{,x)} \end{bmatrix} \end{bmatrix}$$

(39)

$$\begin{bmatrix} \textbf{NOLDA} & \text{`to play'} \\ \text{ARGS} & \begin{bmatrix} \text{ARG1} & \textbf{x:anim\_indef} \end{bmatrix} \\ \text{EVENTS} & [\ \mathbf{e_1{:}process}\ ] \\ \text{QUALIA} & \begin{bmatrix} \text{AGENTIVE} & \mathbf{play\_act(e_1,x)} \end{bmatrix} \end{bmatrix}$$

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[11] The event structure of *ttwinolda* in (40) is inconsistent with a claim made by Abasalo (1977) regarding semantic governance in V-əV compounds such as *nəmə-kada* (cross-go) ‘to go over’. Abasalo argues for a lexical aspect hierarchy that automatically predicts head selection: *action-process* ≫ *action* ≫ *process* ≫ *state*. This hierarchy would make the (incorrect) prediction that the first component of (40) is assigned head status. However, as the majority of Abasalo’s VV compound data involve movement verbs or are better analysed as morphological derivations, it is questionable whether this hierarchy qualifies for VV compounds in the narrow sense employed in the present study in the first place.

(40)

$$\left[\begin{array}{ll}
\text{TTWINOLDA} & \text{‘to frolic’} \\
\text{ARGS} & \left[\begin{array}{ll}\text{ARG1} & \mathbf{x{:}anim\_indef}\end{array}\right] \\
\text{EVENTS} & \left[\begin{array}{ll} \boxed{1} & \left[\begin{array}{l} \mathbf{e_1{:}process} \\ \mathbf{e_2{:}process} \\ \mathbf{e_1\ o_\alpha\ e_2}\end{array}\right] \\ \boxed{2} & \left[\mathbf{e_3{:}process}\right] \\ \boxed{1}\ o_\alpha\ \boxed{2}^{*} & \end{array}\right] \\
\text{QUALIA} & \left[\begin{array}{ll}\text{FORMAL} & \mathbf{play\_act}(\boxed{2},\mathbf{x}) \\ \text{AGENTIVE} & \mathbf{jump\&run\_act}(\boxed{1},\mathbf{x})\end{array}\right]
\end{array}\right]$$

(41) Let GLE_1 and GLE_2 be lexicon entries of V_1 and V_2 and let V_1 and V_2 form a VV compound with GLE_3 being its lexicon entry, then the following holds for GLE_3, provided $\tau(\text{ARG}_i(\text{ARGS}(\text{GLE}_1))) = \tau(\text{ARG}_i(\text{ARGS}(\text{GLE}_2)))$ for all i and $\pi(\text{j}(\text{QUALIA}(\text{GLE}_1))) \neq \pi(\text{j}(\text{QUALIA}(\text{GLE}_2)))$, $\text{j} = \text{AGENTIVE}$:
$\text{ARGS}(\text{GLE}_3) = \text{ARGS}(\text{GLE}_1) \cup \text{ARGS}(\text{GLE}_2)$,
$\text{EVENTS}(\text{GLE}_3) = \text{EVENTS}(\text{GLE}_1) \cup \text{EVENTS}(\text{GLE}_2)$,
$\text{HEAD}(\text{EVENTS}(\text{GLE}_3)) = \text{EVENTS}(\text{GLE}_2)$,
$\text{FORMAL}(\text{QUALIA}(\text{GLE}_3)) = \text{AGENTIVE}(\text{QUALIA}(\text{GLE}_2))$,
$\text{AGENTIVE}(\text{QUALIA}(\text{GLE}_3)) = \text{AGENTIVE}(\text{QUALIA}(\text{GLE}_1))$.

4.3. Metaphor unify

The third operation, METAPHOR_UNIFY, is designed to deal with clashes caused by type mismatch of the core arguments in ARGS. Assume the unification mechanism for two Vs has come to a stage Σ at which an ARG_i with a semantic type specification τ_i in V1 has to be unified with an ARG_i in V2 specified for τ_j. Out of the several possible strategies how to resolve this mismatch, I argue that it is *deleting* which correctly derives the semantics of metaphoric VV compounds in Korean. Deletion of an argument ARG_i in V_x and subsequent unification of V_x with a V_y that contains a (formerly) incompatible specification for ARG_i will succeed because it bypasses the value checking procedure of the standard unification procedure and can therefore avoid crashes when encountering incompatible structures or features. The same holds, of course, for the manipulation of larger structures such as a whole ARGS. Note that technically, *overwriting* or *selecting and copying* could be argued to yield the same results as deletion, but we will see that this is not the case for the VV compound under discussion in this chapter.

For two verbs to form a compound in a lexicon and to thereby allow for conceptual combination of their individual events, one could expect all (core) participants of V1 and V2 to be included in the compound's semantic structure. Some compounds, however, behave differently in this respect and include only a subset of the two verbs' arguments when unification of some ARG$_i$ is blocked by incompatible type specifications. When one of the problematic entries is not integrated into the compound, this can lead to a metaphoric semantic interpretation, which is the case in *purɯtɕitta* 'to demand, to protest loudly'. Consider the examples in (42)–(44). The agent role of V1, *purɯda* 'to call', is occupied by a human being, whereas in the second verb, *tɕitta* 'to bark', the agent is necessarily a dog. The action denoted by the VV compound, 'to demand loudly', has nothing to do with dogs, but it is possible to imagine a scenario in which a group of people shout violently all at once while protesting for e.g. an increase in pay during a union strike. For the addressee (or a passive observer), having problems to make out the individual utterances made by each of the group members in such a situation, those people could resemble (a group of) dogs in emitting loud, indecipherable noises.

(42) Ai-nɯn əmma-rɯl burɯ-nda.
child-TOP mother-DO call-PRS
'The child calls its mother.'

(43) Kae-ka saram-ɯl (po-ko) məŋməŋ tɕit-ta.
dog-SBJ man-DO (see-CNJ) ONOM bark-PRS
'The dog barks at the man (/sees the man and barks).'

(44) Hanguk-ɯn kuktɕehwa-rɯl purɯ+tɕitɕ-əssta.
Korea-TOP internationalisation-DO call+bark-PST
'As for Korea, voices have been raised demanding internationalisation.'

Apart from the type incompatibility, the verbs also differ in crucial aspects in all of their GLEs' representational levels; the only shared property is the basic meaning of sound emission. This is represented by the **make-noise_act** relation in the AGENTIVE quale in the verbs' GLEs in (45) and (46). When examined more closely, it is conspicuous that the GLE of V1 is not only richer in specification than the GLE of V2 but that its EVENTS and QUALIA levels are even proper supersets of the respective levels in V2 as far as structure and relations are concerned. The ARGS entries and their semantic type values, however, are not compatible, as the agent role of the compound *purɯtɕitta* 'to demand, to protest loudly' is reserved for human beings and not for animals. Unification of V1 and V2 can therefore be achieved by discarding ARGS of V2 and subsequently unifying the two verbs' ARGS, EVENTS and QUALIA.

'Discarding' here means that the respective structure is not considered in the ensuing unification procedure, and the technical implementation of that idea is crucial if one wants to fully and correctly derive the compound's GLE given in (47). It is vital to the current discussion that there is a mismatch in the argument types referenced by the **make-noise** relation in the AGENTIVE quale: In (45), reference is made to ARG$_1$ and S-ARG$_1$, whereas in (46), reference is made to ARG$_1$ and D-ARG$_1$. The fact that unification is successful despite this mismatch and that the compound's **make-noise** relation is identical to that of V1 is strong evidence for assuming *deletion* to have taken place. If ARGS of V2 is deleted before the proper unification procedure is initiated, the two arguments in the AGENTIVE quale will have lost their problematic references. It does not affect the outcome of the unification whether the structure at this stage is analysed as containing empty place holders ($\mathbf{R}(\mathbf{e}_1, \_, \_)$) or no argument slots at all ($\mathbf{R}(\mathbf{e}_1)$). Now consider the alternatives. Selection of ARGS of V1 and its copying into VV would pose serious problems for the subsequent unification process of QUALIA, as the argument mismatch in AGENTIVE would not be resolved. Overwriting ARGS in V2 with ARGS of V1 would even cause greater problems because some of the referring symbols in the QUALIA would no longer be aligned with those in ARGS: the referrers would point to some non-existing arguments and other arguments would not be referred to in the QUALIA at all.[12]

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[12] The argument shift of ARG2 to D-ARG1 and the concomitant type shift from **anim_indef** to **abstract** is an issue yet to be resolved and will not be particularly addressed in this study. I do not have any story about motivating factors for this shift nor any formal account at hand, except for the speculative assumption that those situations in which the metaphorical extension of V1 to V2 is appropriate tend to frequently involve very well specified demands for different, but predominantly abstract things. While such a conjecture could explain why the two shifts took place at a certain point after the VV compound had been lexicalised, it is still unclear how to integrate these shifts into a general model of unification if one does not want to resort too much to word-specific rules.

$$\text{(45)}\quad \left[\begin{array}{ll} \textbf{PURɯDA} & \text{‘to call’} \\ \text{ARGS} & \left[\begin{array}{ll} \text{ARG1} & \textbf{x:human} \\ \text{ARG2} & \textbf{y:anim\_indef} \\ \text{S-ARG1} & \textbf{z:voice} \end{array}\right] \\ \text{EVENTS} & \left[\begin{array}{ll} \text{E1} & \mathbf{e_1}\textbf{:process} \\ \text{E2} & \mathbf{e_2}\textbf{:state} \\ \multicolumn{2}{l}{e_1^{*} \langle_{\alpha} e_2} \end{array}\right] \\ \text{QUALIA} & \left[\begin{array}{ll} \text{AGENTIVE} & \textbf{make-noise\_act(}\mathbf{e_1}\textbf{,x,z)} \\ \text{TELIC} & \textbf{at(}\mathbf{e_2}\textbf{,x,y)} \end{array}\right] \end{array}\right]$$

$$\text{(46)}\quad \left[\begin{array}{ll} \textbf{TɕITTA} & \text{‘to bark’} \\ \text{ARGS} & \left[\begin{array}{ll} \text{ARG1} & \textbf{x:dog} \\ \text{D-ARG1} & \textbf{y:anim\_indef} \end{array}\right] \\ \text{EVENTS} & \left[\begin{array}{ll} \text{E1} & \mathbf{e_1}\textbf{:process} \end{array}\right] \\ \text{QUALIA} & \left[\begin{array}{ll} \text{AGENTIVE} & \textbf{make-noise\_act(}\mathbf{e_1}\textbf{,x,y)} \end{array}\right] \end{array}\right]$$

$$\text{(47)}\quad \left[\begin{array}{ll} \textbf{PURɯTɕITTA} & \text{‘to demand, to protest loudly’} \\ \text{ARGS} & \left[\begin{array}{ll} \text{ARG1} & \textbf{x:human} \\ \text{D-ARG1} & \textbf{y:abstract} \\ \text{S-ARG1} & \textbf{z:voice} \end{array}\right] \\ \text{EVENTS} & \left[\begin{array}{ll} \text{E1} & \mathbf{e_1}\textbf{:process} \\ \text{E2} & \mathbf{e_2}\textbf{:state} \\ \multicolumn{2}{l}{e_1^{*} \langle_{\alpha} e_2} \end{array}\right] \\ \text{QUALIA} & \left[\begin{array}{ll} \text{AGENTIVE} & \textbf{make-noise\_act(}\mathbf{e_1}\textbf{,x,z)} \\ \text{TELIC} & \textbf{at(}\mathbf{e_2}\textbf{,x,y)} \end{array}\right] \end{array}\right]$$

A formal definition of METAPHOR_UNIFY is given in (48). It is important to point out that the type specifications of ARG1 in V1 and V2 are not only non-identical, but also logically incompatible, as there is no ontological hyperonym-hyponym relation between them. Rather, both types are co-hyponymic to **anim_indef** (or, less general, **mammal**), but trying to resolve the type clash by choosing the co-hyperonymic type would create an overly general ARGS and thus lead to an incorrect GLE.

(48) Let GLE_1 and GLE_2 be lexicon entries of V_1 and V_2 and let V_1 and V_2 form a VV compound with GLE_3 being its lexicon entry, then the following holds for GLE_3, provided $\tau(\textsc{arg}_i(\textsc{args}(\text{GLE}_1))) \times \tau(\textsc{arg}_i(\textsc{args}(\text{GLE}_2)))$ for at least one i:
$\textsc{args}(\text{GLE}_2) = []$,
$\textsc{args}(\text{GLE}_3) = \textsc{args}(\text{GLE}_1) \cup \textsc{args}(\text{GLE}_2)$,
$\textsc{events}(\text{GLE}_3) = \textsc{events}(\text{GLE}_1) \cup \textsc{events}(\text{GLE}_2)$,
$\textsc{qualia}(\text{GLE}_3) = \textsc{events}(\text{GLE}_1) \cup \textsc{qualia}(\text{GLE}_2)$.

4.4. Opacity in the lexicon

Opacity refers to a situation in which building blocks interact non-transparently (Kiparsky 1973, Assmann et al. 2013). There can be several reasons why a structure does not reveal the motivation why certain processes have been applied to it. Usually, two interaction types are identified: a certain mechanism has not applied although its trigger is visible in the output (*counter-feeding*) or a certain mechanism has applied although its trigger is not visible in the output (*counter-bleeding*). While opaque interactions are probably best studied and understood in phonology, they have also attracted attention in morphology and syntax recently (e.g. Müller 2012).

Unifications always involve *structural* opacity: Given a set $S = \{a, b\}$, it is not possible to determine which of the following pairs of sets were unified when only the output S is considered: $T_1 =< \{a\}, \{b\} >$; $T_2 =< \{a, b\}, \{a, b\} >$; $T_3 =< \{a, b\}, \{\} >$; $T_4 = \ldots$. In addition, when different refined unification strategies which are triggered by certain properties of the unified objects are called upon (e.g. to overcome various sorts of clashes, as was proposed for Korean VV compounds in the preceding paragraphs), there can (but does not necessarily has to) be *operational* opacity with respect to why a specific strategy has been chosen. In the following, I will recapitulate two instances of operational opacity in the unification processes discussed above.

Let us first consider SIMPLE_UNIFY. Recall that for *kulmtɕurida* 'to hunger (involuntarily), to yearn', the two component verbs' GLEs were unified according to general value matrix principles with one additional rule that enforced appending of d-arg entries. The VV compound's args does not contain any information that could reveal which d-arg were taken from V1 and which from V2, so there is structural opacity in the compound's lexical representation. The context requirements in (27) explicitly state that identical args and partially identical qualia are needed for simple_unify to be applied. Obviously, this cannot be inferred from the compound's GLE alone, either: the structure in (26) could just as well have been constructed on the basis of two GLEs with incompatible qualia (the trigger for manner_unify) or incompatible semantic types in args (the trigger for metaphor_unify). This holds analogously for the two other VV compounds, *ttwinolda* and *purɯtɕitta*, as neither of their GLEs contains any hints at the component verbs' relation. Therefore, we observe operational opacity in all three compound unification processes discussed in this paper.

Let us finally have another look at metaphor_unify, more specifically at one of the more subtle subroutines involved in *purɯtɕitta*. I have advocated a metaphorical interpretation due to a deletion operation of one whole argument structure. Recall that deletion must apply before unification and that this ordering effectively bleeds unification crashing. However, one could also take a different perspective and say that deletion feeds unification under the condition that type incompatibility blocks unification before it can even reach a critical point. From yet another viewpoint, it could be argued that an early ordered unification would have destroyed the context for the application of deletion (thereby bleeding it), as deletion was specifically defined to target a module in V2, which (depending on the details of the unification theory) is possibly inaccessible or completely erased after unification has taken place. If such a rule ordering is assumed, the consequence would be that the actually late ordered unification would be counter-bled by deletion. If that is the or a correct analysis, then that represents a classical case of opaque rule interaction, located however at the lexical and not the grammatical level (for a more detailed discussion on the nature of rule reversal and ordering paradoxes, consult Hein, Murphy & Zaleska, this volume).

5. Conclusion

This paper argued for a lexical semantic account for compositionality in three Korean VV compounds using the Generative Lexicon framework. In chapter

2, I presented evidence from multi-verb constructions in various languages and argued for a set of factors that are helpful in distinguishing between VV compounds and non-lexical constructions such as SVCs. I then discussed several Korean MVC types and argued that some of them qualify for lexicon-driven approach to phenomena related to their composition. In chapter 4, I then offered an analysis of three VV compounds in the Generative Lexicon framework. I argued that in all three cases it is possible to derive the semantics of the compounds with the help of unification routines that each provide the means to circumvent obstacles for standard unification processes: D-ARG mismatch, QUALIA mismatch and τ incompatibility. While METAPHOR_UNIFY entailed a metaphoric sense extension, MANNER_UNIFY led to a manner-modifying reading of the compound.

As a side note, I have also pointed out that there is a possible way of enriching a verb's CONST quale with psychological state specifications if this function is not occupied by the verb's core meaning. Furthermore, it has been proposed that a VV compound can have access to multiple lexical meanings of homonymous component verbs.

Finally, the paper put forward the idea that the interaction of lexical building blocks in the course of various complex unification processes can result in opaque structures at various levels, suggesting that opacity is not an uncommon situation in lexical representations. It is my hope that this study will contribute to a better understanding of VV compounds (in Korean, but also in general) and will inspire further insights into the nature of building block interactions in the lexicon.

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