Lexical Semantic Structure for Predicates in Korean

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This paper reports a part of the Lexical Semantics Project on Korean predicates, which has started in 1996 and is scheduled to continue for 9 years. We have built up a formal apparatus to describe semantic structure of lexical predicates in Korean. Adopting the basic ideas of Generative Lexicon theory of Pustejovsky (1995), we have extended and developed the general framework of his semantic structure for better semantic description of Korean predicates. The project has been also stimulated by the work of Buitelaar’s (1998) CoreLex, which provides a principled way of semantically characterizing nominal arguments and their composition with predicates. We have been analyzing 2,000 Korean verbs and adjectives so far.

The paper illustrates and accounts for several issues raised in applying the Generative Lexicon approach to formal lexical semantics of Korean predicates, and further reveals cross-linguistic formal properties of lexical semantic structure. The sections of the paper are organized according to the substructures of Pustejovsky’s (1995) semantic framework: That is, event structure, argument structure, qualia structure. We also discuss surface “case structure” mapping semantic arguments onto syntactic case frames. Our final concern is about the relation between morphology and lexical semantics, which is quite straightforward in languages with rich derivational morphology like Korean.

1. Event Structure: Headedness

1.1. Some Verbs of ‘Putting (into)’

One of the advantages of the Generative Lexicon theory is its treatment of aspectual property of verbs. The difference between accomplishment verbs such as ‘build (a house)’ and achievement verbs such as ‘realize’ are treated as having a different headedness property of subevents. Some English verbs like ‘sink’ which show the dual nature (‘They sank the boat’; ‘The boat sank’) are analyzed as underspecified on headedness.

There are only limited number of such dual verbs in Korean, but an interesting case is a pair of verbs of putting (into something): neh and tam. The typical sentences where these verbs are used are as follows.

J-Nom apple-Acc box-in put-Past-Dec/put-Past-Dec

“John put the apple(s) in the box.”

J-Nom apple-Acc refrigerator-in warehouse-in put-Past-Dec/put-Past-Dec

“John put the apples in the {refrigerator, warehouse}.”

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Now adopting the analysis of Pustejovsky (1995), the lexical representation of \textit{neh} would be as follows.

(3) \textit{neh} ‘put (in)’

\begin{itemize}
\item \textsc{eventstr} = E1 = e1:process
\item E2 = e2:state
\item \textsc{head} = e1
\item \textsc{argstr} = ARG1 = x:animate
\item ARG2 = y:entity
\item ARG3 = z:place
\item \textsc{qualia} = change-of-location-lcp
\item \textsc{formal} = be\_{in}(e2,y,z)
\item \textsc{agentive} = \textit{neh}\_{act}(e1,x,y,z)
\end{itemize}

The lexical semantic structure of \textit{tam} is much similar to that of \textit{neh}, but one difference is that ARG3 of \textit{tam} should be of semantic type of “(small) mobile container”. Another important difference is the headedness nature, which is related to the following alternations.

(4)  John-i sakwa-lul sangca-ey \textit{neh\text{-}ess-ta/tam\text{-}ass-ta}.
\textsc{j-nom} apple\text{-}acc box\text{-}in put\text{-}past\text{-}dec/put\text{-}past\text{-}dec
“John put the apple(s) in the box.”

(5)  sangca-ka sakwa-lul \{\textit{neh\text{-}koiss-ta/tam\text{-}koiss-ta}\}.
\textsc{box-nom} apple\text{-}acc put\text{-}imperfect\text{-}dec/put\text{-}imperfect\text{-}dec
“The box contains the apples.”

A possible analysis would be not to specify headedness on the semantic structure of \textit{tam}. Like the case of English \textit{break, sink}, the lexical realization of the verb depends on which of the subevents is assigned headedness. Thus if the first subevent (e1:process) is headed then the verb will be realized as a ditransitive one, and if the second subevent (e2:state) is headed, then the verb \textit{tam} will behave differently. Then the underspecification of head-event would differentiate the verb \textit{tam} from \textit{neh\text{-}}, which lexically specifies its first subevent as \textsc{head}.

1.2. Adjectives vs. Verbs

Adjectives in Korean are not so different grammatically from verbs, except that adjectives do not take the present tense (or dynamicity) form whereas verbs do. With the distinction of adjectives and verbs, most word forms belong to one of the two categories, but there are exceptions. That is, some forms are both adjectives and verbs. Observe the following examples.

(6)  a. molay-phan-i kolu-ta.
\textsc{sand\text{-}bed\text{-}nom} even
“The (surface of) sand-bed is even.”

\textsc{j-nom} sand\text{-}bed\text{-}acc make\text{-}even\text{-}past\text{-}dec
“John made the (surface of) sand-bed even.”

Such lexical items can be treated in the same way as the case of transitive/intransitive alternation verbs such as ‘break’, except that we might need a device indicating that the intransitive one is not a verb but an adjective. In this case, we may not specify the headed event among the subevents constituting the whole event.
Other cases of adjective/verb alternations are a little different. In the case of the verb *palk* (lit. ‘to become bright’) and the adjective *palk* ‘bright,’ the verb is a kind of achievement verb the final state of which can be characterized as the meaning of the adjective of the same form. Thus, the intransitive verb meaning derives from the headed first subevent (e1:process), and the adjectival meaning from the headed second subevent. (9) and (10) illustrate the two uses of *palk*:

(8) *palk* “bright, become bright”

EVENTSTR = E1 = e1:process  
E2 = e2:state  
ARGSTR = ARG1 = x:human  
ARG2 = y:flat_place  
QUALIA = change-of-state-lcp  
FORMAL = *palk_state*(e2,x)  
AGENTIVE = *palk_act*(e1,x,y)

(9) tong-nyek hanul-i *palk*-ta  
east-side sky-Nom bright-Decl  
‘The eastern sky is bright.’

(10) tong-nyek hanul-i *palk*-nun-ta  
east-side sky-Nom become.bright-Pres-Decl.  
‘The eastern sky is turning bright.’

More problematic cases would be ones like the verb *kamsaha* ‘to thank’ and the adjective *kamsaha* ‘to be thankful’. The two uses share the same argument structure with three arguments, and they are mapped onto the same syntactic case-frame. The following analysis takes the word as polysemous with its head-event underspecified.

(11) *kamsaha* ‘thankful, thank’

EVENTSTR = E1 = e1:state  
E2 = e2:process  
ARGSTR = ARG1 = x:human  
ARG2 = y:human  
ARG3 = z:thing  
QUALIA = psych-communication-lcp  
FORMAL = thankful(e1,x,y,z)  
AGENTIVE = thank_act(e2,x,y,z)

Notice here that the above analysis reveals some peculiar event structure for the psych-communication-predicate: That is, the subevents are ordered in an unusual way — the “state” event before “process.” Thus, someone’s “thank_act” does not cause himself to be in a “thankful” state. Rather, the relation should be the other way around. One complication that arises is that the speaker who ‘thanks’ can be in a non-thankful state in an insincere thanking. This problem may apply to all sorts of illocutionary acts, which require commitments to their corresponding mental/psychological states, as seen in the act-state pair ‘promise’-‘intention.’ To avoid this complication, we may have to add *express*
to the FORMAL role thankful to make it express-thankful—.

2. Argument Structure
2.1 Default Argument

Pustejovsky (1995) includes “default” argument in argument structure, which is defined as “parameters which participate in the logical expressions in the qualia, but which are not necessarily expressed syntactically.” He takes the prepositional phrase with out of as a default argument of the verb build: “John built the house out of bricks.” Due to his definition, we identify nominal/clausal constituents as a default argument, if they are semantically obligatory but not syntactically. Here we note a few types of default argument involved in the semantics of predicates in Korean.

Some adjectives in Korean take a default argument which indicates a scalar dimension (length, height, weight, etc.). It is not awkward at all to overtly express the dimensional arguments, so they are not dubbed as “shadow” argument.

(12) a. ku tari-ka (kili-ka) kil-ta.
the bridge-Nom (length-Nom) long-Dec
‘The bridge is long.’

b. ku kenmwul-i (nophi-ka) noph-ta.
the building-Nom (height-Nom) high-Dec
‘The building is tall.’

c. ku saram-i (khi-ka) khu-ta
the person-Nom (height-Nom) tall-Dec
‘The person is tall.’

We can also find default arguments in a transitive context, which are similar to the dimensional ones illustrated above.

(13) a. kitha cwul-ul (umceng-ul) macchwu-ta
  guitar string-Acc (tone-Acc) adjust-Decl
  ‘tune the strings of a guitar’

b. kil-ul (nepi-lul) nelphi-ta
  road-Acc (width-Acc) widen-Dec
  ‘widen a road’

Another type of default argument shows up with a movement verb. Movement verbs, if they inherently entails a change of location, take either a Goal or a Source as their necessary argument. For example, the verb go requires a Goal, whereas leave should take a Source semantically. We have not actually justified the “argumenthood” of a Goal or a Source for the movement verbs, so let us digress a little to clarify the notion “argumenthood” in Korean.

It is quite free in Korean to syntactically delete an argument of a predicate, if it is recoverable from the discourse context. Thus the argumenthood of an NP is not easy to identify syntactically in Korean. Here, to postulate a norm for argumenthood, we introduce a semantic notion of “information unit” of an utterance. The information unit of an utterance is said to be “complete” if the utterance contains every piece of information that is obligatory to be understood as an acceptable fact or claim. Thus if you have once agreed with the utterance of the other, then it would be unnatural to ask of an information-piece which is necessary for the utterance to be a complete information unit. Consider the following conversations:

(14) A: Mary left last night.
    B: Oh, I see. #But from where?
    C: Oh, I see. But for where?
(15) A: Mary sent all the books
B: Oh, she did. But to whom?
C: Oh, she did. But how?

B’s replies in (14-15) sound unnatural, because by saying “Oh, I see.” B accepts A’s utterance as a complete information unit on the one hand, but asks for a necessary piece of information (from where? in (14) and to whom in (15)). But notice here that the informational completeness of an utterance totally depends on the meaning of the predicate used in the utterance. Thus we take the notion as a semantic one, and claim that they should be coded in the argument structure of predicates.

Now let us turn to the problem of default argument: Movement verbs in Korean takes either a Goal or a Source as a necessary argument, but they often take the other one as a default argument. For example, the verb *tena* ‘leave’ takes a Source as necessary, but a Direction as an adjunct (i.e., not essential for a complete information unit). The following discourse illustrate the point:

(16) A: John-i ttena-ass-e. [‘John left.’]
John-Nom leave-Past-Dec
B: #Ah kuraysse?! Kurentey, eti-eyse? [‘Oh yeah?! But from where?’]
Oh yeah By.the.way where-from
C: Ah kuraysse?! (Kurentey, eti-lo? [ ‘Oh yeah?! But for where?’])
Oh yeah By.the.way where-for

B’s reply is unnatural while A’s is natural, which reveals that the Source is an argument of the verb *tena* but the Direction is an adjunct (argument). Another type of default argument can be attested in passive sentences. We will return to this issue in section 4.1.

2.2. Argument Structure and Case Alternation

Describing the semantic structure of Korean predicates, we have found several types of surface case-alternations which share the same argument structure but result in semantic difference (Levin 1993). Since the case-alternations are not easy to be accounted for by generalized syntactic linking rule of arguments, we have included a “case structure” (CASESTR), which characterizes the surface syntactic case-frames of semantic arguments. Here we note some case-alternation patterns and accounts for their semantic effects in terms of lexical semantic structure of predicates. We, for convenience only, assign a thematic role to each argument in question, e.g., Agent/Theme/Goal and so on.

The Goal/Source-Theme alternation predicates like *spray, load, clear* in English and *chaywu* ‘fill’, *chilha* ‘paint’, *sii* ‘load’, *chiu* ‘clear’ in Korean show certain commonalities for cross-linguistic generalizations and language-specifics as well. The Korean verb *chaywu* ‘fill’, like English *fill*, takes a Goal argument (accusative-marked) and an oblique Figure as in (17). Unlike *fill* in adult English, however, the same verb in (18) can take the Figure argument with an accusative case and the Goal with an oblique case -*ey*.

(17) pyeng-ul mul-lo (*cokum-man) chaywu-ess-ta
bottle-Acc water-Instr (a little only) fill-Past-Dec
‘filled the bottle with water.’

(18) pyeng-ey mul-ul (cokum-man) chaywu-ess-ta
bottle-Loc water-Acc a little only fill-Past-Dec
‘filled (only a little bit of) water into the bottle.’ (intended)

Here we note a meaning difference between (17) and (18): That is, (17) but not (18) entails ‘the bottle is full of water.’ Such meaning difference has been often discussed in terms of “affectedness” and our notion of “thematization.” We will return to this issue shortly and propose a formal account of it. The so-called “locative” alternation is just like the one observed with such English verbs as *spray* and *load*. Further, the verb derives the following ‘unaccusative’ structure of (19), but the verb does not allow the Goal argument to be a subject as shown in (20).
Then, how can we account for this complex alternation pattern in terms of semantic structure of the verb? We propose the following analysis of the verb *chaywu* ‘fill’ in Korean:

(21)  

\[
\begin{align*}
\text{EVENTSTR} & = E1 = e1: \text{process} \\
& E2 = e2: \text{state} \\
\text{ARGSTR} & = \begin{cases} 
\text{ARG1} = x: \text{Agent-human} \\
\text{ARG2} = y: \text{Goal-container} \\
\text{ARG3} = z: \text{Figure-physobj}
\end{cases} \\
\text{CASESTR} & = \begin{cases} 
\text{C-FRAME1} = x_{\text{nom}}, y_{\text{acc}}, z_{\text{instr}} \\
\text{C-FRAME2} = x_{\text{nom}}, y_{\text{loc}}, z_{\text{acc}} \\
\text{C-FRAME3} = z_{\text{nom}}, y_{\text{acc}} 
\end{cases} \\
\text{QUALIA} & = \text{causative-lcp} \\
\text{FORMAL} & = z_{\text{full_of}}(e2, y, z) \\
\text{AGENTIVE} & = \text{chaywu}_\text{act}(e1, x, y, z)
\end{align*}
\]

The verb *chaywu* takes three arguments – Agent, Goal, and Figure – and they have three possible surface case-frames – C-FRAME1, C-FRAME2, and C-FRAME3. Notice that the second argument ARG2=y takes “accusative” case in C-FRAME1 and C-FRAME3 but “locative” case in C-FRAME2, and the third argument ARG3=z also takes different cases in different case-frames. Notice also that the head of the EVENTSTR is not specified, so due to the “underspecification of event-head” proposed by Pustejovsky (1995), we can explain away the unaccusative alternation between C-FRAME2 and C-FRAME3. Now how about the alternation between C-FRAME1 and C-FRAME2? That is, how can we account for the meaning difference that the “locative” alternation has brought about?

We propose to reinterpret the “underspecified head of EVENTSTR”: Pustejovsky (1995) suggests that if an EVENTSTR does not specify its head, any subevent might be interpreted as a head event. Thus if there are two subevents e1 and e2, then the whole event may be headed by either e1 or e2. But we claim that the underspecified head can be interpreted in another way: that is, the whole composite event is headed by itself. We might say this interpretation assigns the “headedness” property to both subevents. Then we have three potential interpretations for an underspecified doublet event structure of *chaywu* ‘fill’ as the following illustrates:

(22)  

a. HEAD = e1+e2  
b. HEAD = e1  
c. HEAD = e2

Each of the three interpretations is linked to one of the C-FRAMEs of the verb *chaywu*: That is, (22a), (22b), and (22c) correspond to C-FRAME1, C-FRAME2, and C-FRAME3 of (21), respectively. Now we can account for the meaning difference in “locative” alternation between (17) and (18): If both of e1 and e2 are specified as HEAD then the AGENTIVE and the FORMAL roles are positively evaluated. Thus the sentence with the C-FRAME1 validates the FORMAL role, i.e., full_of(e2, y, z), with the Thematization effect enforced. So, for example, the sentence (17) entails ‘the bottle is full of water.’ However the C-FRAME2 is linked to the event structure headed by e1 only, so the FORMAL role is not positively evaluated. Therefore, (18) does not entail ‘the bottle is full of water.’ It can only be conversationally implicated, in contrast with (manner-associated) verbs like *pus-* ‘pour,’ *neh-* ‘put in,’
tam- ‘put in, make contain.’ The use of the stronger form chaewu- creates an implicature denying weaker forms.

The verb chaywu-, on the other hand, morphologically consists of the inchoative intransitive verb cha- ‘become full’ and the causative morpheme -wu- ‘CAUSE.’ Therefore, the inchoative verb is associated with its corresponding causative transitive verb by means of the causative morpheme. Otherwise, the relation must be the same as the (equi-form) causative-inchoative alternation such as sink and break.

We can identify the third interpretation of underspecified event-head in several other verbs like macchu- ‘hit,’ sekk- ‘mix,’ teph- ‘cover,’ chilha- ‘paint,’ paru- ‘apply’ and kyenu- ‘aim at.’ Observe:

(23) Kim-un hwasal-ul kwanyek-ey macchu-ess-ta
   K-Top arrow-Acc target-at hit
   ‘Kim hit the arrow at(into) the target.’ (literal)
(24) Kim-un kwanyek-ul hwasal-lo macchu-ess-ta
   K-Top arrow-Acc target-at hit
   ‘Kim hit the target with an arrow.’
(25) {sul-ey mul-ul / sul-ul mul-lo} sekk-ess-ta
   {wine-Loc water-Acc/wine-Acc water-Instr} mixed
   ‘mixed water in wine’/’mix wine with water’ (literal)
(26) {elkul-ey swuken-ul/elkwul-ul swuken-ulo teph-ess-ta
   {face-Loc towel-Acc/face-Acc towel-Instr} covered
   ‘covered a towel on the face/cover the face with a towel’ (literal)
(27) {pyek-ey pheint-lul/pyeuk-ul pheint-lo} chilhay-ess-ta
   {wall-Loc paint-Acc/wall-Acc paint-Instr} painted
   ‘painted paint on the wall/painted the wall with paint’ (literal)

Differently from English, the Korean verb sit ‘load’ cannot take accusative Theme-argument derived from Goal (28b), even though the Goal argument is necessary as in (28c), whereas the Korean chiu ‘clear’ can take one as in (29a). The locative postposition -ey can by default mean ‘onto’ as in (28c), ‘into,’ etc. depending on the meaning of the verb and the telic function of the relevant Goal argument. If the verb is noh- ‘put’ and the Goal is theyibul ‘table,’ the default is ‘on’ and if the Goal happens to be ‘under the table,’ it must be specified as theyibul mith-ey ‘at under the table.’ The verb twu- ‘put something to keep’ takes the Goal expression kumko-ey (safe-Loc), which by default (telic function of a safe) means kumko-an-ey ‘at inside of the safe.’

(28) a. Mary loaded the truck with hay.
   b. *Mary-nun capcho-lo threk-ul sit-ess-ta
      M-Top hay-with truck-Acc loaded
      ‘Mary loaded the truck with hay.’ (intended)
   c. Mary-nun capcho-lul threk-ey sit-ess-ta
      M-Top hay-Acc truck-Loc loaded
      ‘Mary loaded hay onto the truck.’

In the case of the Korean chiuw ‘clear’, ambiguity arises from “Thematization” in such a way that ‘table’ is interpreted either as a Theme derived from Source = Ground or as an object = Figure as shown in (29a). Theme (from Ground) and Figure cannot both be accusativized as in (29b)), but it is still better in the given order than in the opposite order.

(29) a. Mary-nun sikthak-ul chiuw-ess-ta
    M-Top table-Acc clear-Past-Dec
    ‘Mary cleared the table (of something)’ or ‘Mary cleared away the table.’
   b. *Mary-nun sikthak-ul cepsi-lul chiuw-ess-ta
      M-Top table-Acc dishes-Acc cleared
      ‘Mary cleared the table of dishes.’ (intended)
This kind of Source-Theme alternation is also exhibited by the verbs such as *piwu-* ‘empty,’ *peski-* ‘take off, peel,’ and *naerye-o-* ‘come down.’ If a derived Theme is used metaphorically as follows, its underlying sentence with its Source expression and Figure can hardly occur, in accordance with the Principle of Argument Decreasing in frozen expressions (Lee 1993):

(30) a. Kim-un maum-ul piwu-ess-ta  
   K-Top mind-Acc empty-Past-Dec  
   ‘Kim emptied his mind.’

b. ⋆Kim-un maum-eyse yoksim-ul piwu-ess-ta  
   K-Top mind-from greed-Acc empty-Past-Dec  
   ‘Kim emptied greed from his mind.’

The Goal-locative realization of (28a) and (17) with the verb *chaywu* ‘fill’ are instances of cumulative (activity) events (modifiable by *for an hour*) and the derived Themes with accusative case in (28c) and (18) are special cases of incremental (quantized) Themes and these sentences normally represent accomplishment events (modifiable by *in an hour*).

However, even the derived Themes, when they receive indefinite plural marking in English and receive indefinite plural reading in Korean, become cumulative and form activity events. Similarly, in the Goal/Source-locative realization of (28) and that of (29) (such as ‘Mary cleared dishes from the table’, and in (17), if the indefinite Figure (material) gets a definite or other quantized reading (by numeral in English or by numeral classifier in Korean), then these objects come to represent incremental Themes. The events become delimited or measured out by definite or quantified marking. Observe:

(31) a. Mary loaded trucks with hay for an hour.

b. ⋆Mary loaded trucks with hay in an hour.

(32) a. Mary loaded two tons of hay onto the truck in an hour.

b. ⋆Mary loaded two tons of hay onto the truck for an hour.

Therefore, even Themes derived via Thematization must undergo incorporation into the associated verbs to create cumulative activity events rather than accomplishments with incremental Themes.

3. Qualia Structure and Composition

3.1. Type Coercion: Verbs Selecting Events or Propositions

Pustejovsky’s (1995) analysis of English complements assume that the semantic types of event and proposition are important and that canonically the former is realized by VP[+PRG] and the latter by S[+INF]. In Korean, the types of event and proposition are also important and are realized syntactically in an interesting way.

When Korean verbs select clausal arguments, the arguments can appear in various forms (with various complementizers): -*nunkes* [‘internally factive’], -*kohanunkes* [‘externally factive’], -*ko, -ki, -um*. 

In most cases, if we know the meanings of complement-taking verbs, we expect proper forms of the complements. It seems that verbs semantically select propositions, events, or properties and these are related to -*nunkes*, -*kohanunkes*/-*ko/-um*, and -ki, respectively. So the following grammaticality holds for a perception verb which requires an event as its semantic argument:

(33) ku-nun say-ka {na-*nunkes-ul / *nanta-*kohanunkes-ul / *nal-ki-lul} poaasta  
    he-Top bird-Nom fly-Comp-Acc / fly-Comp-Acc / fly-Comp-Acc saw  
    'He saw a bird fly.'
In short, the canonical syntactic realization of a proposition (in the sense of Pustejovsky 1995) is by -kohanunkes and that of event is by -nunkes. But -nunkes can be used with proposition-taking verbs such as hwaksilha ‘be certain’.

(35) ku-ka o-nkes-i hwaksilhata.
he-Nom come-Comp-Nom certain
'It is certain that he came.'

The correct generalization would be: -kohanunkes realizes propositions and -nunkes typically realizes events but the latter can be coerced to realize propositions too in some cases (such as ‘certainty/factivity’). The notion of type coercion is fully exploited by Pustejovsky (1995) and it is relevant in the semantics of clausal arguments. The semantic structures of po ‘see’ and uymiha ‘mean’ are given in (37-38) below.

(36) | event | proposition |
    | Coerce |          |
  S[-nunkes] S[-kohanunkes]

(37) po ‘see’
EVENTSTR =  E1 = e1:process
ARGSTR =  ARG1 = x:animate
          ARG2 = y:event
QUALIA =  AGENTIVE = po_act(e1,x,y)

(38) uymiha ‘mean’
EVENTSTR =  E1 = e1:state
ARGSTR =  ARG1 = x
          ARG2 = y:proposition
QUALIA =  AGENTIVE = uymiha_state(e1,x,y)

The subject of uymiha can be either a human noun, an entity, an event, or a proposition, as with the English counterpart ‘mean’:

(39) a. He meant that ...
b. Smoke means that there is a fire.
c. That John escorted her means that he liked her.

The analysis that -kohanunkes realizes propositions can be coupled with the analysis that -ko complements do not realize propositions directly but somehow introduce the external content of a mental state and a communicative act (Devlin 1991). The -ko complements are the most natural way of describing a communicative act and mental attitude situation, but the other method of using -kohanunkes is also acceptable (although the latter is less natural in some cases).

(40) Bill-i John-i Mary-lul {ttaylinta-ko / ?ttaylinta-kohanunkes-lul} cucanghayssta
    B-Nom J-Nom M-Acc hits-Comp hits-Comp-Acc claimed
'Bill claimed that John hit Mary.'
Some authentic examples from Korea-1 Corpus (Kim and Kang 1996) which show the use of *kohanunkes* complements with verbs of communication and verbs of mental attitudes are as follows.

(41) kukos chotunghakkyo chwulsintul-uy colyek-i manh-ass-ta-
      kohanunkes-ul malha-ca there element. school graduate-Gen help-Nom much-Past-Comp-Acc say-as-soon-as 'As soon as (he) said that the graduates of the element. school helped a lot, ...'

(42) onulnal-kkaci-to yengmwunhak-uy kicho-ka
today-upo-even English.literature-Gen foundation
pwusilha-ta-kohanunkes-ul hangsang nukkiko issupnita weak-Comp-Acc always feel be-ing 'I always think that (we) still have weak foundation of English literature studies'

The verbs that come with *-kohanunkes* complements include:

      insikcha- ‘recognize’, mwunchichay- ‘notice’, ttuhca- ‘mean’, tteloldi- ‘remind’, myengsimha -
      realize’, nukki- ‘feel’, hwakinha- ‘confirm’, etc.

The difference between the *-ko* complements and *-kohanunkes* complements is that the latter are used to denote things (propositions) directly. Namely, they are a kind of themes and as such, they are more objective and more prone to observation. (Even we may think that propositions as “things” are things transferable from person to person, a typical role of Theme.) So some factive verbs requiring facts (i.e. true propositions) as their arguments, allow *-kohanunkes* but disallow *-ko*, or at least the former type of complement is much more natural.

(44)  ku-nun Chelswu-ka chencay-la-
      kohanunkes-ul / ??chencay-la-ko kkaytal-ass-ta
      he-Top C-Nom genius-be-Comp-Acc / ??genius-be-Comp realize
      ‘He realized that Chelswu was a genius.’

For mental attitude verbs such as mit ‘believe,’ nominal complementation is awkward in most cases since speakers’ main concern is about the mental attitude and the external content of the mental state rather than some observable proposition.

(45)  !??Bill-i John-i Mary-lul ttaylinta-
      kohanunkes-ul mitnunta
      B-Nom J-Nom M-Acc beats-Comp-Acc believe
      ‘Bill believes that John beats Mary.’

But when the proposition is a kind of public thing, such that many people debate about it, the nominal complementation is much better, even perfect.

      J-Nom God-Nom exists-Comp believe
      ‘John believes that God exists.’

      ‘John believes that kohanunkes-ul mitnunta.’

Complement-taking verbs usually take nominal arguments denoting events and propositions too. For example, *malha ‘say’* can take either a proposition denoting complement or a noun which denotes a
proposition as shown in (47). (48) is the semantic structure of malha ‘say.’

    J-Nom {the claim, Mary clever-Dec-Comp-Acc} say-Past-Dec
    ‘John said/stated {the claim, that Mary is clever}.’

(48) malha ‘say’

EVENTSTR = E1 = e1:process
ARGSTR = ARG1 = x:human
         ARG2 = y:proposition
QUALIA = AGENTIVE = malha_act(e1,x,y)

The proposition argument can be realized as a proposition-denoting complement or a proposition-denoting noun. The above analysis fits well with the behavior of complement taking nouns such as kwangkyeng ‘scene,’ cwucang ‘claim,’ etc.

(49) a. pi-ka {o-nun / *onta-kohanun} kwangkyeng
    ‘the scene of raining’
   b. pi-ka {*o-n / oassta-kohanun} cwucang
    ‘the claim that it rained’
   c. pi-ka {o-n / oassta-kohanun} sasil
    ‘the fact that it rained’

Here, kwangkyeng ‘scene’ requires an event-denoting complement and cwucang ‘claim’ requires a proposition-denoting complement. Sasil ‘fact’ requires a fact-denoting complement and allows somehow the -nun complement to be coerced to denote a proposition even if it usually denotes an event. The following semantic representation will do.

(50) kwangkyeng ‘scene’

ARGSTR = ARG1 = x: event
QUALIA = FORMAL = x
         TELIC = see(e,w,x)

(51) cwucang ‘claim’

ARGSTR = ARG1 = x: proposition
QUALIA = FORMAL = x
         TELIC = communicate(e,w,x)

(52) sasil ‘fact’

ARGSTR = ARG1 = x: fact
QUALIA = FORMAL = x

‘Fact’ is a special type of proposition and although a -nunkes complement can be coerced to denote a proposition only facts requiring noun like sasil, but not other nouns requiring propositions like cwucang, allow the coercion to occur.

3.2. Co-composition and Event-Quantization

The generative lexicon principles can universally or cross-linguistically applied. For instance, the representation for bake in English can be applied to the Korean counterpart kwup as follows (Pustejovsky 1995):
(53) *kwup* ‘bake’

EVENTSTR = E1 = e1:process
ARGSTR = ARG1 = x:Agent/animate_ind
        FORMAL = physiobj
        ARG2 = y: (Theme?)/mass
        FORMAL = physiobj
CASESTR = C-FRAME = x_nom,y_acc
QUALIA = change_of_state-lcp
AGENTIVE = kwup_act(e1,x,y)

The object argument noun of the verb can be represented with an AGENTIVE qualia value of \(\lambda y x \exists x[bake(e, y, x)]\) in common with the above, as follows:

(54) *ppang* ‘bread’

ARGSTR = ARG1 = x:artifact•food_ind
        D-ARG1 = y:mass
QUALIA = CONST = y
        FORMAL = x
        TELIC = eat(e1,z,x)
AGENTIVE = kwup_act(e1,w,y)

Here, the mass y essentially consists in ‘dough.’ By function application of binding the complement object into the argument structure of the verb, with qualia unification, and the operation of co-composition, we can get the representation of the VP *ppang-ul kup* ‘bake (a loaf of) bread,’ with E2 = e2:state in EVENTSTR, and create-lcp, FORMAL = exist(e2,y) in QUALIA, in parallel with English. Thus, the verb gets the newly ‘derived’ reading of creation-accomplishment, based on the verb and the nature of the artifact noun. The representation of *artifact•food* in ontology is an adoption of Buitelaar’s (1998) filled middle dot notation. The classes artifact and food are cross-classificatory (there are independent non-food artifacts) and conjunctively required. The basic meaning arises when we have a *natural•food* object such as *kamca* ‘potato,’ *saengsen* ‘fish,’ ‘peanut,’ etc. for the verb.

What we must seriously consider here is how to represent “individuation” or “quantization” (Krifka 1997) (= “incremental Theme” (Dowty 1991)) effects. In the case of baking a cake or a loaf of bread, the degree of the change of state of the whole (rather than parts) is mapped into the degree of the event of baking it (in *eat* and *drink*, its changing state of part-whole relationships is mapped). If the expected maximal degree of change in the process of baking is reached, the bread comes to exist (creation is change from the non-existent state to the existent). Definite, specific, and numeral-marked nouns are quantized nouns in any language (numerals may be explicit or fuzzy). In Korean, definite or specific can be null and numerals occur with classifiers to quantize nouns. Observe a numeral classifier example:

(55) Kim-un sip pun man-ey ppang se kae-lul kwup-ess-ta
    K-Top 10 minute in  bread 3 Cl-Acc bake-Past-Dec
    ‘Kim baked three loaves of bread in 10 minutes.’

If the object is indefinite and plural, it amounts to a mass (in Korean, plurality is rarely marked) and the VP behaves as an activity but if it is in a perfective context, it must include the sense of repetitive accomplishments.

(56) Kim-un se sikan tongan/man-ey ppang-ul kwup-ess-ta (in the indefinite plural sense)
    K-Top 3 hour for in bread-Acc bake-Past-Dec
    ‘Kim baked bread for three hours.’

On the other hand, in its basic process meaning, the verb *kwup* ‘bake’ forms an activity with an object
like kamca ‘potato’ (natural-food), even with numeral Cl specification such as kamca se kae ‘three potatoes,’ and can occur with a duration expression like sip pun tongan ‘for ten minutes.’ In this case, even the numeral-marked object seems to count essentially as a mass rather than incrementally affected or quantized separate entities. In other words, there is no inherent telic point at which the process (continuous state change of baking) ends and a new subevent of state (no change) starts. Therefore, the resultant state can be modified by degree adverbials like cal ‘well,’ paccak ‘hard,’ and saleccak ‘lightly’ (cal kwup-un ‘well-baked’(*cal cwuk-un ‘well-dead’). The perfective prenominal form is possible with a material mass argument but hardly with a created argument (kwup-un kamca ‘baked potato,’ ?*kwup-un ppang ‘baked bread’). A result compound nominal is possible only with a material mass argument (sayngsen-kwu-i ‘fish-baking=baked fish,’ *ppang-kwu-i).

The ‘derivational’ relation between the basic process meaning of the verb and its creation meaning with artificial food objects is cross-linguistically possible because the event involved in the latter includes the meaning of going through the agentive process of baking the material mass. So, it can be decompositionally paraphrased as ‘made the bread by (means of) baking dough.’ The agentive process of baking dough is backgrounded and the salient outcome is directly associated with the verb kwup ‘bake’ by some metonymic process and becomes the direct argument of the verb. All other creation accomplishment verbs such as cis- ‘build’ show the same mechanisms.

4. Morphology in Lexical Semantic Structure

Korean employs derivational morphology for passive or causative predicates. For example, the causative verb cwuk-i ‘to kill’ consists of a stem cwuk ‘to die’ and a causative morpheme -i- which is one of the productive causative morphemes. A passive verb like cap-hi ‘to be caught’ also contains a derivational passive morpheme -hi- following the stem cap ‘to catch’. These morphological derivations are quite productive, so we want to capture the generative semantic relations of the derivations. We note how Pustejovsky’s semantic structure can be exploited to characterize the semantics of passive/causative morphology in Korean. The idea is that these morphological derivations change the overall semantic structure of the relevant predicates. The rest of this section will describe the change in event-/argument-/qualia-structure of passive/causative predicates.

4.1. Passive verbs

The following roughly shows the semantic structure of the passive verb cap-hi ‘to be caught’:

(57)  cap-hi ‘be caught’

EVENTSTR = E1 = e1:process
          = E2 = e2:state
          = HEAD = e2

ARGSTR = ARG1 = x
          = D-ARG1 = y

QUALIA = passive-lcp
          = FORMAL = ‘be-caught’(e2,x)
          = AGENTIVITY = cap-(e1,y,x)

The above illustrates the semantic structural correlation between an active verb and its passive counterpart. (i) First, the AGENTIVITY of the passive is assigned its value in terms of the active verb cap- ‘to catch’, so to properly represent the semantic relation between an active and a passive. (ii) The HEAD of the whole event falls on the second subevent (e2:state) of the passive, whereas the HEAD of the active lies in the first event (e1). (iii) An active/passive pair share two arguments, but the passive takes a default argument (D-ARG) which corresponds to ARG1 of the active verb.

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4.2. Causative verbs

The following is the rough semantic structure of the causative *cwuk-i* ‘to kill’ in Korean:

(58)  
\[
\begin{align*}
\text{EVENTSTR} & = \text{E1 = e1:process} \\
& \quad \text{E2 = e2:transition} \\
\text{HEAD} & = \text{e1} \\
\text{ARGSTR} & = \text{ARG1 = x} \\
& \quad \text{ARG2 = y} \\
\text{QUALIA} & = \text{causative-lcp} \\
& \quad \text{FORMAL = } \text{cwuk-}(e\text{-}_\text{iss-})(e2,y) \\
& \quad \text{AGENTIVE = } \text{cwuk-i}_\text{act}(e1,x,y)
\end{align*}
\]

The HEAD of the whole event falls on the first subevent, and the second subevent (e2) of the causative predicate is a “transition” denoting a change of state, so the transition is naturally identified as a result-event indicated by FORMAL. Notice here that the FORMAL feature is represented in terms of the base verb form *cwuk-* ‘to die’, or rather its result state *cwuk-e_iss-* ‘dead,’ which takes only one argument (y). The argument is ARG2 [causee] in the causative, but it corresponds to the single argument of the base verb, naturally revealing the entailment relation between the subject argument of the base form or the inchoative intransitive verb and the object argument of the given causative transitive verb.

The derivational morphology for causatives yields two place predicates from one place ones (including adjectives as well as intransitive verbs), and three place predicates from two place ones. The three place predicate *mek-i-* ‘to feed’ is a derived causative, which is composed of a causative morpheme *-i-* and the stem *mek-* ‘to eat’. So the causative takes three arguments, and the event structure consists of two processes, where the first process (e1) is a causing event, and the second one (e2) is a caused event. So fully generalizing, we claim that the causative morphology adds one extra process event (e1) and one more argument (ARG1) to the event structure and the argument structure of the base predicate, respectively.

Let us note one more semantic contribution of causative morphology: If an adjective derives a causative verb, then the causative takes a transition as its second subevent. But the transition is somehow different from the one in the event structure of *cwuk-i* ‘kill’ discussed above. The transition event of *cwuk-i* is a change of state from being alive to being dead, so the change is absolute/punctual. But we can easily find a difference in the transition of the causatives which are derived from adjectives. So, for example, the causative *noph-hi* ‘to make high/elevate’ is derived from the adjectival stem *noph* ‘high’ and a causative morpheme *-hi-*.

5. Concluding Remarks

We have shown universally or cross-linguistically attested powerful mechanisms of the generativelexicon theory and suggested some extensions and adjustments of its formal apparatus so that it can be fruitfully applied to other languages such as Korean than English.

References


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