

Type Construction of Nouns with the Verb *ha-* 'do'

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Abstract

This paper aims to give an explanation of the combination of certain nouns and the verb *ha-* 'do'. Although the verb *ha-* 'do' normally takes an event type argument, it takes some substantival nouns such as *paiolin* 'violin', *umsikcem* 'restaurant', and so on. A substantival noun undergoes type shifting, because the governing verb *ha-* 'do' coerces an entity type noun to an event reading, taking missing information from the qualia of the entity type noun. In addition, some nouns like *ppallay* 'laundry' are dot objects. The verb taking a dot object selects a proper type between multiple subtypes of the dot object. Type pumping operation makes that selection possible.

1. Introduction

Much of the current research on *suru* 'do' in Japanese and *ha-* 'do' in Korean has been focused on its light verb function when it combines with verbal nouns since Grimshaw & Mester (1988). Although many papers have tried to uncover the nature of the Korean verb *ha-* 'do', they still have difficulty in defining the lexical semantic property of this verb. Recent studies of the verb *ha-* including Jun (2001), Im & Lee (2001) touch on the issues of substantival nouns with *ha-* 'do'. In this paper, we account for how the verb *ha-* 'do' is directly combined with substantival nouns or complex type nouns.

Specifically, we first list the nouns used together with the verb *ha-* 'do' in chapter 2. The nouns are classified into verbal nouns, substantival nouns, and dot objects. In chapter 4, we accounted for the combination of the verb *ha-* 'do' with substantival nouns or complex type nouns. A substantival noun undergoes a type shifting operation by type coercion of the governing verb *ha-* 'do'. Type pumping operation makes possible that *ha-* selects a proper type out of multiple types of a dot object. Our explanation is based on the Generative Lexicon (GL) Theory (Pustejovsky, 1995, 2001).

2. Data

In Chapter 2, we classify the kinds of nouns that combine with the verb *ha-* 'do'. Verbal nouns constitute the light verb construction with *ha-* 'do'. A verbal noun, basically, assigns thematic roles to its arguments. The words in (1) are typical verbal nouns.

(1) *kensel* 'construction', *phagoy* 'destruction', *ceycak* 'production', ...

Secondly, a substantival noun such as *paiolin* 'violin' can be a complement of the verb *ha-* 'do' as in (2):

(2) John-un paiolin-ul ha-n-ta
J-TOP violin-ACC do-PRES
'John plays the violin'

Although *ha-* 'do' normally takes an event type noun as its argument, some kinds of substantival nouns combine with *ha-* 'do' naturally. We present a part of group of substantival nouns combining with the verb *ha-* 'do' in (3):

(3) a. *yencwu* 'play': *cheyllo* 'cello', *phiano* 'piano', *tulem* 'drum', ...
b. *chakyong* 'wearing': *mokkeli* 'necklace', *phalcci* 'bracelet', *meylppang* 'suspenders', ...
c. *wunyeng* 'management': *pyengwon* 'hospital', *kakey* 'store', *kongcang* 'factory',
d. *wuncen* 'driving': *thayksi* 'taxi', ...
e. *hupyen* 'smoking': *tampay* 'cigarette', *aphyen* 'opium', ...
f. *umyong* 'drinking': *khephi* 'coffee', *swul* 'alcoholic drink', *kholla* 'coke', ...

In the above, we listed two kinds of nouns combining with the verb *ha-* 'do'. But there are nouns belonging to neither verbal nouns nor substantival ones. It is not easy to explain the properties of those nouns, because of their ambiguities¹. The sentences in (4) show the polysemy of the noun *ppallay* 'laundry' with different predicates.

(4) a. onul-un ppallay-ka nemwu manh-ta
today-TOP laundry-NOM too much-DEC
'Today, I have too much laundry'
b. na-nun ppallay-lul imi kkutnay-ss-ta
I-TOP washing-ACC already finish-PAST-DEC
'I have already finished washing'

In (4a), *ppallay* 'laundry' is an entity type noun denoting the clothes that need washing. But *ppallay* 'washing clothes' is an event type noun meaning a washing activity. We give an explanation of how those nouns combine with *ha-* 'do' and what the meaning of those is. The words in (5) have ambiguities because those belong to multiple types on ontology.

¹ These nouns are different from the nouns such as *paiolin* 'violin'. *Paiolin* 'violin' has no ambiguity intrinsically. The types of the nouns are coerced by the governing verb only when governed by it. While, the noun such as *ppallay* 'laundry' is ambiguous in itself.

(5) *ppallay* 'laundry', *swukcey* 'homework', *sayngkak* 'thought', *mal* 'language', *iyaki* 'talk', *hakmwun* 'science', *poko* 'report', ...

In this paper, we confine our research to an analysis of the nouns in (3) and (5). In consequence, our argument will be a trial to explain why and how the nouns combine with the verb *ha-* 'do'. We show the frame of GL theory as an introduction to our argument.

3. Generative Lexicon Theory

3.1 Lexical Semantic Structure

The idea of GL is that polysemy comes by the logical inference from a basic meaning of a word. The lexical semantic structure designed by Pustejovsky (1995) consists of event structure, argument structure and qualia structure. For example, the lexical semantic structure of the English verb *build* is like the following in (6)²:

(6) *build*

EVENT STR = E1 = e1: process
 E2 = e2: state
 HEAD = e1
 ARGSTR = ARG1 = x = animate_ind
 ARG2 = y = artifact
 D-ARG1 = z = material
 FORMAL = mass
 QUALIA = create_lcp
 FORMAL = exist (e2, y)
 AGENTIVE = build_act (e1, x, z)

Qualia structure represents semantic or conceptual information of words. In other words, qualia structure of a word is the mode of explaining that and gives the relational force of a lexical item. That includes formal, constitutive, telic and agentive quale.

² Event structure characterizes basic event type of a lexical item and internal, subeventual structure. Argument structure specifies the number and type of arguments that a lexical item carries. Default arguments allow us to consider conceptual participants of an event represented by a verb.

(7) Qualia Structure

- a. CONSTITUTIVE: the relation between an object and its constituent parts;
- b. FORMAL: that which distinguishes it within a larger domain;
- c. TELIC: its purpose and function
- d. AGENTIVE: factors involved in its origin or "bringing it about" (Pustejovsky, 1995)

In the next section, we argue about the ontology and types of words based on Pustejovsky (2000).

3.2 Ontology and Types of Nouns

Pustejovsky (2000) suggests a ranking of types, pointing out the defect of Montague's flat typing model. He distinguishes between natural (simple) types and functional types, and then motivates the use of complex types (dot objects) to model objects with multiple and interdependent denotations.

- (8) a. NATURAL TYPES: Predication from the domain of substance,
e.g., the qualia FORMAL or CONST.
- b. FUNCTIONAL TYPES: Predication includes reference to either AGENTIVE or TELIC qualia
- c. COMPLEX TYPES: Cartesian type formed by Dot Object Construction.

According to him, the upper concept lattice is structured into three domains: entities, qualities, and events. Each domain is itself structured by a type ordering relation, from simpler to more complex types. Natural types are grounded types and Functional types combine qualia-based information from AGENTIVE and TELIC modes of explanation with a ground type. *Book* is a typical complex type noun. *Book* is a physical object but includes information. Pustejovsky (1995, 2000) call this noun a dot object.

- (9) a. John stole every book in that library.
- b. John read every book in that library. (Asher & Pustejovsky, 2000)

In (9), the verb *steal* selects the physical object type of the noun *book* and *read* selects the information interpretation. In the next chapter, we will discuss about dependent type nouns such as *paiolin* 'violin' and dot objects such as *ppallay* 'laundry', based on these theoretical concepts.

4. The Generative Mechanism of Polysemy

Asher & Pustejovsky (2000) introduces two different operations in order to explain polysemy. They explain a dot object by type pumping operation. On the other hand, a dependent type noun which does not have a proper type required by its governing verb undergoes type shifting by type coercion. We suggest that these operations allow the nouns in (3) and (5) to combine with the verb *ha-* 'do'.

4.1 Argument Type of the Verb *ha-*

The nouns in (3) are entity type ones. Is it possible for entity type nouns to combine with the verb *ha-* 'do'? The transitive verb *ha-* takes an event type argument as its complement as in (10):

- (10) a. *John-un son-ul ha-ye na-lul pwulu-ess-ta
J-TOP hand-ACC do-ending I-ACC call-PAST-DEC
'John called me doing the hand (literally)'
- b. John-un soncis-ul ha-ye na-lul pwulu-ess-ta
J-TOP hand signal-ACC do-ending I-ACC call-PAST-DEC
'John beckoned to me'

In the above examples, the verb *ha-* cannot combine with an entity type noun *son* 'hand'. *ha-* can combine with only *soncis* 'hand signal' meaning an act. The following question and answers show that the verb *ha-* takes only event type arguments.

- (11) Q: ne mwue-ha-ni?
You what-do-INTR
'what are you doing?'
- A: a. na, pap mek-e
I boiled rice eat-DEC
'I'm eating a meal'
- b. na, pang chengso ha-e
I room cleaning do-DEC
'I'm cleaning the room'
- c. *na, chayksang ha-e
I desk do-DEC
'I'm doing a desk'

In (11), only expressions denoting events can be an answer to the question. In conclusion, the verb *ha-* takes an event type noun as its complement argument. In 4.2, we explain the compound of the dependent type noun like *paiolin* 'violin' and *ha-*.

4.2 Dependent Type Nouns and Type Coercion

Im & Lee (2001) notes a superficial type conflict in the construction of SNs plus the verb *ha-* 'do'. Substantival nouns are entity type nouns but *ha-* 'do' takes an event type noun as its complement argument. But the verb *ha-* 'do' takes an entity type complement in (12a):

- (12) a. John-un paiolin-ul *ha-n-ta*.
 J-NOM violin-ACC do-PRES-DEC
 'John plays the violin'
- b. Who's *doing* the food for your party?

Both *paiolin* 'violin' and *food* in (12) are entity type nouns but combine with the verb taking an event type argument such as *ha-* 'do' in Korean and *do* in English. Then, the meaning of *paiolin* 'violin' is an activity 'playing the violin' in (12a). While, in other light verb constructions, *ha-* 'do' does not combine directly with a substantival noun as in (13).

- (13) a. *cekkwun-i tosi-lul ha-ess-ta
 the army-NOM city-ACC do-PAST-DEC
 '*The army did a city'
- b. cekkwun-i tosi-lul phagoy-lul ha-ess-ta
 the army-NOM city-ACC destruction-ACC do-PAST-DEC
 'The army destructed a city'

The verbal noun *phagoy* 'destruction' in (13b) is a verbal noun in the light verb construction. *tosi* 'city' is an argument of the verbal noun *phagoy* 'destruction'. In (13a), the entity type noun *tosi* 'city' cannot combine directly with the light verb *ha-* 'do' without the verbal noun *phagoy* 'destruction'. If so, how is it possible that a substantival noun like *paiolin* 'violin' combine with *ha-* 'do' as in (12)? Pustejovsky (1995, 2000) explain the combination of the entity type noun with the verb *begin* by type coercion.

- (14) a. Mary began reading a book.
 b. Mary began a book.

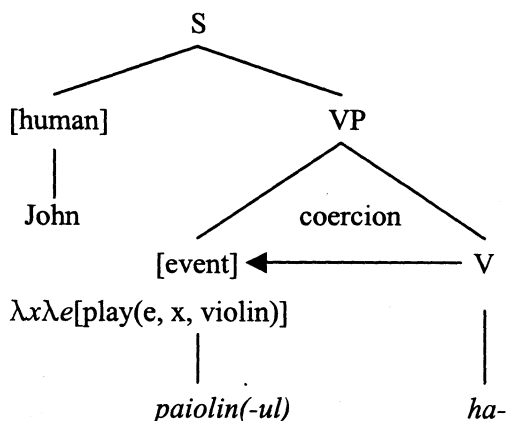
The verb *begin* coerces type of the argument *book* to an event function introducing the event reading of the NP *a book* because, otherwise, there is a type error in that combination. In this way, the verb *ha-* 'do' in Korean and *do* in English coerces the type of their arguments to an event type, when they are combined with special entity type nouns. The type coercion is based on the qualia structure of the arguments. The verb *ha-* 'do' coerces its argument to event type, taking missing information for the correct interpretation from the qualia structure. The noun *paiolin* 'violin' in (12a) is interpreted as *paiolin yencwu* 'playing the violin'. This interpretation is from the telic quale of the noun *paiolin* 'violin' in its qualia structure as in (15).

(15) *paiolin* 'violin'

QUALIA = musical_instrument_lcp
 FORMAL = x: physobj
 TELIC = play (e, w, x)
 AGENTIVE = make_act (e', v, x)

In sum, we can represent the type coercion to event description on the noun *paiolin* 'violin' from the governing verb *ha-* 'do' in (12a), as follows:

(16)



There are limited kinds of nouns whose type changes by type coercion based on their telic quale. These nouns must get specification on *ha-* combinability in the lexicon to block overgeneration of substantive N plus *ha-*.

The [SN + *ha-* 'do'] construction constitutes an individual-level predicate for business or profession, as major or habit (in a secondary telic quale) when type shifting is based on the telic quale of the substantive nominal. Observe:

(17) ce-nun swul-un mot-*ha*-pnita
 I-TOP alchohic drink-TOP cannot-do-DEC
 'I cannot/don't drink'

The substantive nominals involved in this construction are necessarily nonspecific generic (Note that a nominal involved in such a stage-level aspectual predicate as in (14b) is necessarily specific). But the construction can be changed into the stage-level predication by quantizing the nominal or adding time adverbials, as follows:

- (18) wuli maykcwu han-can ha-ca.
 we beer one-glass do
 'Let's drink a glass of beer'

Nouns such as *pap* 'boiled rice' are coerced into an event type of such agentive quale as 'cook_act' instead of their telic quale as 'eat'.

- (19) ecey-nun nay-ka pap-ul ha-ess-ta.
 Yesterday-TOP I-NOM boiled rice-ACC do-PAST-DEC
 'Yesterday, I cooked rice'

Type coercion on substantive nouns based on an agentive quale introduces a stage-level predication of making/preparing, not an individual-level one. This exactly applies to (12b) in English. Their event readings are dependent on their unique qualia roles.

In sum, a dependent type noun undergoes type shifting from an entity type to an event type by type coercion of governing verb *ha-* 'do'. Type coercion is based on the qualia structure of the noun. If it requires telic quale information, the combination of the noun and *ha-* is an individual-level predicate. Otherwise, it is likely to be a stage-level predicate. If so, how can we explain the combination of the complex type noun such as *ppallay* 'laundry' with *ha-*? In the next section, we show disambiguation of a complex type noun.

4.3 Complex Type Nouns and Type Pumping

A noun such as *ppallay* 'laundry' is a dot object with multiple meanings. Dot objects have complex types and the two subtypes of a dot object are mutually interdependent. So, we cannot have one without the other. This mutual dependency makes copredication possible. Let's see sentences in the following;

- (20) ppallay-ka acwu manh-ass-ciman, seythakki tekpwun-ey 1sikan-maney kkutnay-ss-ta
 laundry-NOM very much-PAST-but washing machine help 1hour-in finish-PAST-DEC
 'the laundry was very much, but I finished washing in one hour thanks to a washer'

The verbal noun *ppallay* in Korean is able to be copredicated corresponding to both *laundry* and *washing* in English. We cannot imagine laundering without laundry. *ppallay* as laundry is an entity type noun and one denoting laundering is an event type noun.

- (21) a. ppallay-ka cec-ese nemwu mwukep-ess-ta
 laundry-NOM wet-ending too heavy-PAST-DEC

'Laundry was too heavy, for it was wet'

- b. Yumi-nun halwucongil ppallay-lul ha-ess-ta.
 Yumi-TOP all day washing-ACC do-PAST-DEC
 'Yumi did washing all day long'

The noun *ppallay* in (21a) is an entity type noun but *ppallay* in (21b) is an event type noun. These complex type nouns get their process and result/pre-act nominal readings through the type pumping (projection) process as in (22)³:

- (22) a. Yumi-nun halwucongil cipan ppallay-lul ha-ess-ta
 'Yumi did her family laundry all day long'
 b. *ha*- 'do' ($\Theta(\Sigma_1(ppallay: process \cdot physobj))$)(Yumi) \Rightarrow
ha- 'do' ($\Theta(ppallay: process)$)(Yumi) \Rightarrow
ha- 'do' ($\Theta(ppallay: event)$)(Yumi)
 (Θ : subtype coercion operator, Σ : type pumping operator)

Because the verb *ha*- 'do' takes an event type argument, *ha*- selects an event reading out of the two types; entity type and event type. But *ppallay* is interpreted as an entity when it combines with the verb *cec*- 'be wet, for *cec*- takes only an entity type noun as its argument as in (23):

- (23) a. ppallay-ka cec-ese mwukep-ta
 laundry-NOM wet-ending heavy-DEC
 'laundry is heavy, because it is wet'
 b. *cec*- 'wet' ($\Theta(\Sigma_2(ppallay: process \cdot physobj))$) \Rightarrow
cec- 'wet' ($\Theta(ppallay: phsyobj)$) \Rightarrow
cec- 'wet' ($\Theta(ppallay: entity)$)

Let's consider the noun *mal* 'speech'. *mal* 'speech' is a kind of dot object.

- (24) a. John-un han-sikan naynay swi-ci anh-ko mal-ul ha-ess-ta
 J-TOP one-hour throughout rest-ending not-ending speech-ACC do-PAST-DEC
 'John continued to say something throughout one hour without stopping'

³ Pustejovsky (1995) suggests subtype coercion operation and use Θ as that operator.

(1) John drives a benz.

In (1), *benz* is one of kinds of cars made by a company in Germany. When the verb *drive* combines with *benz*, *benz* is interpreted as a car. It is possible through subtype coercion operation.

(2) Θ [*benz* \boxtimes car]: *benz* \boxtimes car

Thanks to subtype coercion, we have no difficulty in interpreting proper meaning of the sentence in (1).

b. kukes-un cham cinpwuhan mal-ita.
 That-TOP very stereotyped expression-DEC
 'That is a very stereotyped expression'

In (24a) *mal* 'saying' means an activity expressing or conveying someone's thought or feeling etc. And its type is an event. But *mal* in (24b) is an abstract entity type noun similar to *phyohyen* 'expression'. The noun *mal* in Korean is a complex type noun⁴. In sum, nouns such as *ppallay* 'laundry' and *mal* 'speech' are dot objects having a complex type. The verb combining with those selects a proper type out of multiple types by type pumping operation.

5. Conclusion

We can thus solve the puzzle of why certain substantival nouns take *ha-* 'do' as their main verb and this direction will shed new light on the same crosslinguistic phenomenon. This is possible by means of the systematic lexical semantic specification of their qualia structures and a generative operation device – type coercion – provided by the Generative Lexicon Theory. Also, we gave an account of the combination of nouns such as *ppallay* 'laundry' and the verb *ha-* 'do'. Based on Asher & Pustejovsky (2000), we treat nouns such as *ppallay* 'laundry' as a kind of dot object, because those have multiple types in themselves. The verb *ha-* selects an event type interpretation between two subtypes of a dot object through type pumping operation.

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⁴ *mal* in Korean can be translated to several words - *speech, language, expression, word, statement, etc.* on in English.