On the Derivation of Process Nominals*

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1. Introduction

This paper aims at clarifying the mechanism for word formation of process (or event) nominals which refer to a process or an event of their base verbs. Recent works have proposed that such nominals are formed not in the lexicon but in the syntax. However, I will claim that such a proposal is empirically and conceptually flawed, and show that process nominals are formed in the lexicon by a word formation process which is assumed and argued for here. Following the lexical approach based on argument structure, which is proposed by Grimshaw (1990), I will show that the fact that process nominals exhibit verb-like properties can be properly captured at the level of argument structure, without appealing to their derivation in the syntax.

2. Facts and Previous Approaches

2.1. Syntactic Behaviors of Process Nominals

In this section, we discuss various properties of process nominals.

Since Chomsky (1970), it has been noticed that input words and output words share the argument-taking property, which is characterized as the "inheritance" of argument structure (cf. Randall (1984, 1988)). In the case of

process nominalization, the argument structure of base verbs is not different from that of new nominals. In (1), for example, the process nominal *examination* obligatorily takes an object argument just like the base verb *examine*.

(1) a. They examined the students.
b. The examination of the students will take several hours.
c. *The examination will take several hours.

(Abney (1987 : 116))

Although in (1b) the subject argument is not realized overtly as a prenominal possessor, a *by*-phrase or a denominal adjective, it can be argued that PRO exists there (cf. Roeper (1993)). If it can be realized as PRO, it would be assumed that process nominals obligatorily take a subject argument as well as an object one.

Verbal properties of process nominals can be seen from the fact that they are compatible with certain adjuncts. They can cooccur with the same range of adverbial phrases as their base verbs, e. g. locative, temporal and instrumental phrases, which are given in (2), (3) and (4), respectively.

(2) a. We induced protein growth in a test tube.
b. The induction of protein growth in a test tube finally succeeded.
(3) a. We induced protein growth on Monday.
b. The induction of protein growth on Monday allowed us to meet the dead line.
(4) a. They destroyed the warehouse with a wrecking ball.
b. The destruction of the warehouse with a wrecking ball was frightening to watch.

(Rappaport and Levin (1992 : 142))

They can also appear with clausal adjuncts such as *while*-clauses and rationale clauses.

(5) a. the doctor's examination of the patient while looking out the

window

b. the establishment of a new order to better the world

(Lebeaux (1986 : 240-241))

Furthermore, as pointed out by Fu, Roeper and Borer (1995), process nominals can license some-*ly* adverbs.

(6) a. the protection of the children completely

b. his explanation of the problem immediately

(Fu, Roeper and Borer (1995 : 8))

The observations so far indicate that process nominals exhibit verb-like properties in spite of their categorial status. Then, a question arises here of why those nominals behave like verbs. To pursue this question, there have been made several works, which can be divided largely into two approaches : syntactic and lexical ones. We will outline the two types of approaches in the next section and point out some problems with them.

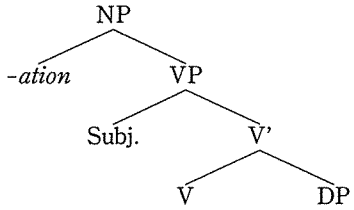
2. 2. Previous Approaches

2. 2. 1. Syntactic Approaches

Fu, Roeper and Borer (1995), van Hout and Roeper (1998), Picallo (1991) and Valois (1993) independently propose that process nominals are formed in the syntax and that their syntactic derivation is responsible for their verbal properties. Their proposal is based on a theory of morphosyntax, where morphological operations such as affixation, compounding and conversion are not restricted to the lexical component. In this morphosyntactic framework, some regular derivational processes are assumed to take place not in the lexicon but in the syntax proper.

Along these lines, for instance, Fu, Roeper and Borer (1995) propose the following structure for process nominals.[1]

(7) the explanation of the accident



(Fu, Roeper and Borer (1995 : 5))

In this structure, the suffix *-ation* combines with VP in the syntax and changes it into NP. Before the suffixation occurs, the host *explain* is entered into the syntax as a verb. If the verb itself exists in the syntax, it is ensured that it projects its lexical properties onto the syntactic structure, and consequently its argument structure is preserved in that nominalization. Moreover, the derived NP contains a VP structure, which allows process nominals to cooccur with adjuncts such as rationale clauses and *while*-clauses.

This approach, however, faces some empirical and conceptual problems, and therefore cannot be maintained.

First, as illustrated in structure (7), process nominals contain a VP in their internal structure. If they have a VP, it would be predicted that they may cooccur with VP adverbs. Indeed, the prediction is borne out. They appear with some VP adverbs such as *completely* and *immediately*, as shown above. McCawley (1988), however, convincingly argues that VP adverbs, in general, are not compatible with derived nominals, even with process nominals, as in (8).

(8) a. Fred's acceptance of such a menial job (??willingly)

b. Lucy's performance of *Tzigane* (*beautifully)

(McCawley (1988 : 408))

This fact will be a serious problem for the syntactic analysis, since if a VP

structure is always contained in a process nominal, the ungrammaticality of (8a, b) remains unaccountable and the analysis predicts incorrectly that (8a, b) should be grammatical.[2]

Second, as Ishikawa (1991) noticed, the following constructions will be counterexamples for this kind of analysis :

(9) a. Destruction with a machine is fun.

b. Construction with pile drivers can be hard on the nerves.

(Sproat (1985 : 265))

These process nominals cooccur with the instrumental adjuncts, which is characteristic of process nominals. In these cases, however, obligatory internal arguments are not realized. Under the analysis assuming that verbs change into nouns after projection of their arguments, the fact that internal arguments are not realized cannot be properly accounted for.

Finally, we should point out that the treatment of process nominalization in the syntax is dubious in a conceptual ground as well. It is not clear how the accusative Case-assigning ability of a host verb disappears. Evidently, the accusative Case is not available for the object argument. Thus, it must be absorbed somehow. But, none of the analyses provides a clear explanation for this problem. Until a satisfactory explanation is provided, the syntactic approach will not be able to avert this conceptual difficulty.

2. 2. 2. Lexical Approach

Grimshaw (1990) claims that process nominals (complex event nominals in her terminology) are formed in the lexicon by combining base verbs with the suffix whose external argument is Ev(ent). This is illustrated in (10).

(10) observation (Ev (x (y))) - process nominals

(Grimshaw (1990 : 66))

According to her assumption, for instance, whenever the suffix *-ation* is attached to a verb, the suffixation allows the base verb's argument struc-

ture, containing the Event argument (Higginbotham (1985)), to be inherited by the new nominal.[3]

On the basis of these assumptions, she accounts for verb-like properties of process nominals. Those nominals can bear their own argument structures, which are inherited from their base verbs. This enables her to explain the fact that arguments must be realized in process nominals, since if they are not, the argument structure of process nominals is not satisfied. In addition, process nominals bear the Event argument in their argument structure just like verbs. Thus, it is predicted that they share with verbs the same capacity to cooccur with some adjuncts.[4]

Grimshaw's (1990) analysis, however, is not unproblematic. To begin with, it suffers from a conceptual difficulty. She assumes that suffixes such as *-ation* and *-ment*, which form process nominals, hold the Event argument as their external argument. However, it is not natural to postulate that nominalizers hold such an argument unless there is strong evidence for its existence, because it has been generally assumed that the nominal category has an R(eferential) argument, not Ev(ent) (Williams (1981b)).

In addition to the conceptual difficulty, her analysis also encounters a technical problem. Although it hinges crucially on the existence of the event structure in process nominals, Aoshima (1993) notes that it is difficult to see how the Event argument is inherited by them. As mentioned above, Grimshaw assumes that a process nominal suffix has the Event argument as its external argument. If such a suffix is attached to a verb, which itself contains the Event argument in its argument structure (Higginbotham (1985)), the resulting nominal would bear double Event arguments. Thus, to obtain the proper argument structure of process nominals proposed by Grimshaw, an additional operation would be needed to eliminate either the Event argument of a verb or of a suffix. This problem, however, is not discussed in her study and remains unclear.

Furthermore, the above-cited constructions in (9), which were used to refute the syntactic approach, also become troublesome for her analysis. Her analysis cannot give a satisfactory explanation to the non-realization of internal arguments in those constructions. This was a serious problem for the syntactic approach as discussed above.

3. Proposals

In this section, we will attempt to explore how process nominals are derived. As observed above, the previous works are not adequate on both empirical and conceptual grounds. In particular, we showed that the syntactic approach involves the serious empirical problems. Rather, it seems that the fact that process nominals have verbal properties can be captured at the level of argument structure, as suggested by the lexical approach. In what follows, basically along the lines of the lexical approach developed by Grimshaw (1990), I will propose that the argument structure of a base verb is partially inherited by its derived nominal. To overcome the shortcomings of the previous analyses and obtain a higher level of theoretical adequacy, we will adopt a notion of morphological head advocated by Di Sciullo and Williams (1987) and Di Sciullo (1992), which provides a natural account for why argument inheritance is possible in process nominalization.

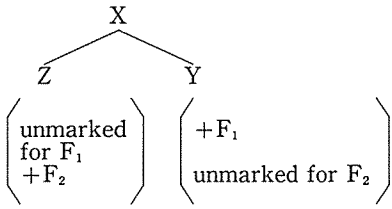
Based on the original notion of morphological head put forth by Williams (1981a), Di Sciullo and Williams (1987) and Di Sciullo (1992) propose the notion "relativized head" in morphology, which is stated in (11).

(11) Definition of "head_F" (read : head with respect to the feature F) :
The head_F of a word is the rightmost element of the word marked for the feature F.
(Di Sciullo and Williams (1987 : 26), Di Sciullo (1992 : 71))

According to (11), a morphological head is determined not for a complex

word as a whole but for each feature. As mentioned explicitly by them, this modified definition theoretically allows a complex word to have two heads specified for different features.[5]

(12)



(Di Sicullo and Williams (1987 : 27))

Here, Y is considered to be a head of X for feature$_1$ since Z is not marked for this feature. Similarly, Z is considered to be a head of X for feature$_2$.

Given (11) and (12), it is possible to postulate that the bundle of features in a new word consist of the compositional features of the two constituents. I will extend this line of reasoning to the analysis of argument inheritance in process nominalization.

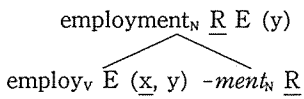
Before entering into the discussion of a technical mechanism of word formation of process nominals, we outline the fundamental framework we assume. The analysis I will present is mainly based on the standard assumption that lexical items have their own argument structure. We further posit that the argument structure includes non-thematic arguments, E (Event) and R (Referential). Higginbotham (1985) introduces the E argument to the argument structure of a verb and argues that it corresponds to the "hidden" argument place for events (in a wide sense, including states). As for the R argument, Williams (1981b) first suggests that nouns have the R argument as their external argument and that the open R position is satisfied by predication or reference.

On the basis of these assumptions, let us now turn to the issue as to how process nominals are derived. Following the lines of the lexical approach

by Grimshaw (1990), I propose that the lexicon includes suffixes to form process nominals. Departing from her analysis, however, I assume that such suffixes have the R argument as their external argument. This suggestion is based on the idea that affixes have their own lexical entries with some syntactic, (phonological and semantic) specifications as free morphemes do (cf. Selkirk (1982)). Then, what syntactical information is specified for the process nominal suffixes ? If nouns have the R argument as their external argument, then it is reasonable to assume that a nominalizer should include this argument as well. Thus, our analysis, we believe, would not include a mere stipulation as Grimshaw (1990) does in her analysis, according to which process nominal suffixes have the Event argument.

We are now ready to examine how the suffixes combine with verbs to form process nominals. Given Di Sciullo and Williams' (1987) and Di Sciullo's (1992) definition of head in morphology, the availability of argument inheritance readily follows. I propose that the argument inheritance phenomenon is an instance of feature percolation of the relevant head. We show this mechanism by taking the suffix *-ment* and the verb *employ* as an example :

(13)



As for category specification in this word formation, the suffix, which is the rightmost element, is defined as the head for this feature by (11), though the categorial feature is marked for both the verb *employ* and the suffix *-ment*. Thus, since feature specification for the complex word is determined by its relevant head, the N feature of *-ment* can be percolated up to specify *employment* as a noun.

Let us next turn to argument specification. We assume that the relevant

head is determined not for a whole argument structure, but for an external and internal argument each. More specifically, an external and internal argument each counts as a morphological feature. Then, (11) allows the external argument of *-ment* R to percolate up since the suffix is the rightmost element, though the host verb *employ* also includes the external argument x. As a result, percolation of x ends up to be blocked, or suppressed. As for the internal argument and the E argument, their features are not marked for *-ment*.[6] Thus, it is possible for them to percolate up from the apparent left constituent *employ*, since they are considered to be the theoretically rightmost elements.

So far I have put forth the hypothesis that argument inheritance in process nominalization is one of the feature percolations, which are governed by the notion of morphological "head." What we should consider next is that word formation must be regular and uniform in interpretation (cf. Selkirk (1982)). For instance, *-er* derived nominals always correspond to the external argument of base verbs (Rappaport and Levin (1992 : 129)). Then, an immediate question is in what way process nominalization is regular and uniform. To answer this, we need to look carefully into what a process nominal denotes.

It is obvious that a process nominal refers to some event relevant to the action of its base verb. In this sense, it is assumed that a process nominal has the referent of an event just like a concrete entity. Thus, I will propose the following construal rule for process nominalization :[7]

(14) $\underline{R}$ argument binds the Event type, E (y), denoted by the base verb.
$E(y)=\underline{R}$

(14) ensures that a process nominal refers to the event type, E (y), by the function of the R argument. To clarify this point, consider the following example:

(15) The construction of the building lasted three years.

In (15), the process nominal *construction* has the argument structure, E (y)= R (in this case, y=*the building*). This argument structure specifies the referent of the nominal as being the event of "constructing the building."[8] In other words, the nominal refers to this event, and then the R argument of the nominal is syntactically discharged.[9,10]

Given (14), it is correctly predicted that a process nominal refers to an event. In this respect, our proposal is consistent with the general requirement that word formation must be interpretationally regular and uniform and that the meaning of the resulting words must be fully predictable.

4. Explanation and Consequences

4.1. The Existence of Argument Structure in Process Nominals

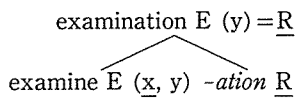
This section shows that the present analysis can provide an adequate account for the various properties of process nominals discussed in section 2. We have shown that process nominals can take arguments and that clausal and phrasal adjuncts are compatible with such nominals. These verbal properties can be properly explained under the analysis proposed in the preceding section.

Let us first consider argument realization in process nominals. The relevant example is repeated in (16) (=(1b)).

(16) The examination of the students will take several hours.

The process nominal *examination* in (16) takes the object argument. We claim that this is due to the fact that the nominal has its own argument structure. As proposed above, the process nominal *examination* is derived as follows :

(17)



In this word formation, *examination* has its argument structure [E (y)=R], which includes the thematic argument y. The y argument thus must be realized syntactically as in (16) ; otherwise the resulting construction becomes ungrammatical since the argument structure of the nominal is not satisfied.

Let us next turn to another property of process nominals, which involves the compatibility with clausal and phrasal adjuncts. The present analysis argues that process nominals inherit the Event argument as well as an internal argument from their base verbs. The existence of the Event argument in their argument structure indicates that they contain an event structure. In this respect, our analysis is the same as that of Grimshaw (1990), though her morphological analysis of how the Event argument is inherited by process nominals is quite different from ours. As we have seen, she proposes that process nominals are allowed to cooccur with adjuncts due to their event structure. It seems that her proposal is easily available to our analysis. Following her proposal, thus, let us assume that adjuncts are licensed by an event structure. Then, we can account for the compatibility with adjuncts by claiming that the event structure of the process nominals licenses the adjuncts.

This line of argument might be extended to the explanation of the following cases, which involve *-ly* adverbs.

(18) (=(6)) a. the protection of the children completely
b. his explanation of the problem immediately

One possible explanation of why these *-ly* adverbs can appear with the process nominals is to appeal to the fact that the nominals include an event structure. If this kind of explanation is valid, it is safely assumed that an

event structure of process nominals could license not only clausal and phrasal adjuncts but also *-ly* adverbs. This assumption, however, is not maintained empirically. Interestingly, my informants find the expressions in (18) to be unacceptable. They also point out that fully acceptable expressions result if the adverbs are replaced by adjectives such as *complete* and *immediate*.[11]

(19) a. the complete protection of the children
b. his immediate explanation of the problem

In addition, as mentioned earlier, process nominals cannot cooccur with VP and IP adverbs other than adverbs like *completely*. This is exemplified in (20) (=(8)) and (21), where VP and IP adverbs appear, respectively.

(20) a. Fred's acceptance of such a menial job (??willingly)
b. Lucy's performance of Tzigane (*beautifully)

(21) a. *his explanation of the problem fortunately
b. *his removal of the evidence presumably

(Fu, Roeper and Borer (1995 : 10))

These facts lead us to conjecture that even if (18) is acceptable for some speakers, its acceptability is a reflection of intrinsic properties of *completely* and *immediately* themselves rather than some property of the process nominals *protection* and *explanation*. Indeed, those adverbs are used in various contexts.

(22) a. In fact, it's *completely* beyond me how anyone can wake up in the morning. . .

(*The Times*, N2000960217)

b. We now accept the allegations were untrue and *completely* without foundation.

(*Today*, N6000121006)

c. In this north-facing garden, the area *immediately* in front of the house is in shade all year round.

(UK-published magazines, N000000060)

d. China Beach, *immediately* south of Da Nang is where the US Marines waded ashore nearly 30 years ago, and. . .

(UK-published magazines, N000000343)

As illustrated in these sentences, which are taken from COBUILD *Direct, completely* and *immediately* can modify PP and AP. It should be concluded, from what has been observed above, that (18a, b) are not interpreted as examples which show a general property of process nominals. Consequently, we claim that *-ly* adverbs are not licensed by an event structure in process nominals.

So far, we have shown how the present analysis succeeds in providing a proper account for the verbal properties of process nominals. In the reminder of this paper, we will discuss two issues to lend support to the validity of our analysis. One is how to handle the troublesome constructions of (9), whose grammaticality cannot be accounted for by the previous analyses. The other is the status of external arguments in process nominals.

4.2. Generic Nominals

We have seen that the following constructions of (23) (=(9)) refute the previous analyses, since obligatory internal arguments are not realized.

(23) a. Destruction with a machine is fun.

b. Construction with pile drivers can be hard on the nerves.

These constructions could be counterexamples to the present analysis as well. Recall that we assume that the mechanism of process nominalization forces a process nominal to inherit an internal argument of a host verb. These constructions thus might appear to cast doubt on the adequacy of our analysis. However, if we can handle these in a proper way, our analysis will receive a higher level of explanatory adequacy than the previous analyses.

The difficulty of handling of the constructions of (23) can be eluded in

careful consideration of the reading of the process nominals in (23). Ishikawa (1991) observes that what they refer to is not a specific event. (23a) does not mean that destroying this or that building with a machine is fun. Rather, it seems to imply that in general destroying something with a machine is fun. To put it differently, the process nominals in (23) have generic readings without any specific referents. If Ishikawa's observation is correct and such nominals refer to generic events, it can be said that those events do not have specific affected objects. Then, we might argue that the reason why overt objects do not occur in (23) is not that the nominals do not contain the object arguments in their argument structures. Instead, we argue that the object arguments are expressed as arbitrary PRO in (23) rather than overtly.

This line of argument is in accordance with the present analysis. We have argued that a process nominal has the R argument as its external argument just like a normal noun. As is well known, a normal noun can have a generic reading. The following examples illustrate this point.

(24) a. *The/a leopard* has a dark-spotted yellowish-fawn coat.

b. *The whale* is an endangered species.

(Huddleston (1984 : 255))

The/a leopard in (24a) and *the whale* in (24b) do not have a specific referent ; they both have generic readings. This indicates that the R argument has the function of the generic reference, too. Thus, it is reasonable to assume that this function of the R argument applies in the case of process nominals, because they have the R argument as well, as suggested. Consequently, it can be argued that the process nominals in (23) refer to generic events through the function of the R argument.

Furthermore, our analysis correctly predicts that when a process nominal refers to a generic event, there are cases where its object argument is not expressed overtly. Recall that we propose that the R argument binds

the event type E (y). If the object argument y is bound by the R argument with generic reference, it is predicted that the generic R argument forces y not to be overtly expressed with a specific referent. As a result, y is expressed as an arbitrary PRO, which has a generic reading.[12] The present analysis, therefore, without any additional stipulation, can handle the otherwise troublesome constructions in (23). We thus believe that it is preferred to Grimshaw's (1990) analysis and the syntactic analyses.

4.3. Suppression of External Argument

This section deals with the status of an external argument in process nominal expressions. We have argued that a process nominal inherits the argument structure of a host verb. It has also been claimed, however, that the external argument of a base verb is suppressed through the competition with the R argument of a suffix. This indicates that an apparent external argument in a process nominal expression is not an argument of the nominal but an adjunct. Then, we suggest that an apparent external argument is a modifier, whose realization is not motivated by the argument structure of a process nominal. We provide good evidence to support this suggestion.

First, an advantage of this suggestion is that we can explain the optionality of realization of an external argument in a simple and straightforward way. Recall that an external argument of host verbs need not be expressed in process nominal expressions unlike cases of verbal expressions, as illustrated in (25).

(25) a. The enemy destroyed the city.

b. the destruction of the city

If a process nominal does not contain a thematic external argument in its argument structure, it is a natural consequence that in (25b), the external argument of the host verb is not realized, since the process nominal *destruction* does not have the property to assign external theta-roles. In this

respect, external arguments are essentially different from the internal arguments, *the city*, which must be obligatorily projected to satisfy the argument structure of the process nominals. As a result, we argue against the hypothesis that the external argument is realized as PRO in examples like (25b), as suggested extensively by Roeper (1993).

A second piece of evidence is concerned with interpretation of *by*-phrases in nominal expressions. Those phrases cannot realize any thematic roles other than Agent. In passives, as the examples in (26) show, *by*-phrases can realize whatever thematic roles, depending on the argument structure of the passive participles.

(26) a. John was recognized by Bill.
b. Mary was loved by Jimmy.
c. The message was received by Bill.

(Hoekstra (1986 : 574))

Given that *by*-phrases in passives are external arguments as argued convincingly in Maranz (1984) and Goodall (1997), and if *by*-phrases in nominal expressions were also external arguments, it would be predicted that such phrases show the same pattern as in passives. This prediction, however, is not borne out, as illustrated in (27).

(27) a. *the recognizing of John by Bill
b. *the loving of Mary by Jimmy
c. *the receiving of the message by Bill

(Ibid.)

Contrary to *by*-phrases in passives, those in nominals cannot receive theta-roles such as Experiencer, Theme and Source, as shown in (27). Only the Agent *by*-phrase is compatible with the process nominals, as shown below :

(28) the imprisonment of refugees by the government

(Grimshaw (1990 : 137))

The fact that only Agent is introduced by the preposition *by* indicates that

the theta-role is not assigned by a nominal, but *by* itself. From the contrast between (26) and (27), therefore, we can conclude that *by*-phrases in nominal expressions are modifiers, not arguments.[13]

Furthermore, Rappaport and Levin (1992) observe that *by*-phrases exhibit a similar property to other modifiers such as temporal and locative ones. Consider the following examples :

(29) a. ?This time the destruction of the city was by the Romans, not by the Babylonians.
b. This time the destruction of the city was on Monday, not on Tuesday.
c. *This time the destruction was of the car, not of the house.

(Rappaport and Levin (1992 : 144))

As shown in (29c), the object argument *of the car* cannot be separated from the process nominal *destruction* by the copula, whereas in (29b), the temporal modifier *on Monday* can. This contrast predicts that if a *by*-phrase is a modifier as suggested here, a copula can separate it from a nominal. The prediction seems to be correct, as shown in (29a), in which the *by*-phrase is separable like the modifier in (29b). The observed contrast between (29a, b) and (29c), thus, suggests that *by*-phrases are modifiers.

So far, we have shown that in process nominals prenominal possessors and *by*-phrases are not arguments but modifiers, which is correctly predicted if our analysis is on the right track. Finally, I would like to present further support for the "modifier" analysis by exploring the possibility of dealing with process nominals with two internal arguments within the present framework. Kayne (1981) observes that process nominals do not take more than one internal argument, as illustrated in (30).[14]

(30) a. *the President's deprivation of the strikers of their right to vote
b. *the robber's divestment of the people of their jewelry

(Kayne (1981 : 164))

Process nominals such as *deprivation* and *divestment* do not take two internal arguments, though their base verbs are three place predicates. Compare (30) with (31):

(31) a. The government deprived employees of their rights.

b. The robber divested the people of their jewelry.

Given that the verbs *deprive* and *divest* can take two internal arguments, we conjecture that their derived nominals could bear the same arguments through argument inheritance, because the suffix does not contain the relevant competing arguments. Then, the ungrammaticality of (30) might not be expected from a word formational point of view. But the present analysis enables us to rule out the ill-formed constructions in (30) in terms of argument inheritance.

Randall (1988) proposes the following principle :[15]

(32) theta-HIERARCHY : Theme
Agent
Instrument, Source, Goal, Path, Location,. . .

(33) INHERITANCE PRINCIPLE
A category-changing operation which blocks the assignment of a theta-role blocks the assignment of all theta-roles lower on the hierarchy.

(Randall (1988 : 138-139))

She argues that the argument realization in deverbal words is governed by (32) and (33). Consider the following examples :

(34) a. The kite is *flyable* (*by experts).

b. The kite was *flown* by experts.

(Ibid. : 136)

As the contrast between (34a) and (34b) shows, *-able* deverbal adjectives, unlike passive participles, has no intrinsic ability to assign the Agent theta-role. She further observes that this contrast is relevant to other

theta-role assignment, as illustrated in (35).

(35) a. The plane is flyable (*into the wind/*to Paris/*by computer/. . .)

b. The plane was flown (into the wind) (from London) (to Paris) (by a pilot with a death wish). . .

(Ibid. 137)

It seems that (32) and (33) correctly predict the difference between (35a) and (35b). Since *-able* adjectives cannot assign the Agent role as in (34a), (32) and (33) predict that theta-roles like Goal, which are defined as being lower than Agent, cannot be assigned as well.[16] On the other hand, passive participles can assign Goal or Source, since they can assign Agent as in (34b). As shown in (35), *-able* adjectives and passive participles therefore behave asymmetrically as predicted by (32) and (33).

Let us now adapt her proposals to our framework and assume that (32) and (33) operate at the level of word formation. Then, (33) will be modified as follows :

(36) INHERITANCE PRINCIPLE

A category-changing operation which blocks the percolation of a theta-role blocks the percolation of all theta-roles lower on the hierarchy.

Given (32) and (36), we can exclude constructions like (30). Suppose that the verb *deprive* has the argument structure in (37). (For explanatory reasons, only thematic arguments are expressed with theta-role labels.)

(37) deprive (<u>x</u> y z)
Agent Theme Source

Given that when this verb combines with the suffix *-ation*, the Agent external argument x is blocked, (32) and (36) ensure that the resulting nominal *deprivation* bears the argument structure in (38). (Again, non-thematic arguments are ignored.)

(38) deprivation (y)

Theme

To put it more precisely, the Source argument z is not permitted to be inherited to the nominal, because the higher Agent argument is suppressed. The resulting argument structure in (38) means that the process nominal *deprivation* contains only one internal argument, which is to be saturated syntactically. Process nominals like those in (30), therefore, cannot license two internal arguments. Consequently, constructions like (30) are ruled out because two internal arguments are realized. If our argument is on the right track, by contrast, (38) predicts that if one internal argument is realized, the relevant constructions become grammatical. This prediction seems to be correct. My informants fully accept the following constructions.

(39) a. the deprivation of their right

b. the divestment of their jewelry

Thus, the present analysis can handle the contrast between (30) and (39) in an appropriate way.

5. Conclusion

In this paper, we have examined why process nominals exhibit verb-like properties. Assuming the lexical derivation of those nominals, we have shown that the theory of argument structure can capture their various properties. Then, we have argued against their syntactic derivation, which is proposed by several recent works. Of course, we are not claiming that every deverbal process should take place in the lexicon. Verbal passives and gerunds might be formed in the syntax. However, this paper showed that the derivation, at least, of process nominals, favors the lexical approach over the syntactic one.

Notes

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[1] Van Hout and Roeper (1998), Picallo (1991) and Valois (1993) basically assume this structure. They propose their own particular structures, but we will not discuss them, and focus on how the syntactic approach explains the verbal properties of process nominals.

[2] Interestingly, in contrast to the judgement in Fu, Roeper and Borer (1995), my informants find the constructions with *completely* or *immediately* unacceptable. See section 4. 1 for more detailed discussion.

[3] Grimshaw assumes that external arguments can be suppressed. But she does not give an reasonable explanation of why they are. Here, we will agree to this point, but it will be shown that the suppression of external arguments takes place in a principled way rather than just a stipulated way.

[4] Grimshaw proposes that PRO of rational clauses is controlled by the event structure.

[5] The schema in (12) is slightly modified to remove a notational mistake made in Di Sciullo and Williams (1987 : 27).

[6] Note that the E argument is neither defined as an external argument nor as an internal one, as suggested in Higginbotham (1985).

[7] Here, the notation=is used to express 'binding.'

[8] One question might arise as to whether or not an event can be identified without an external (Agent) argument. Here, we assume that the existence of the E argument in process nominals is responsible for their eventuality. An alternative is also possible. As van Hout and Roeper (1998) argue, an object (Theme) argument might imply "Agentivity."

[9] We assume that the E argument can also be discharged along with the R argument by reference to an event.

[10] The notion of "event" is sensitive to time or tense. Therefore, the referent to which a given process nominal refers might not be correctly determined without time specification. If an event is regarded as something like a referential expression, as assumed here, the event time should be anchored as suggested by Enç (1987). We argue, however, that the R argument of a process nominal does not function as a specifier of time, and posit, instead, that time specification rests on some function of tense of verbs such as *lasted* in the sentence in (15). Detailed discussion of this subject is beyond the scope of this paper, and then it is left open.

[11] One of my informants points out that the adverbs in the sentences below modify the subject rather than the action : *They* were very protective or *He* was very prompt.

(i) a. They protected the children completely.

b. He explained the problem immediately.

This might indicate that (18a, b) cannot receive the expected interpretation even if they are acceptable.

[12] We are not proposing that whenever process nominals refer to generic events, their affected objects are not realized overtly. If affected objects themselves are a kind of generic nouns, they can appear overtly, because their appearance is not semantically in conflict with process nominals with generic readings. Our analysis predicts that only specific objects contradict the semantics of process nominals with generic readings.

[13] Grimshaw (1990) treats *by*-phrases in passive sentences and nominal expressions as argument-adjuncts. However, the contrast between (26) and (27) cannot be accounted for under her analysis, since they will both have the same status.

[14] One might argue that the ungrammaticality is due to the presence of the subject arguments. My informants, however, rule out the following constructions, though some of the informants feel that (ia, b) are better than (30a, b).

(i) a. *the deprivation of employees of their right

b. *the divestment of the people of their jewelry

[15] See Jackendoff (1972), Larson (1988) and Grimshaw (1990) for more general thematic hierarchies. Here I assume Randall's since it alone concerns the relationship between category-changing and theta-role assignment.

[16] Randall notes that when PPs are construed as adjuncts, they can appear with deverbal words.

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Synopsis

On the Derivation of Process Nominals

Shinichi Nimura

The main purpose of this paper is to investigate how process nominals are derived. It is well known that they behave just like verbs in certain respects.

(1) a. The examination of the students will take several hours.

b. The destruction of the warehouse with a wrecking ball was frightening to watch.

c. the doctor's examination of the patient while looking out the window.

As the examples in (1) illustrate, process nominals take arguments, and they also cooccur with some adjuncts. Then an immediate question arises as to why these are observed. Recently several researchers (e. g. Fu, Roeper and Borer (1995)) suggest that such nominals are formed in the syntax and that their syntactic derivation is responsible for their verbal properties.

In this paper, however, I argue against the idea that process nominals are formed in the syntax. It is shown that their syntactic derivation faces serious empirical and conceptual problems. Alternatively, based on the analysis proposed by Grimshaw (1990), I show that process nominals are formed in the lexicon through a word formation process which is assumed and argued for in this paper. Specifically, adapting the relativized "head" in morphology advocated by Di Sciullo and Williams (1987) and Di Sciullo (1992), I propose a new analysis, under which argument inheritance partially occurs in process nominalization.

The present analysis can provide a proper account for not only the argument-taking property of process nominals but also their compatibility with some adjuncts. It is shown that their verbal properties are due to the fact that they have their own argument structure, which includes the Event argument. This will indicate that the theory of argument structure suffices to capture the

verb-like properties which are observed in process nominals. This paper thus suggests that the lexical derivation is superior to the syntactic one in terms of process nominalization.