Nominalization in English*

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0. Introduction

In this paper, I will discuss the syntax and semantics of nominalized constructions in the framework of Montague Grammar. The four types of nominalized constructions below will be in the scope of this study.

a. *that* clause
b. *for-to* clause
c. *to*-infinitive
d. (verbal) gerund

I will claim that we need to modify the notion of individual in order to analyze nominalized constructions properly, and a new kind of individual, Situation Individuals, will be incorporated into the domain of individuals. And further, taking into consideration the semantic properties of each type of nominalized constructions, I will divide the Situation Individual into two subtypes, Situation Type(henceforth, S-type) and Situation Token(S-token).

1. Syntax of Nominalized Constructions

In this section, I will consider a traditional approach to nominalized constructions and propose an alternative.

1.1. Traditional approach in Montague Grammar: Partee(1977)

Partee(1977) attempts to formulate the syntax of *to*-infinitives.

(1) To please John is easy.

She treats the *to*-infinitive in (1) as an IV. Since the category IV corresponds to the type <e, t>, which denotes a property, the type which predicates something of the type <e, t> must be <<e, t>, t>, which denotes a set of

properties. So she introduces IV of property-level, $\overline{\text{IV}}$, which corresponds to this type, <<e, t>, t>. By virtue of this extension of the category system, we can analyze sentences like (1):

(2) *To please John is easy.*

IV	$\overline{\text{IV}}$
<e, t>	<<e, t>, t>

According to her analysis, the sentence (1) means that the property expressed by *to please John* is in the set of properties expressed by *is easy*. Needless to say, if we admit this property-level $\overline{\text{IV}}$, we have to admit bar-level categories in all categories whose definitions are dependent on IV: $\overline{\text{T}}$ $\overline{\text{IV}}/\overline{\text{IV}}$, etc.

This analysis has a few problems. First, if we consider that bar-level categories themselves can be nominalized, we have to admit higher bar-level categories: $\overline{\overline{\text{T}}}$, $\overline{\overline{\text{IV}}}$, etc. And there is no upper limit in such a process. (This problem was pointed out in Chierchia(1982).) Second, if we consider other types of nominalization, we face another problem. Consider the sentences below:

(3) a. That John killed Mary surprised Bill.
b. For people to love their children is common.

If we follow Partee(1977), the subject and the predicate in (3a) should be assigned types as below:

(4) *That John Kissed Mary surprised Bill.*

<s, t>	<<s, t>, t>

That is, *that John kissed Mary* is naturally regarded as a proposition, which is of type <s, t>, so the predicate, *surprised Bill*, must be of type <<s, t>, t>. Hence we must introduce another type of category other than property-level categories (i. e. proposition-level categories). As you can see from this argument, this approach loses the simplicity and consistency of the category system. If it is possible, we should avoid this approach.

1.2. An Alternative

As is evident from the discussion in 1.1, Partee's approach, in which we assign each of the types<e, t>, <s, t> to *to*-infinitives and *that* clauses respec-

tively, causes complication of the category system. Then, how can we treat these and other nominalized constructions properly? Consider the sentence below:

(5) *John killed Mary.*
e <e, t>

As indicated, *John* is of type e, and *killed Mary* is of type <e, t>. If we assume that all types of nominalized constructions (i.e. *to*-infinitive, *that* clause, *for-to* clause, gerund) denote individual like *John*, we need no categories other than the traditional ones. Therefore I introduce the following function, which maps propositions into the domain of individuals:

(6) Individualizing Function (IF)
(i) Domain: All $\hat{}\varnothing$, $\hat{}\varnothing \in$ ME<s, t>
(ii) Range IF ($\hat{}\varnothing$) $\in$ A

ME: meaningful expression
$\hat{}\varnothing$: proposition
A: domain of individuals

This function recasts all propositions into individuals. I will call the individuals Situation Individuals, since it is natural to regard propositions as denoting situations. (I use the term 'situation' as a cover term for 'event' and 'state'.) By virtue of this function, we can treat all types of nominalized constructions without introducing categories of new types. But we must consider whether this function, which incorporates situations into the domain of individuals, is semantically valid or not. Note the following examples from Jackendoff (1983):

(7) a. I bought this yesterday. (Thing)
b. That(*pointing*) had better not happen again around her. (Event)

(8) a. What did you buy? — a fish. (Thing)
b. What happened next? — Billy fell out the window. (Event)

(9) a. Bill picked up $\left\{\begin{matrix}\text{something}\\ \text{everything}\end{matrix}\right\}$ that Jack picked up. (Thing)
b. $\left\{\begin{matrix}\text{Something}\\ \text{Everything}\end{matrix}\right\}$ that happened yesterday also happened today. (Event)

According to Jackendoff, (7-9) indicates that situations can be treated as,

in our terminology, individuals. (7b) indicates that situations can be referred to by pragmatic anaphors just like things. (8b) indicates that situations can be the targets of *wh*-questions. (9b) indicates that situations can be quantified over in the same way as things. This consistent parallelism between situations and things constitutes strong evidence that justifies the function in (6).

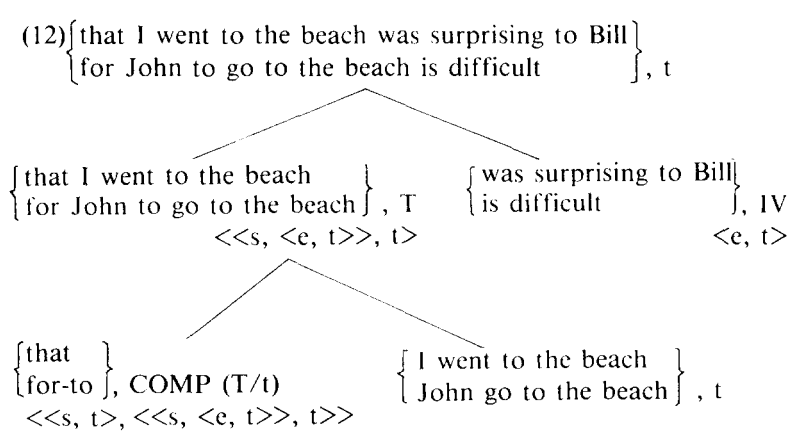
Though I stated that *John* is of type e to simplify the argument, technically, *John* constitutes a term phrase (type <<s, <e, t>>, t>). In order for all types of nominalized constructions to constitute term phrases parallel with *John*, I introduce the category below:

(10) COMP {to, -ing, for-to, that}
Categorial Definiton: T/t
Corresponding Type: <<, s t>, <<s, <e, t>>, t>>

This category takes a sentence(proposition) as an input and yields a term phrase (a set of properties of a Situation Individual). With these innovations, we can treat nominalized constructions syntactically without damaging the category system.

(11) a. That I went to the beach was surprising to Bill.
b. For John to go to the beach is difficult.
c. To go to the beach is enjoyable.
d. Going to the beach is enjoyable.

The analysis tree of (11a, b) is as follows (irrelevant structures are omitted):



Though the individualizing function and the category COMP make it possible to treat *that/for-to* clauses syntactically, *to*-infinitives and gerunds ((11c, d) above) still resist this treatment, for they are seemingly IVs, which are not proper inputs of the category COMP. To solve this problem, I introduce the following rule:

(13) Assume the following variable to be in the subject position, if no overt subject exists:

$$h\ e_n \in P_1$$

Observe the following analysis tree (irrelevant structures are omitted):

(14) {he 1 to go to beach is enjoyable / he 1 going to the beach is enjoyable}, t

{he 1 to go to the beach / he 1 going to the beach}, T — is enjoyable, IV

{to- / -ing}, COMP (T/t) — he 1 go to the beach, t

By rule (13), a variable, *he 1*, is inserted in the subject positions of *to go to the beach/going to the beach*, so they can be treated as t's, the proper inputs of the category COMP.

2. Semantics of Nominalized Constructions

In the last section, I showed a way to treat the nominalized constructions syntactically. All types of nominalized constructions fall in the scope of this treatment. The heart of the treatment is the individualizing function, which maps propositions into the domain of individuals. But if we take into consideration that each type of nominalization has its own semantic properties, it is clear that we should assume different types of Situation Individuals.

2.1. *That* Clause and *For-to* Clause

The difference of the semantic properties between *that* and *for-to* clauses is obvious in the following examples:

(15) a. That the earth is flat is true.
b. *For the earth to be flat is true.

(16) a. *That people love their children would be crazy.
b. For people to love their children would be crazy.
(Bach, 1977)

As the acceptability of the above sentences shows, the meanings of *that* and *for-to* clauses are quite different. One of the examples that shows the difference most prominently is the following:

(17) a. That people own handguns is illegal in England.
b. For people to own handguns is illegal in England.
(Carlson, 1979)

The *that* clause in (17a) denotes a specific actual situation. The *for-to* clause in (17b), on the other hand, denotes not a specific situation but a certain situation. This is the difference which Bach intuitively characterizes as that between 'proposition' and 'eventuality'. To make this point clearer, note the following examples, all of which are from Bach(1977):

(18) a. That the earth is flat is true.
b. *For the earth to be flat is true. (= 15)

(19) a. *That you are here is imperative.
b. For you to be here is imperative.

(20) a. *That people love their children is common.
b. For people to love their children is common.

If we regard *that* clauses as denoting a specific situation and *for-to* clauses as denoting a certain situation, these judgements naturally follow. Though a specific situation can be 'true' or 'false', a certain situation cannot (in (18)). And a specific situation cannot be common or imperative as in (19), (20). The sentences below justify this point further:

(21) a. ??For John to kill his fish was wrong.
b. ??For John to go there bothered me.
c. That John went there bothered me.
(factive)

(22) a. For John to kill his fish would be wrong.

b. For John to go there would bother me.
c. *That John went there would bother me.

(non-factive)

The factive predicates in (21) require their subjects to be facts. In such cases, *for-to* clauses show low acceptability. If we regard a fact as a kind of specific situation, this follows quite naturally from the point of view above. That is, what is denoted by *for-to* clauses is not a specific situation but a certain situation. On the other hand, in (22), the predicates require hypothetical situations as their subjects, because the subjects are in the scope of *would*. Since specific situations cannot be hypothetical, *that* clauses are not acceptable. Now that the semantic difference between *that* and *for-to* clauses are clear (i. e. *that* clause: a specific situation, *for-to* clause: a certain situation), let us move to the next question: Why does this semantic difference arise?

According to Bresnan(1972), the difference depends on the complementizer meaning. That is, *that* 'definitizes' a complement, and *for* indicates that the content of a complement is 'unrealized'. Though many investigators follow this assumption, this analysis is dubious. Consider the following examples:

(23) a. *That you are here is imperative.
b. That you be here is imperative.
c. For you to be here is imperative.

If the semantic difference between *that* and *for-to* clauses depends solely on the meaning of the complementizers, these examples cannot be explained: the tenseless *that* clause in (23b) has the same distribution pattern as the *for-to* clause in (23c), and further, they share the same meaning, that is, 'unrealized'. Note the next example in which the tensed *that* clause is acceptable, and the tenseless *that* clause and *for-to* clause are not. (This example is adapted from Huntley(1982).)

(24) { That Mary invited John to the party
*That Mary invite John to the party
*For Mary to invite John to the party } is ture.

If we attribute this semantic difference not to the meaning of the complementizers but to the presence or absence of tense, these facts follow naturally. That is, since the presence or absence of tense is crucial to the difference, tenseless *that* clauses and *for-to* clauses have the same meaning and distribution pattern.[1] One more piece of evidence will be sufficient to

confirm this point. *For-to* clauses with tense consistently show greater degree of acceptability with factive predicates than those without tense.

(25) a. ??For John to kill the girl bothered me.
b. ?For John to have killed the girl bothered me.

(26) a. ??For John to kill his goldfish was wrong.
b. ?For John to have killed his goldfish was wrong.

(27) a. ??It surprised me for prisoners to be released from the jail.
b. ?It surprised me for prisoners to have been released from the jail.

From the discussion above, it should be clear that the semantic difference between *for-to* and (tensed) *that* clause mainly depends not on the complementizer meaning but on the presence or absence of tense. Why then does the presence or absence of tense cause this difference? Before answering this question, let me define the term 'situation', which I used frequently but which is not welldefined yet.

(28) V (Argument^{n})

(28) shows the structure of a real situation. The *Argument* in the bracket indicates (most typically) real things that participate in a situation. The V indicates a real state or action of, or a real relation between *Arguments*. The V's and *Arguments* are expressed linguistically as verbs and arguments subcategorized by verbs, respectively. For example, the sentence in (29a) denotes a real situation shown in (29b):

(29) a. John killed Mary.
b. kill (John, Mary)

But this definition of a situation is not enough to identify a specific situation, because it does not pinpoint the time and the world of a situation. For example, (29b) represents not only the situation intended by the sentence (29a) but also all situations in which *John* is in a *kill* relation with *Mary*. I therefore add one more constituent to the representation in (28): index, which locates a situation on the plane with world and time axes.

(30) V (Argument^{n}) Index ($w \times t$)

Following Huntley(1982, 1984), I assume that the time in an index is realized by a tense operator, and the world by a modal operator such as *can, must*

IM[2], so the situation denoted by (29a) is represented as follows:

(31) kill (John, Mary) IM/Past

The modal operator IM locates the situation uniquely in the actual world, and the tense operator at some time earlier than the speech time. In the sense that these constituents are indispensable for identifying a specific situation, I call them the necessary constituents of a situation.

We are now ready to answer the question: why does the presence or absence of tense cause the semantic difference pointed out above? *That* clauses (with tense) denote such situations as below, since they contain tense and modal operators, the realizers of an index:

(32) α (β, γ) $\varkappa/\varrho$
α β γ $\varkappa$ p: specified value

On the other hand, *for-to* clauses, which lack specification of indices, denote situations as below:

(33) α (β, γ) x
α β γ : specified value
γ : variable

As is clear from the difinition above, *that* clauses denote specific (or uniquely identifiable) situations, since they contain all of the necessary constituents. But *for-to* denote all the situations which satisfy α (β, γ), since they contain variables as their indices, which means they are abstracted away from idices. In this sense, *for-to* clauses denote not specific situations but types of situations which contain specific situations as their tokens. The semantic difference between *for-to* and *that* clauses pointed out in this section can be explained if we take this standpoint. I will call situations without variables (as in (32)) S-token, and situations which contain variables (as in (33)) S-type.[3]

2.2. *To*-infinitives and Subjectless Gerunds

A *for-to* clause is not the only construction that denotes S-type. *To*-infinitives and subjectless gerunds also denote S-type, though the S-type is different from that of *for-to* clauses: it is abstracted away also from the subject.

(34) a. To kill animals is wrong.

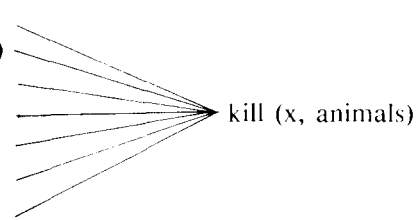
b. Killing animals is wrong.

The situation denoted by (34a, b) is as follows (indices can safely be ignored on this topic):

(35) kill (x, animals)
x: variable

This S-type can be thought of as containing the following as its tokens, which have constants instead of variables:

(36) kill (John, animals)
kill (Mary, animals)
kill (Ellen, animals)
.
.
.
.



The representation in (36) correctly represents the semantic property of the *to*-infinitive and gerund. In gereral, *to*-infinitives and subjectless gerunds denote not specific actions but classes of actions.[4] The *to*-infinitive in (34) does not denote a specific action that somebody participated in, or that took place somewhere sometime. This semantic property easily follows if we assume that what is denoted by *to*-infinitives and subjectless gerunds is S-types whose structures are like that of (35).[5]

This approach is rich in consequences. For example, the following paradigm follows naturally:

(37) a. *A man's coming in here bothered me. (factive)
b. A man's coming in here would bother me. (non-factive)
(Pope, 1976)

In general, gerunds with indefinite subjects can not go with factive predicates. As far as I know, there is no explicit explanation for this fact. Consider the situation denoted by *a man's coming in here:*

(38) coming—in—here (max (x))

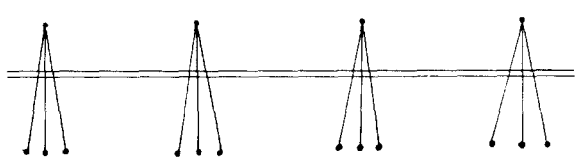
Since *a man* is indefinite, it is a variable ranging over 'man'. As the structure in (38) contains a variable, it is an S-type. Factive predicates requiring

subjects to be facts(i. e. specific situations), S-types are refused.

2.3. Formalization

As discussed above, there are two types of situations: S-type and S-token. Since situations are in the domain of individuals by the individualizing function, there must be two kinds of individual. I assume here that there are two strata in the domain of individuals: the type stratum, and the token stratum. The situations with one or more variables (S-types) are in the type stratum, and others are in the token stratum.

(39) The domain of individuals



The e-type is related to e-token by value-assignment. Since an individual in the e-type stratum has one or more variables in it, it is supposed to have a set of ways to be realized as an e-token, that is, it has a set of ways of value-assignment. This relationship is expressed by the lines in (39).

Technically, this stratification is accomplished by imposing conditions on the individualizing function as follows. The motivation for these conditions must be clear frøm the discussion in the above section.

(40) (i) If $\hat{}\varnothing$ does not cantain a tense/IM operator, then it is mapped into the e-type stratum.
(ii) If $\hat{}\varnothing$ contains an unbound variable (he_n), then it is mapped into the e-type stratum.
(iii) Otherwise, $\hat{}\varnothing$ is mapped into the e-token stratum.

3. Summary

The theory of nominalization which I have just sketched is far from complete. There are many points that must be carefully considered or made explicit. First of all, the approach to semantic properties of nominalized constructions given in section 2 is also quite possible in the framework of the newly developed Situation Semantics, since we assume a structure of situations similar in important features. I should make explicit the advantages and disadvantages in taking this direction, but not knowing the

framework in full detail, I am not ready to discuss this matter. Second, I said nothing about modal operators other than IM. It should be made clear what possible worlds they refer to. But these problems aside, the approach presented here is one way to treat nominalization phenomena.

NOTES

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1. The argument here is essentially based on Huntley (1982, 1984).

2. The model operator IM(indicative mood) is assumed to be in a finite clause which contains no modal auxiliary. It refers to the actual world.

3. As for this point, gerunds seem to denote both types of situations.

(i) a. For John to go there would bother me.
b. John's going there would bother me.
c. *That John went there would bother me.
(non-factive)

(ii) a. ??For John to go there bothered me.
b. John's going there bothered me.
c. That John went there bothered me.
(factive)

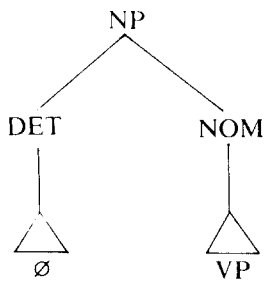
As is clear from the above examples, gerunds sometimes behave like *for-to* clauses, which denote S-type, and sometimes like (tensed) *that* clauses, which deonte S-token. This fact follows quite naturally, if we assume that gerunds are assigned their indices from the main clauses. In (ii), since the index in the main clause is specified, the gerund is assigned its index and denotes an S-token. On the other hand, the main clause in (i) does not have a specific index, so the index of the gerunds remains unspecified. Therefore it denotes an S-type like *for-to* clauses.

4. We have to exclude from this observation cases in which a subject is contextually given, and cases in which a subject is controlled by another ele-

ment in the sentence.

5. Schachter(1976) tries to explain this fact by structural analogy with NPs without determiners. According to his analysis, subjectless gerunds have the following structure:

(i)



Ordinary NPs share this structure(i.e. (DET)NOM). NPs without determiners refer to a class of objects as the sentences below show:

(ii) a. Milk does something for everybody.
b. Beans are a cheap source of protein.

The gerunds without initial possessive NPs, which are nominals without determiners in his analysis, also refer not to a specific action but to a class.

But this analysis is problematic. *To*-infinitives also share this class of action reading (cf. (34)). As far as I know, there is no justification for assigning a (DET) NOM structure to *to*-infinitives. So the explanation for this fact must be based not on such structural analogy, but on indeterminacy of a subject.

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