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Title	A Causal Chain Analysis of Possessive Genitives in Derived Nominals with Special Reference to the Phenomenon of Possessor Selection
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Citation	OUPEL(Osaka University Papers in English Linguistics). 1995, 2, p. 1-30
Version Type	VoR
URL	https://doi.org/10.18910/72953
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A CAUSAL CHAIN ANALYSIS OF POSSESSIVE GENITIVES IN DERIVED NOMINALS WITH SPECIAL REFERENCE TO THE PHENOMENON OF POSSESSOR SELECTION*

1 INTRODUCTION

In this paper I seek to characterize the conditions under which the nominal form of a predicate may employ as its possessor that argument which would normally be expressed as an object, were the predicate realized as an active verb. Let us describe such an argument informally as a logical object. Note that the derived nominals of certain verbs can select their logical objects as possessors, but others cannot:

(1) a. the prisoner's release (by the FBI)
b. the city's destruction (by the enemy)
c. the missiles' deployment (by the enemy)

(2) a. *the picture's observation (by the audience)
b. *the cliff's avoidance (by the climbing party)
c. *the film's enjoyment (by the audience)

It is not immediately obvious why this contrast should exist. A priori, one might expect that any argument of any predicate can be a possessive genitive, but actually this is not the case, as illustrated in (1) and (2). Obviously some criterion must be found to distinguish verbs that allow logical-object possessors when nominalized from those that don't. A variety of approaches to this problem have been advanced, involving notions of affectedness (Fiengo 1980) and aspect (Fellbaum 1987, Tenny 1987). I shall point out problems with all of these and propose in their place a cognitive analysis that draws on the work of Croft (1991).

In adopting a cognitive linguistic approach, I seek to analyze linguistic data through direct reference to the mental processes that underlie human cognition. In particular, I will take advantage of what Lakoff (1987) calls an idealized cognitive model (ICM), in order to describe verbal semantics. An ICM is basically a subjective

*The work presented here is developed from a part of my presentation at the 11th general meeting of English Linguistic Society of Japan, held at Kyoto University on November 28, 1993. I am grateful to all those who gave me valuable comments and suggestions. I wish to offer my special thanks to Michael T. Wescoat for his patient cooperation and suggestions through the course of this study. Andrea and Shravan Vasishth kindly corrected my stylistic errors, to whom I would like to express my gratitude. Of course, responsibility for any inadequacies in this work rests solely with me.

model through which an individual organizes and makes sense of the complexities of the objective world. The model is idealized, in the sense that it embodies a simplification of objective realities that might otherwise be overwhelmingly complicated.

Croft (1991) employs an ICM based on energy dynamics to represent events. The ICM features three primitive notions describable as energy transfer, energy absorption, and inertia, which correspond to the event types of causing, becoming, and being, respectively. Croft claims that verbal meanings are representable with small subparts of this ICM called causal chains. I shall argue that Croft's ICM-based approach provides useful tools to describe the class of predicates that allow logical-object possessors when nominalized: such predicates must describe events comprising components corresponding to energy absorption and inertia.

This paper is structured as follows. Section 2 provides an overview of relevant data and introduces previous analyses. I will focus here on so-called deverbal nominals to the exclusion of other forms of nominalization. Such nominals are typically derived from verbs, often by the addition of Latinate suffixes such as *-ance, -al, -ation, -ment, -ure, -age,* and so on. Section 3 sets forth the underpinnings of the cognitive model established by Croft. In section 4, I propose a constraint in terms of this model to predict when nominalized verbs can take their logical objects as prenominal possessors. The theory facilitates this by providing criteria to pick out several relevant verb classes. I will also show how our cognitive model accommodates the empirical data. Section 5 will consider some motivations for our constraint from the cognitive viewpoint.

2 Previous Analyses of Possessor Selection

In this section, I shall set out a number of empirical observations for which my subsequent analysis must account. It shall be observed that the semantic category of a predicate determines whether or not its logical object may be realized as a prenominal genitive when that predicate is nominalized.

One well-known constraint on the passive construction in general is the affectedness constraint originated from Anderson (1978) and adopted by Fiengo (1980) for analyzing passive nominals. This notion holds that only affected objects can be prenominal genitives: an object is affected when it changes its state due to an event expressed by the verb (Fiengo 1980). (3) shows some examples in which affected logical objects are acceptable possessors, while in (4) the logical objects are not affected and cannot be realized as genitives.

(3) a. the city's destruction (by the enemy)
    b. Germany's unification (by Kohl)
(4) a. *the film's enjoyment (by the audience)
    b. *the picture's observation (by the audience)

In such constructs as *enjoy the film*, or *observe the picture*, the designata of the

objects do not undergo any change due to the events denoted by the verbs. Thus, they cannot be regarded as affected objects, and are predicted to be impossible as prenominal genitives.

Besides the affectedness constraint, Rappaport (1983) proposed another constraint, i.e., Experiencer constraint on nominals derived from psych verbs like *fear* or *fright*, which take Stimulus and Experiencer. It states that the possessive genitives in psychological nouns should be Experiencer, not Stimulus. In both (5) and (6) *the scarecrow* is Stimulus and *Amy* is Experiencer.

(5) a. The scarecrow frightened Amy
b. *the scarecrow's fright (of Amy)
c. Amy's fright
(6) a. Amy feared the scarecrow.
b. *the scarecrow's fear
c. Amy's fear (Rappaport 1983: 130-132)

Examples above still obey the affectedness constraint in that Stimulus causes Experiencer to undergo a change of mental state.

The notion of affectedness, useful as it is, has been notorious for its vagueness, and is considered difficult to treat as an analytical primitive. Fellbaum (1987) and Tenny (1987) propose to replace this vague characterization or criteria with one that appeals to an aspectual property, i.e., delimitedness of the predicate. There are some examples which Fellbaum (1987) claims cannot be explained by the affectedness constraint. She offers the intuition that the logical objects in (5) are not affected by the actions denoted by the verbs.

(7) a. the movement's execution
b. the sermon's delivery
c. the mystery's solution (Fellbaum 1987: 78)

Fellbaum, who questions the accuracy of the affectedness constraint, tries to relate the type of predicates seen in (7) to an aspectual class in the sense of Vendler (1967). Vendler distinguishes four types of aspectual classes among verbs: activities, achievements, accomplishments, and states. An event of the activity type (e.g., *run along the street*, *swim*) has a certain duration but no natural endpoint. An accomplishment-type event (e.g., *destroy the city*, *deliver the sermon*) has temporal duration and incorporates a natural endpoint or result state. An achievement (e.g., *reach the top*, *recognize*) also has a culminating point but is punctual, i.e., without temporal duration. Lastly, a state (e.g., *know the answer*, *see the picture*) has no natural endpoint in itself, nor does it involve any change. Fellbaum, looking at examples like these as in (7), comes to the conclusion that this difference can be accounted for in terms of aspectual properties of the predicates. She claims that only deverbal nouns formed from accomplishment-type verbs select their logical objects as prenominal possessors.

In a similar way, Tenny (1987) also tries to generalize the nature of

accomplishment verbs as predicates having delimitedness. She observes that affected objects have the ability to delimit their predicates aspectually. For instance, *drink* alone describes an activity, whereas *drink a glass of beer* portrays a delimited accomplishment. Thus the affectedness constraint is subsumed by Tenny's concept of delimitedness, and only those logical objects which themselves delimit the predicate aspectually may be realized as a possessor.

This characterization of predicates allowing logical objects as possessors seems plausible enough at first sight. For instance, the examples in (7), which are not explained in terms of the affectedness constraint, feature predicates that would be classified as accomplishments. The following standard test of accomplishmenthood proves the point.

(8) a. execute the movement {in an hour /?for an hour}
b. deliver the sermon {in an hour /?for an hour}
c. solve the mystery {in an hour /*for an hour}

All of these examples are compatible with *in*-phrases but not *for*-phrases. This implies that there is some terminal point at which each event is terminated. Additionally, this explanation correctly admits the foregoing acceptable examples in (1) and (3), which also contain accomplishment-type verbs, as demonstrated in (9). Besides, unacceptable examples in (4) are classified as activity verbs without a terminal point, as the *in/for*-test shows in (10).[1]

(9) a. destroy the city {in an hour/*for an hour}
b. unify German into one country {in a day /?for a day}
c. deploy the missile {in ten minutes / ?for ten minutes}
(10) a. enjoy the film {*in an hour/for an hour}
b. observe the picture {*in an hour/for an hour}

Therefore, Fellbaum's claim that only accomplishment-type verbs, and Tenny's claim that only delimited predicates allow their logical objects to be prenominal genitives when nominalized seems to be plausible enough so far.

However, there are still some problems in their analysis. First, some examples of nominals with preposed logical objects, cited by Fellbaum, are classified not as accomplishments but as achievements in Vendler's system. They are different in that events denoted by achievement verbs do not have temporal duration in themselves.

(11) a. the captive's release from the prison (Fellbaum 1987: 80)
b. John's arrest by the FBI (ibid: 80)
c. America's discovery by Columbus

[1] Note that the *for*-phrase can sometimes modify the result state which would not continue forever and which might be canceled sometime in the future. In (9b) and (9c), the *for*-phrase is acceptable only in this result-modifying reading. As a delimiting test, however, the reading which will be our concern is only of process-modifying reading, which is not available here.

The events denoted by verbs such as *release*, *arrest*, and *discover* are interpreted as punctual. Thus, not only accomplishment but achievement verbs allow their logical objects to be possessors when nominalized. One might suggest that the aspectual analysis could be saved simply by saying that both accomplishment and achievement verbs take delimiting objects and allow them as prenominal genitives. However, this too would be problematic, because not all achievement verbs allow their objects to be possessors when they are nominalized. For instance, predicates like *entry* and *recognition*, which denote punctual actions and therefore qualify as achievements, are incompatible with logical-object possessors.

(12) a. *the room's entry
b. *John's recognition by Mary
c. *the government's (bad) perception

The difference between (11) and (12) lies in whether or not the logical objects of the nominals undergo some change at the end of the action. In (11a), for instance, *the captive* is transformed into a free person by means of release, while in (12a) *the room* does not change as a result of the entry.

Moreover, some verbs which are categorized as accomplishments are excluded from the set of predicates allowing logical objects as prenominal genitives. One group of such predicates is the class of possession-alternation verbs:

(13) a. ??the wall's inscription with the motto
b. ??the valedictorian's presentation with the medal
(14) a. inscribe the wall with the motto {in an hour/?for an hour}
b. present the valedictorian with the medal {in a minute/*for a minute}

As (13)-(14) illustrate, though they show the same behavior as (8) and (9) with respect to co-occurrence with *in*-phrases, the prenominal use of logical objects is blocked. These examples cannot be accounted for by Fellbaum's approach nor by Tenny's. For instance, according to Tenny, both arguments in (14b), i.e., *the valedictorian* and *the medal*, can be regarded as delimiting the event denoted by the predicate and thus should be possessors. However, they show asymmetrical judgments in acceptability between (15) and (16).

(15) a. ??the wall's inscription with the motto [=(13a)]
b. ??the valedictorian's presentation with the medal [=(13b)]
c. ??the library's provision with books
d. ??the patient's injection with the drug
(16) a the motto's inscription on the wall
b. the medal's presentation to the valedictorian
c. the book's provision to the library
d. the drug's injection to the patient

In general, the arguments classified as goals are inappropriate as possessors. As we have seen, attractive as Tenny's analysis may appear, it also has the drawback of being unable to distinguish (13) from (14). The difference seen above should be accounted for in some way.

Furthermore, even some activity verbs can promote their logical objects to possessors, which does not accord with Fellbaum's nor Tenny's claims.

(17) a. The ship's skillful navigation by the first officer saved the crew.
b. navigate the ship {for three hours /*in three hours}

Besides, contrary to Fellbaum's claim, some of her examples are acceptable or at least not so bad, according to my investigation.

(18) a. *the invitation's repetition (Fellbaum 1987: 85)
b. the slogan's repetition

This implies that aspectual classification is not so straightforward as Fellbaum and Tenny first illustrate. Table 1 shows empirical summary by aspectual classes.

<TABLE 1: EMPIRICAL SUMMARY BY ASPECTUAL CLASSES>

ASPECTUAL CLASS	OBJECTIVE POSSESSIVE GENITIVES
Accomplishment	sometimes
Achievement	sometimes
Activity	sometimes
State	never

Even some activity verbs can be a member of the predicates in question. In other words, as claimed by Fiengo, affected objects should bear some change of state regardless of the delimitedness of their predicates. The problem is how it should be explicitly represented.

So far, we have briefly looked at some of the empirical phenomena surrounding prenominal use of logical objects in nominals and two proposed explanations: first the affectedness constraint and then the aspectual restriction as an alternative. Neither is sufficient to characterize the set of verbs which allow their logical objects to be possessors when nominalized. Affectedness is a property of causatives, and causes some change of state on the part of the object, not the subject. Accomplishment and achievement are aspectual properties of events. Both factors need to come into play in explaining the phenomenon: either one taken alone is not enough to characterize the group of verbs compatible with prenominal possessors.

Here, we may tentatively and informally describe as follows the class of verbs whose logical objects can be prenominal possessors when nominalized:

(19)LOGICAL OBJECT PROMOTION GENERALIZATION
Verbs whose logical objects are appropriate as prenominal genitives are those whose objects undergo some change through

the course of the depicted event.

This statement roughly captures the distinction seen in examples in (3)-(18). It succeeds in capturing the difference between (3) and (4) in that the latter lacks change of state on the part of the object. It disambiguates the two types of achievement verbs observed in (11) and (12) in that the former causes its object to change its state, while the latter changes its subject. Logical objects in alternation verbs seen in (13) and (15) are regarded as mere destinations, having no particular change themselves throughout the course of the event. Finally, the activity verbs in (17), in contrast to those in (4), cause the object to undergo some change.

In the discussion below, we shall discover that the informal characterization of verbs that allow logical objects as possessors in their nominal forms made in (19) finds a natural and elegant implementation in the cognitive-theoretical approach advocated by Croft (1991) and Langacker (1991), among others.

3 THE CAUSAL-CHAIN MODEL

Before proceeding with the cognitive-theoretical analysis of possessor selection, we must first establish some of the basic concepts that underlie the causal-chain model. Though the approach was originally developed for the description of verbal structures, it extends straightforwardly to nominal forms, as I shall demonstrate presently.

Let us begin with a fuller discussion of the energy-dynamics-based ICM mentioned in the introduction, which Croft (1991) proposes to represent events.

3.1 The Energy-Dynamics Model

This ICM represents the structure of simple events; this is the type of event which may be represented by simple lexicalized predicates, e.g., verbs and adjectives. Croft adopts the Davidsonian view that events are fundamentally defined by relations of cause and effect. These relations are to be represented through energy dynamics among individuals. The claim behind this model of events is that at some level of abstraction or 'idealization' all events may be subjectively regarded as complex combinations of energy transfer, energy absorption and inertia: causation is regarded as involving one individual bringing energy to bear on another. In the process, an energy transfer takes place; the energy emitted from the initiator of the event comes to be borne by the other participant. The effects of causative events may be modeled with energy absorption and inertia. When energy is brought to bear on an individual, that energy is absorbed, thereby bringing about some change in the individual. In contrast, when energy is stable, inertia results, and the individual remains in a steady state until such time as it is disturbed by an influx of energy from another individual.

3.2 A Graph-Theoretic Representation: Causal Chains

To represent the energy-dynamic nature of events, Croft utilizes a graph-theoretic representation called a causal chain. The ICM may be rendered as a directed graph, where vertices correspond to individuals, and arcs represent causal links between them. Suppose, for instance, an arc exits a vertex associated with the individual x and enters one associated with the individual y, i.e., x --> y. This piece of the graph indicates that x was the bearer of energy before the event represented by the arc and that y is the bearer of energy afterward.

ICMs of events consist of three-arc directed trails, whose arcs are labeled, from first to last, CAUSE, BECOME, and STATE: CAUSE for energy transfer, BECOME for energy absorption, and STATE for inertia. A directed trail is a sequence of alternating vertices and arcs, where (a) the terminal vertex of one arc is the initial vertex of the next arc, and (b) the arcs are all distinct.[2]

An example of a causal chain is given below, modeling the event described in the accompanying sentence:

```
rock    window  window  window          A rock broke the window.
  *-------->*--------->(*)------>(*)
    CAUSE   BECOME  STATE       <FIGURE 1: Causal Chain Representation>
```

In the diagram above, vertices are labeled to identify the associated individuals, here namely *rock* and *window*. I follow Croft in using a somewhat unorthodox graphic convention: causal chains are strung out linearly from left to right, even when that entails drawing the same vertex more than once. Parenthesization indicates that the vertices so-marked are identical to the immediately preceding vertex.

3.3 Causal Chains and Lexical Meanings

We should explicate what kind of representation of events is possible by means of Croft's causal chain ICMs. As already mentioned, verb meanings are theorized to depict parts of simple events. In terms of the graph-theoretic representation, a verb denotes a continuous subpart of a causal chain, called here the verbal segment. In the diagrams it is represented with verb segment delimiters (###). The verbal segment consists of one or more arcs and all incident vertices. One purpose of the verbal segment is to align participants in the described event — corresponding to vertices in the causal chain — with arguments of the verb.

The verbal segment allows one to define the notions of Logical Subject and

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[2] There are some additional conditions which Croft imposes on simple events. For instance, simple events should be self-contained. Thus, if two distinct individuals exert energy on a third, and the last individual changes state as a result of the combined energy transfer: then an otherwise well-formed simple event that incorporates one causer but not the other would not be self-contained and would therefore be excluded from consideration.

Logical Object.

(20) a. LOGICAL SUBJECT: An argument is the logical subject of a predicate if the designatum of that argument is associated with the left-most vertex included in the verbal segment of the causal chain corresponding to the verb.

b. LOGICAL OBJECT: An argument is the logical object of a predicate if

(a) it is not the logical subject, and

(b) the designatum of that argument is associated with the right-most vertex included in the verbal segment of the causal chain corresponding to the verb.

In terms of syntactic realization, the logical subject and object of a predicate will of course be the surface subject and object in the active voice.

In this model, three types of internal structure of simple events are distinguished as prototypical verbal types; they are described as causative, inchoative, and stative. Causative verbs correspond to causal chains that incorporate three arcs, i.e., CAUSE, BECOME and STATE; inchoative verbs are representable with just the last two arcs, namely BECOME and STATE; finally stative verbs have only STATE arcs in their causal chains. Each verb type is illustrated in Figure 2 by an example sentence and the corresponding causal chain.

<FIGURE 2: The Three Sentence Types and Their Causal Chain Representations>

CAUSATIVE: The rock broke the window.

```
rock   window   window   window
  *-------->*------->(*)------->(*)
   CAUSE   BECOME   STATE
  ###        break        ###
  SBJ                     OBJ
```

INCHOATIVE: The window broke.

```
          window   window   window
  *-------->*------->(*)------->(*)
   CAUSE   BECOME   STATE
         ###      break    ###
```

STATIVE: The window is broken.

```
                  window   window
  *-------->*-------->*-------->(*)
   CAUSE   BECOME   STATE
                 ###broken###
```

Other non-prototypical verbal types also exist, and these will be described below.

3.4 Non-Prototypical Event Types

Among the relations there are some which do not involve the causal relation in a strict sense. For instance, spatial and possessive relations do not involve energy transmission from one participant to another. In this point, they deviate from prototypical transitive relations. It is true, though, that the status perceived of those participants are certainly asymmetrical: in terms of spatial configuration, where at least two entities are involved, the moving or movable object is construed as Figure with respect to the other functioning as Ground; and the possessive relation also consists of Possessor and Possessed. The question is, how can we portray these relations in terms of causal chain analysis?

To integrate these non-prototypical relations into the causal chain analysis, Croft adopts the notion of coercion. Coercion means the "conceptualization of non-causal relations like spatial or possessive ones as if they did possess an asymmetry like that between a causally defined initiator and endpoint (Croft 1991: 198)." In other words, the asymmetry of the possession and figure-ground relations suffices to establish an analogy with the prototypical energy-dynamic relation of causation. On the strength of this analogy, a coercion arc representing one of these relations may be inserted into a causal chain, though it deviates from the prototypical causal chain arc.

Croft mentions several types of coercion, two of which are: *Figure-first coercion* in verbs of motion and *Possessed-first coercion* in transfer-of-possession verbs. By means of Figure-first coercion, causal relations are imposed on them so that Figure precedes Ground.

(21) He sprayed the wall with paint.

```
X       Y        (Y)coer. (Z)
*------->*------->(*)------>(*)
###          verb          ###
SBJ                        OBJ
```

<FIGURE 3: Figure-First Coercion>

In the same way, Possession is an asymmetrical relation between two participants, a Possessor and a Possessed. Though they do not constitute a causal relation, Possessed is aligned to precede a Possessor by means of Possessed-first coercion.

(22) a. John gave Mary a candy.
b. The dean presented the valedictorian a medal.

```
X       Y        (Y)coer. (Z)
*------->*------->(*)------>(*)
###          verb          ###
SBJ       present          OBJ
```

<FIGURE 4: Possessed-First Coercion>

The coercion is usually carried out at the result state of the event, i.e., at the last arc of the causal chain. Note that, unlike a prototypical causal chain of a simple event,

individuals associated with vertices which are incident to a coercion arc are distinct. This indicates that the causal chain containing a coercion arc in it deviates from normal, prototypical causal chain which consists of CAUSE, BECOME, and STATE arcs, as exemplified in Figure 1.

3.5 Descriptive Potential of Causal Chains

One of the benefits afforded by the use of the causal chain model is a straightforward representation of the notion of affectedness. An affected individual can be viewed as one which has absorbed some form of energy. When it is fully affected, then it has entered a result state and become inertia. In terms of the graph-theoretic model, it is definable as follows:

(23) An affected individual is one associated with the vertex at the end of the BECOME arc of the chain. Especially, an individual is fully affected when it is associated with the vertices incident to the last two arcs, i.e., BECOME and STATE arcs.

This succeeds in incorporating the traditional notion of affectedness into the causal chain system and makes it clear. When BECOME arcs are mentioned in the following, it always implies the notion of affectedness.

Note that, in aspectual analyses like Fellbaum or Tenny, the compatibility with *in*-phrases is used as a test for evaluating affectedness. Our approach diverges from them in that only the BECOME arc is needed for affectedness which governs the possessor selection. For instance, through the event denoted by *navigate* in (17), the object *the ship* is surely affected with its position changing, though it does not allow *in*-phrase. It is true that *in*-phrase compatibility and objective possessor realization sometimes overlap, but the relation is not perfect one.

In-phrase, however, can be a diagnostic not for affectedness but for the presence of BECOME-STATE segment: if the predicate is compatible with *in*-phrase, then it comprises both BECOME and STATE arcs in its causal chain representation. In other words, *in*-phrase serves as a sufficient condition for the presence of BECOME-STATE sequence. Note that the predicates with the STATE arc only do not accept *in*-phrases. This implies that STATE arcs should be accompanied by BECOME arcs in order to license the co-occurrence of *in*-phrases.

(24) a. He knew the answer (*in ten days).
b. John feared the scarecrow (*in a minute).

Secondly, the chain model also provides a new insight into aspectual classification of the predicates, giving rise to an interesting variation on Vendler's classical distinctions. Recall that Vendler recognizes four aspectual classes, i.e., statives, activities, accomplishments, and achievements. The first of these classes is straightforwardly representable in this model as the set of verbs corresponding to

verbal segments comprising only STATE arcs. The second class, i.e., activities, which do not contain any specific result state in general, consists of verbs whose verbal segments lack STATE arcs.[3] In using the distinction between STATE and non-STATE arcs as an analytical tools, we are then left with one remaining class of verbs, those whose verbal segments comprise both STATE and non-STATE arcs. This category unifies traditional classes of achievements and accomplishments. In allowing new natural classes of aspectual meanings, the causal chain model will afford us new possibilities for analyzing possessor selection in the following section.

Thirdly, the causal chain representation can distinguish verbs which describe subject-change from those of object-change, regardless of their aspectual classification. Note that the prototypical causal chain is a representation of the event which depicts change on the part of its object. If the participant corresponding to the vertex from which BECOME arc exits is identical with that of the logical subject, then the predicate describes an event in which the subject undergoes some change.

Summarizing so far, the model explained above gives a causal-aspectual characterization of events: it can unify both causal and aspectual factors which seem to affect the use of objects as possessors as seen earlier.

3.6 Causal Chains and Nominals

Our next task is to apply the causal-chain model to the analysis of nominals derived from verbs. It seems safe to assume that such derived nominals presuppose the causal chains of the corresponding verbs as the basis of their meaning. This assumption appears to be in accord with the thinking of Langacker (1987b), who states that a verb and its nominalization can describe the same event. Seiler (1983) also states "[A]bstract nouns (=deverbal nouns) pertain to a linguistic technique that allows actions and processes to be treated as if they were things" (Seiler 1983: 53). Consequently, if the described events are the same, it follows that the event representations, i.e., the causal chains, are also plausibly identical. The difference between verbs and their corresponding derived nominals, says Langacker, lies at a higher level abstraction concerning the individuation of events (see Langacker 1987b: 90). The verb stem focuses explicit concern on a series of component atomic events scanned sequentially through time, while its derived nominal emphasizes the unified nature of the state sequence as a whole, disregarding the temporal scanning (cf. Langacker 1987b: 90). Thus, I assume that whatever semantic differences separate verbs from their corresponding nominals, at the very least causal-chain representations will remain constant across the two categories.

Having provided an explanation on the causal chain model and its applicational

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[3] In defining activity in this manner, I leave open the possibility of having activity verbs which correspond to verbal segments containing just one arc, either CAUSE or BECOME. Activity verbs involving both of these arcs in their causal-chain representations are numerous; however, I know of no convincing cases of activity verbs that would map onto single arcs. I'm not sure what if any consequences follow from this gap in the paradigm.

validity to nominal structures, I shall analyze in the next section the data we have observed in section 2.

4 Application of Causal Chain to Deverbal Nominals

Let us utilize the causal chains sketched above to explain the empirical phenomena we have seen in section 2, and see that the present analysis elegantly accommodates them.

4.1 The Lexically Framed Affectedness Constraint

Having established a cognitive-theoretic foundation in the previous section, I would like to recapitulate the informal characterization made in (19) in terms of the causal chain model as follows:

(25) The Lexically Framed Affectedness Constraint
The logical object of the deverbal noun can be promoted to prenominal genitive position if and only if (a) and (b) are both satisfied:
(a) The corresponding event features energy absorption; in terms of the causal chain graph, the verbal segment for the deverbal noun includes at least the BECOME arc.
(b) The designatum of the logical object undergoes energy absorption; in terms of the causal chain graph, the logical object vertex must be identical to that from which the BECOME arc exits.

The causal chain diagram itself describes the idealized cognitive model of events in general, a part of which is framed out by the verbal segment of each verb. Technically, logical objects are perceived as individuals which absorb energy and become inert, i.e., which appear at the end of CAUSE arc and remain in STATE arc. It can incorporate the general fact that affected objects can be prenominalized as genitives, for the logical objects which become inert at the end are recognizable as 'fully affected' ones: the result state can be ascribed solely to the logical object which is involved in that STATE arc. In fact it is my contention that the aspectual distinction on which Fellbaum and Tenny base their analyses are epiphenomena of lexically framed affectedness.

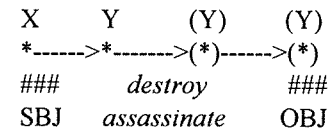
In the remainder of this section, I shall undertake an in-depth examination of how this characterization in terms of causal chains allows us to predict accurately the various categories of predicates in which logical objects may be selected as possessors in nominalizations. I shall also demonstrate that this formulation of the constraint on the realization of logical objects actually subsumes certain parts of the previous affectedness- and aspect-based analyses, while it diverges from its

predecessors in certain ways that lend it a greater degree of empirical adequacy.

4.2 Nominals Derived from Accomplishment Verbs

Firstly, let us examine the following examples of nominals derived from verbs consisting of all the three segments of the causal chain, i.e., CAUSE, BECOME and STATE. *Destruction* or *assassination* are two such examples, and their corresponding causal chain representation is as follows:

(26) a the city's destruction by the army
b. Caesar's assassination by Brutus



<FIGURE 5: Accomplishment Verbs>

Here we want to focus on Y, the logical object of the predicate in question. Elements represented as Y receive energy exerted from Causer X, undergo change and reach a certain result state. In the case of (26a), for example, *the city* receives energy exerted from *the army* and changes its state. The individuals corresponding to vertices represented as Y above obtain some change and a new resulting state. Recall that *in*-phrase works as a diagnostic for evaluating the existence of the BECOME-STATE segment.

(27) a. destroy the city in a week
b. assassinate Caesar in a day
(28) a. the completed destruction of the city
b. the completed assassination of Caesar

In the same way, the adjective *completed*, which can only be used to describe bounded events with an endpoint to be reached, may modify derived nominals in question. Here, the predicates like *destroy*, *assassinate* conform to the statement in (25) that, in order to realize their logical objects as prenominal possessors, they should describe events that comprise at least the BECOME arcs in their corresponding causal chain representation, where their logical objects are involved.

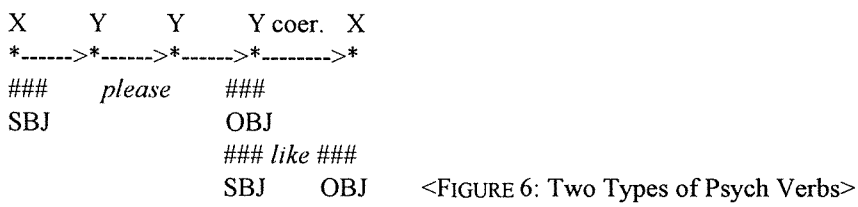
4.3 Nominals Derived from Psych Verbs

Croft (1991) states that psych verbs with experiencer-objects are also considered to be causative process verbs, the stimulus causing the experiencer to enter a new mental state, while experiencer-subject verbs are stative. Croft cites two kinds of examples to illustrate the difference. Firstly, co-occurrence of means clauses is a characteristic of causative verb types while it is not the case with stative verbs.

Secondly, progressive forms of causative mental verbs are acceptable if some appropriate contexts are provided. This implies that they are process verbs. These points are exemplified in (29) and (30), respectively:

(29) a. John pleased his boss by coming in early every day.
b. *John's boss liked him by coming in early every day.
(cf. John's boss liked him because he came in early every day.)
(30) While the adults were chatting, the clown was amazing the children with his acrobatics. (Croft 1991: 215)

This phenomenon indicates that the object-experiencer verbs like *please* are regarded as causal-process verbs causing the new mental state. This is represented in the causal chain as CAUSE-BECOME-STATE segment. On the other hand, subject-experiencer verbs are typically regarded as stative mental verbs in that they do not involve any causal relation in general. They are represented, therefore, as consisting of only coercion arc. Note that object-experiencer verbs like *please* and subject experiencer verbs such as *like* presuppose the same causal chain in their base but the portion delimited by their verbal segment is different.



<FIGURE 6: Two Types of Psych Verbs>

This causal chain diagram represents a general structure of psychological effect that X causes Y to change its mental state so that Y feels some emotion toward X. The structure of the object-experiencer psych verbs satisfies the requirement stated in (14) in that the logical object Y is identical with the designatum of the vertex from which the BECOME arc exits. As expected, they derive well-formed nominals when their logical objects are promoted.

(31) a. the people's disillusionment with the president (Rozwadowska 1988: 148)
b. the audience's disappointment at the news
c. Mary's amusement at the fairy tale
d. John's (public) embarrassment of Mary (Grimshaw 1991: 119)

On the other hand, verbs with coerced STATE arc only are insufficient for the logical object promotion, as predicated in (25), since they are void of the BECOME arc in their causal chain representation. This point is confirmed by the following examples.

(32) a. John fears the ghost.
b. *the ghost's fear

(33) a John prefers this garden.
b. * this garden's preference.

To sum up, experiencer-object psych verbs, which consist of BECOME and STATE arcs of the causal chain, take their logical objects as prenominal genitives when nominalized, while Experiencer-subject psych verbs do not, since they are stative verbs without the BECOME arc in their causal chain representation.

4.4 Alternation Verbs

Next, let us examine the case of those nominals derived from possession verbs like *present, provide, inscribe, inject* and so on.

(34) a the award's presentation to the valedictorian
b. the book's provision to the library
c. the motto's inscription on the wall
d. the drug's injection into the patient

These verbs involve an asymmetrical binary relation between two participants, i.e., the possessor and possessed. In the case of the verb *present*, *the valedictorian* is the possessor and *the award* is the possessed. Though these verbs are not ordinarily considered as involving causation or energy transmission, Croft (1991) assumes Possessed-first coercion to make them fit into causal chain diagram as follows:

```
X      (Y)       Y    coer. Z (=Location)
*------->*------>(*)------->(*)
###    verb     ### prep. ###
SBJ              OBJ       OBL
```

<FIGURE 7: Alternation Verbs (1)>

Participants selected as Possessors are represented as Y in the diagram above. The verbal segment contains a BECOME arc in it, and the logical object at the end of the verbal segment is associated with a participant corresponding to the vertex incident to the BECOME arc. This condition matches our statement in (25), allowing the logical objects to be prenominal genitives when the predicate is nominalized, as we have seen in (34).

Note that these verbs are famous for their alternations, as illustrated in (35)-(38).

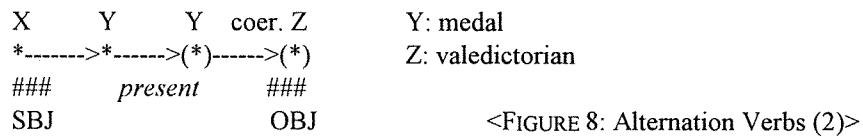
(35) a. present the medal to the valedictorian
b. present the valedictorian with the medal
(36) a. provide the books to the library
b. provide the library with books
(37) a. inscribe the motto on the wall
b. inscribe the wall with the motto
(38) a. inject the drug to the patient

b. inject the patient with the drug

This is due to the fact that they have two possibilities of selecting logical objects: the possessor and possessed. We have so far looked at cases where the possessed is selected as a logical object and realized as a prenominal genitive. It is possible, of course, for the possessors to be logical objects, as illustrated in (35)-(38), but the possessors are not successfully realized as prenominal genitives when their predicates are nominalized, as indicated in (39).

(39) a. *?the valedictorian's presentation with the medal
b. *?the library's provision with books
c. *?the patient's injection with the drug
d. *?the wall's inscription with the motto

(39) corresponds to (b) examples of (35)-(38) in that *the valedictorian*, *the book*, *the wall*, and *the patient* are selected as logical objects. Their causal structures are diagrammed as follows:



<FIGURE 8: Alternation Verbs (2)>

Note that the causal chain diagram itself, which consists of CAUSE, BECOME and coerced arcs, is the same as that of (34) (see Figure 7). The difference lies in the portion of the causal chain which is framed out by the verbal segment of (34) and of (39). The verbs in (39) cover all the three segments of the causal chain, while those in (34) frame a part of it.

Here, it is true that the causal chain representation given above satisfies the first condition in (25): the event denoted by the predicates in question forms a three-segmental causal chain containing the BECOME arc. It is also the case of their alternation counterparts seen in (a) examples of (35)-(38). But, as shown between (34) and (39), there is in general a contrast in acceptability of prenominal genitives. The problem is, it does not satisfy the second requirement made in the Lexically Framed Affectedness Constraint in (25): the participant corresponding to logical object here is not identical with, but distinct from that of the vertex from which the BECOME arc exits. Thus, the condition stated in (25) correctly predicts the difference in acceptability between (34) and (39).

Note that the alignment of objects in the causal chain is different between (34) and (39). In an energy transmission chain, the argument selected as a possessor in (39), illustrated as Z in the diagram above, is not construed as a participant which receives energy and transfers it to another, but rather as its destination or its goal. We have seen so far that what can be possessors should receive some energy transmission from Causer, i.e., it should be incident to the BECOME arc of the causal chain. Since *the valedictorian*, *the wall*, and *the patient* in (39) tend to be

construed merely as location or destination at the end of causal chain, they are not qualified enough as appropriate candidates for possessors, and this is the reason why it is rather difficult for them to be prenominal possessors.

Note also that the affectedness constraint and the notion of delimitedness of the predicates cannot distinguish the contrast in (34) and (39), for logical objects in both examples are to be regarded equally as affected, undergoing change, as illustrated in (40) and (41).

(40) a. ??Jeremiah sprayed the paint on the wall (in five minutes) and there was half a can left over.
b. Jeremiah sprayed the wall with the paint (in five minutes) and there was half a can left over.

(41) a. Jeremiah sprayed the paint on the wall (in five minutes) and the wall was only half covered.
b. ??Jeremiah sprayed the wall with the paint (in five minutes) and the wall was only half covered. (Tenny 1994: 53-54)

In (40a) and (41a), the internal arguments, here namely *the paint*, are understood as completely consumed and therefore totally affected. This implication is incompatible with the situation as in (40a) where half a can was left over. On the other hand, (40b) and (41b) indicate that the containers realized as direct arguments, here *the wall*, can also be understood as completely affected. If this is correct, then it follows that the affectedness constraint will always predict falsely that the examples observed previously in (39) should all be acceptable. Either *the paint* or *the wall* could be interpreted as 'affected' as (40) and (41) show: *the paint*, because it changes its location, or *the wall*, because it changes its state from not being covered to being painted. Tenny's notion of delimitedness of the predicates also fails to explain these contrasts: *in*-phrase being compatible both in (40b) and (41a), both objects have delimiting function and can be realized as possessors. However, as the examples of possessives in (39) shows, it is not so.

In our analysis based on causal chains, it is apparent that *the paint* and *the wall* differ in the possibility of prenominal objective possessor: the former is more likely to be a candidate for the use of its object as a possessor. Recall that our statement in (25) requires the logical objects to absorb the energy transmitted from the Causer.

In sum, the contrast in acceptability between (34) and (39) can be illustrated explicitly in terms of causal chain analysis. Though logical objects of the former consistently appear both at BECOME and STATE arcs, those of the latter take part only in the last STATE arc, which is inconsistent with the statement we have established in (25).

4.5 Achievement Verbs

Next, let us examine the case of achievement verb type. Achievement verbs denote an event of punctual occurrence; they depict events of single moments of time,

moments of completion of an event. Therefore, they cannot generally appear in the progressive form, as illustrated in (42).

(42) a. ??The policeman is arresting the criminal.
b. ??The policeman is releasing the captive from the prison.
c. ??Columbus was discovering America.
d. ??He was entering the room.

Besides, achievement verbs are generally compatible with *in*-phrases but quite strange with *for*-phrases.

(43) a. The policeman arrested the criminal {in/??for ten minutes}.
b. The policeman released the captive {in/??for ten days}.
c. Columbus discovered America {in/??for ten days}.
d. He entered the room {in/??for ten minutes}.

Some nominals derived from verbs of achievement type do not allow logical object promotion, while others do. This contrast is exemplified as follows:

(44) a the captive's release from the prison (Fellbaum 1987: 80)
b. John's arrest by the FBI (ibid: 80)
(45) a. *the robber's recognition by the policemen
b. *the government's (bad) perception
(46) *the room's entry

All the base verbs in (44)-(46) are classified as achievement verbs in that the occurrence of the event denoted by them is punctual: the culmination of the events is regarded as point-like, without temporal duration. To take a closer look, however, it reveals that they are different in causal chain representation.

Note that the causal chain representation does not take into account the temporal occurrence of the predicated event. It is unfolded regardless of its realization along time axis. The internal structure of the event denoted by the predicate itself is representable in the causal chain graphics, while it is out of scope whether the event in question is realized with temporal duration or punctually.

In verbs like *arrest* or *release*, the objects are regarded as undergoing change through the activity denoted by the verbs. For instance, *the captive* changes his/her state by means of release and becomes free; John changes its state, becoming a prisoner by the act of arrest and imprisoned; America also changes its status through the act of discovery and comes to be known to everybody. These verbs are represented in the causal chain as follows;

```
X       Y       (Y)      (Y)
*-------->*------->(*)------>(*)
  CAUSE  BECOME  STATE
###       arrest       ###
SBJ                    OBJ
```

<FIGURE 9: Achievement Verbs (1) — *arrest*>

This representation is in accordance with our constraint in (25): the designatum of the logical object of the predicate undergoes energy absorption and change, i.e., it is identical with the designatum of the vertex from which the BECOME arc exits.

In the case of base verbs of *recognition* and *perception*, on the other hand, they lack CAUSE arc and involve the coercion arc in their causal chain representation. First, a class of adverbs are semantically anomalous with this group of achievement verbs, indicating that CAUSE arc is absent from their representation. Note that other achievement verbs like those in (10), which allow object possessors, can take these adverbs.

(47) a. John attentively released the captive from the prison.
b. The policeman carefully arrested the criminal.
(48) a. ??John attentively recognized the robber.
b. ??John carefully perceived the object.

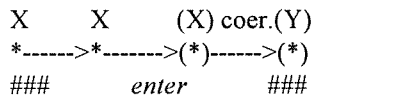
Second, by the act denoted by derived nominal *recognition*, the logical object does not undergo any special change. In fact, it is not the logical object, but the logical subject, which undergoes change of its perceptual world. This is represented in Figure 10:

```
X      Y      (Y)      (Z)
*------>*----->(*)------>(*)
 CAUSE BECOME  COER.
      ### recognize  ###
      SBJ            OBJ
```

<FIGURE 10: Achievement Verbs (2) — *recognize*>

Here, the designatum of the logical object does not correspond to that of a vertex from which the BECOME arc exits. Our Lexically Framed Affectedness Constraint stated in (25) correctly predicts the unacceptability of (45), while accepting the case in (44).

In the case of verbs of spatial configuration as *enter*, the Figure-First coercion is applied. The base verb enter contains CAUSE arc, for it is compatible with agentive adverbs like *carefully*. Moreover, this verb depicts the change of subject, not of object. It is represented is in Figure 11, which indicates that X, the participant which undergo energy absorption, is not identical with that selected as the logical object, here represented as Y.



<FIGURE 11: Achievement Verbs (3) — *enter*>

Therefore, the logical object cannot be realized as a possessor.

To sum up, the causal chain representation, which disregards the temporal axis along which the event denoted by the predicate is unfolded, successfully distinguishes the two cases of achievement-derived nominals we have seen in (44) and (45)-(46). This kind of difference in the base verbs cannot be captured by traditional aspectual distinction (cf. Vendler 1967) where they have been unified under the name of achievement type verbs. The causal-chain analysis can describe the difference appropriately in spite of the similarity in their temporal occurrences.

4.6 Nominals Derived from Activity Verbs

Fellbaum (1987) and Tenny (1987) claim that nominals derived from activity verbs do not allow their logical objects to be promoted. Actually, plural objects of accomplishment verbs, which contribute to derivation of activity predicates from accomplishments, cannot be prenominal genitives:

(49) a destroy cities {??in five minutes/for five minutes}
b. alter proposals {??in a day /for a day}
c. consume beers {??in a month/for a month}
(50) a. *Cities' destruction (by the barbarians) (Fellbaum 1987: 82)
b. *Proposals' alteration (by the authors) (ibid.)
c. *beers' consumption (by Japanese workers)

Examining closely, however, it is not so straightforward. In fact, some examples of activity-derived nominals cannot take object possessors, while some can, as in (51) and (52).

(51) a. *America's idealization by post-war generation (Hamano 1989: 128)
b. *the phenomenon's observation by scholars (Fellbaum 1987: 85)
c. *the film's enjoyment
(52) a. The ship's skillful navigation by the first officer saved the crew.
b. The slogan's repetition changed the emotion of the public.

They are both categorized as activity verbs, as indicated in *in-/for*-phrase test in (53)-(54).

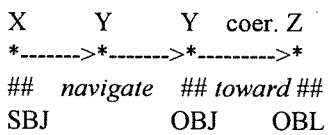
(53) a. idealize America {for ten years / *in ten years}
b. observe the phenomenon {for ten months/*in ten months}
c. enjoy the film {for two hours/*in two hours}

(54) a. navigate the ship {for fifteen minutes/*in fifteen minutes}
b. repeat the slogan {for a week/??in a week}

While the approaches like those of Fellbaum or Tenny which are based on aspect alone fail to explain these contrasts, the causal chain analysis, which combines the notions of causation and aspect, can handle them neatly within its own framework. As *in/for*-test indicates, events denoted by verbs like *navigate* or *repeat* do not have endpoint themselves, which might be added by obliques like *to the shore* in (55).

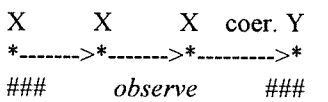
(55) navigate the ship to(ward) the shore (in fifteen minutes)

They, however, have in their causal chain representation the BECOME arc which is predicated of the object participant: it represents the phase of its logical object, *the ship*, to be in a different place in the verb of *navigate*, and in *repeat*, *the slogan* is actually used many times.



<FIGURE 12: Activity verbs (1) — *navigate*>

On the other hand, verbs like *idealize* or *observe*, which imply change on the part of the subject participant, will be described as follows.[4]



<FIGURE 13: Activity verbs (2) — *observe*>

Among activity verbs, those which portray object-change such as *navigate* can take the logical object possessor because they are affected. Verbs describing subject-change, however, have no particular effect on the part of their objects. Emotional process verbs like *idealize* are classified into the latter group.

In summary, the activity verbs, of which the objective possessive expression has been claimed to be ill-formed, can in fact appropriately take the object possessor when they describe change on the part of the object. This fact is captured in the form of BECOME arc in the causal chain representation.

In this chapter, I have shown that the present analysis accommodates the phenomenon of possessor selection in nominals. The causal chain analysis could incorporate the notion of affectedness by means of BECOME (and STATE) arc(s). The Lexically Framed Affectedness Constraint given in (25) successfully describes

[4] Note that the presence of BECOME-STATE segment in the causal chain representation of the predicate is the necessary condition, but not the sufficient condition, of the compatibility with *in*-phrases. Therefore, the fact that *idealize* or *observe* does not allow *in*-phrase modification does not contradict the representation in Figure 13.

and explains the examples we have observed in section 2, some of which the aspectual approach fails to explain.

5 A COGNITIVE MOTIVATION FOR THE BECOME REQUIREMENT

Having examined various examples of objective possessive genitive construction, we are led to confirm the validity of the Lexically Framed Affectedness Constraint proposed in (25). We have shown that the BECOME arc works as a central role in accepting nominals with object possessors, and only the unique participant associated with the BECOME arc can be realized as a possessor.

A more fundamental question follows: why do the deverbal nominals without the BECOME arc in their causal chain representation show low acceptability? This section explores a cognitive motivation for this constraint.

5.1 Cognitive Grammarians' Views

Langacker (1991, 1993) claims that, in possessive construction in general, the possessors should serve as a reference point with respect to the possessee. The reference point is a landmark in order to make explicit the mental contact, i.e., the path taken by the speaker in identifying the target. When we invoke one conceived entity for the purpose of establishing mental contact with the target, we make it a reference point. In order to identify the target successfully, the reference point "should have a certain cognitive salience, either intrinsic or contextually determined (Langacker 1993: 6)." Therefore, while we can talk about *the boy's watch* or *Lincoln's assassination*, we cannot say **the watch's boy* nor **the assassination's Lincoln*.

This notion captures quite a broad range of possessive constructions, but Langacker does not go further to render explicit which participant is the best candidate for the possessor, i.e., a reference point. For instance, he does not mention the difference in acceptability between *the city's destruction* and **the picture's observation*. It is not clear why *the city* has enough salience and thus serves appropriate reference-point with respect to *destruction* while *the picture* does not with respect to *observation*.[5]

Taylor (1994), based on Langacker (1991, 1993), has tried to specify the salience using the notion of informativity. Informativity is the degree to which the participant provides reliable and effective cues for the identification of the target (see Taylor

[5] Besides, Langacker's reference-point schema has a risk of over-generating ill-formed possessive expressions. For instance, Langacker utilizes the example as following to illustrate the cognitive ability based on this schema: to locate the North Star as a target, people can deliberately mark the Big Dipper as a perceptual reference point. However, this reference point cannot functions as an appropriate possessor, as in *##the Big Dipper's North Pole*. This strongly suggests that the nominal structure in this construction should be also taken into account.

1994: 225). Taylor, citing some concrete examples, gives an informal and descriptive characterization of the notion. For example, in order to check the truth of the statement that *A loves B,* we would look to *A* or the emotional state of *A*, rather than *B*. Here, *A* is considered a more effective cue with respect to the loving relation. In another statement like *A destroys B*, the higher degree of cue for identification of the target lies on the part of *B*, not *A* (Taylor 1994: 225). In this way, the participants which are candidates for the possessors should bear high informativity vis-a-vis the possessee.

The causal chain approach based on energy dynamics presented here could add a cognitive theoretical basis to this notion. The causal chain representation provides the internal structure of the event within which the informativity of the participant is measured. Before giving an explanation, let us briefly introduce one characteristic of English nominalization and examine it from the perspective of cognitive grammar.

5.2 Ergative Characteristics of English Nominalization

Among languages there are two case-marking systems: accusative and ergative. In accusative languages, one of which is English, transitive subjects and intransitive objects receive the same Nominative case (NOM) while the transitive objects receive Accusative case (ACC). In ergative languages, on the other hand, transitive objects and intransitive subjects are assigned the same case, called Absolutive (ABS) and transitive subjects are isolated, receiving Ergative case (ERG). (56)-(57) are examples from Samoan:

(56) a. Mary slept.
NOM

b. Wally tickled Sandy.
NOM ACC

(57) a. 'ua itl le teine. 'The girl has died.'
PERF *die the girl* (ABS)

b. Na fufulu e le tama le ta'avale.
PAST *wash* ERG *the boy the car* (ABS)
'The boy washed the car.' (Langacker 1991: 379)

	SUBJECT	SUBJECT	OBJECT
	Transitive	Intransitive	Transitive
Accusative lg.	NOM		ACC
Ergative lg.	ERG	ABS	

<TABLE 2: Assignment of Arguments to Grammatical Relations>

Interestingly, though English is predominantly an accusative language, nominalization shows ergative character, as observed by Williams (1987) and Langacker (1991).

(58) a. the expression of bad sentiments by the patients
b. the expression of bad sentiments

c. the expression of the patients (Williams 1987: 366)

(59) a. the chanting of the slogans by the demonstrators

b. the chanting of the slogans

c. the chanting of the demonstrators (Langacker 1991: 380)

Here, the intransitive subjects and transitive objects may be encoded in the same prepositional phrase, i.e., in a prenominal possessor phrase or in *of*-phrase, while transitive subjects receive unique encoding, i.e., in *by*-phrase. This phenomenon is similar to that of the ergative languages, where the subject of intransitives and the object of transitives receive the same ABS, while the subject of transitive verbs are realized as having ERG.

5.3 English Nominalization Based on Conceptual Autonomy/Dependence Alignment

The next question, then, is how this characteristic of ergativity in English nominalization is reflected in causal chain analysis. According to Langacker, as we have seen, ergativity is represented as a reflex of conceptual autonomy/dependence alignment. Based on the fact that the more unmarked case, i.e., the zero-marked case is used on the part of ABS, he notes that ABS is more basic than ERG in ERG/ABS system. This is also applied in the case of English nominals, in that *of*-phrases, which correspond to ABS, are considered as a default preposition.

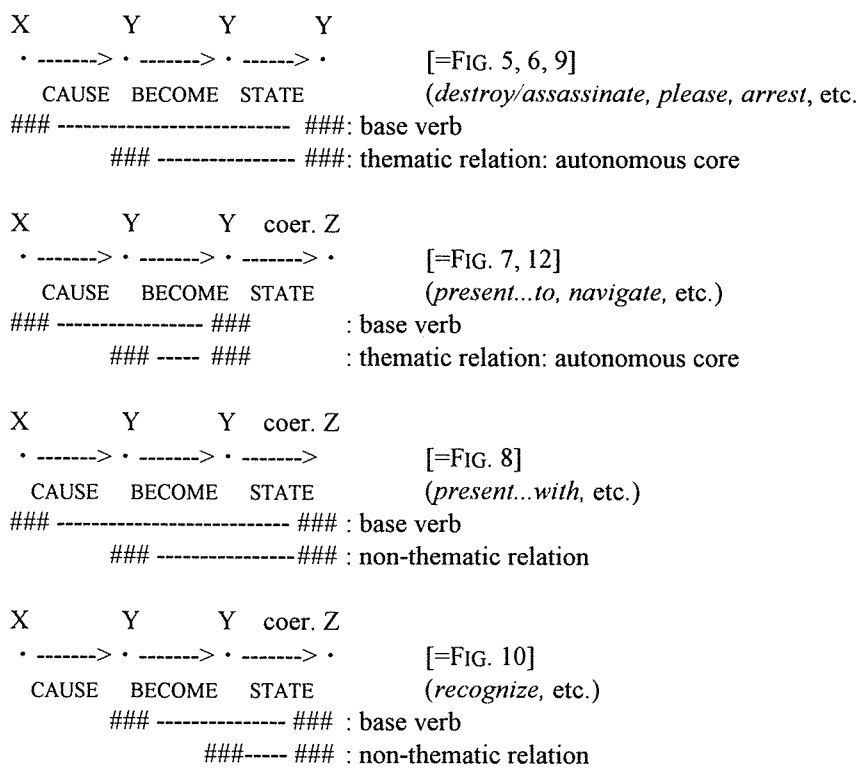
The basic characteristic of the ERG/ABS system is well-captured in the conceptual autonomy/dependence advocated in Langacker (1991). The autonomy/dependence layering (henceforth A/D layering) inherent in the conception of a complex event defines a path running counter to the flow of energy represented by causal chain diagram. In *Floyd broke the glass with a hammer*, for example, the most simple and autonomous conception is abstracted as *the glass breaking*, where only one participant is involved. Langacker claims that a theme and the change it undergoes provide the minimum semantic content required for a processual predication, thus constituting its irreducible conceptual "core", and characterizes it as a thematic relation (Langacker 1991: 287). By incrementing into the thematic relation, which is the autonomous core, the conceptually dependent event components involving causations or energy input, more complex event conception is formed, as in *the hammer breaking the glass* and further in *Floyd causing the hammer to break the glass*. Here, ABS is regarded as representing the theme, the starting point of a natural path defined in terms of conceptual A/D. The theme is shown to be the most basic participant involved in the conception of events, no matter how expanded they are.

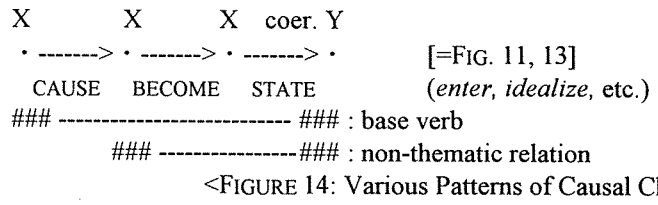
It might be questioned, then, why English nominalization indicates ergativity, while the language predominantly indicates accusative character. This might be due to the atemporalizing effect of nominalization (see Taylor 1994: footnote 25). As I mentioned in 3.6, the conceptual basis of derived nominals lies in the unified nature of the state sequence as a whole as if they were "things", disregarding temporal sequence. The corresponding verbs, which rely on temporal scanning of the transition of state sequence, strongly suggest energy dynamics on which causal chain is based.

In other words, energy dynamics is highlighted mostly through the course of temporal scanning. If the temporal scanning is suspended in nominalization, the energetic construal is weakened, giving way to conceptual A/D layering. It is reflected in some symptoms of ergative character in nominalization.

Having demonstrated the behavioral similarity of English nominals to languages in ergative system and assumed the relevance of conceptual A/D to the nominalizations, let us go back to the issue of possessor selection. The point relevant to the possessor selection here is that we need BECOME arc in the causal chain representation of the base predicates. Why is this so? This depends on whether we can extract what Langacker calls in its genuine sense thematic relation from the causal chain representation of the predicate in question. The potential for extracting thematic relation as the autonomous core of the event is straightforwardly representable in the causal chain model which specifies the notion of linear path. Since thematic relation denotes a process, it is representable in causal chain as a segment consisting of BECOME (and STATE, if any) sequence.

This implies that we cannot call BECOME(-STATE) segment a thematic relation when it involves more than one participant; therefore, a thematic relation as autonomous core cannot be extracted from the causal chain representation as long as it contains a coercion arc, where at least two participants are to be involved. This is illustrated in the following diagrams:





<FIGURE 14: Various Patterns of Causal Chain Representation>

Interestingly, only those predicates which can extract the autonomous thematic relation from their causal chain representation allow their logical objects to be possessors when they themselves are nominalized. The participant which is involved in the autonomous thematic relation plays a cognitively significant role in the predicate in question. In this point, Taylor's notion of informativity is cognitive-structurally measured in causal chain representation. A participant is regarded as informative enough in Taylor's sense when it is the unique participant in its thematic relation.

From the discussion above, it is derived that the BECOME arc plays a crucial role not only in object possessor selection but also in conceptualization in general in that it is necessarily included in the unit of autonomous process called thematic relation in Langacker's sense.[6]

This A/D alignment further gives an explanation to a general fact that *of*-phrase is required when the subject is realized as a possessor, as in (60).

(60) a the enemy's destruction of the city
b. the destruction of the city
c. ??the enemy's destruction
d. the city's destruction (by the enemy)

The logical subject, here *the enemy*, is a dependent notion on *city's being destroyed*, which is the conceptual autonomous core. Since it is a dependent notion, it can be eliminated as in (60b), but it alone cannot stand without the autonomous core on which it depends, as in (60c). Note that logical object *the city*, being a participant

[6] Doron and Rappaport (1993), based on their own event structure representation, attempt to define the notion of affectedness in terms of the "separation" property. They claim that the affectedness is identified with the externalization of an internal argument, which means the removal of the original external argument from the argument structure of the verb. The verb which allows this removal in argument structure should have a separation property in that its event structure stands even without the original external argument.

Their analysis, though within a different framework, is basically compatible with the present study in that only the predicate which can do without its external argument or causer can promote its object as possessor. I assume the approach here can give a further motivation to their formalization as to why separation property comes into play. It can be attributed to the possibility of extracting thematic relation from the causal chain representation of the predicates, which in turn is based on conceptual autonomy. Based on the fact that nominalization in English indicates its ergative characteristics, it is predominantly governed by conceptual autonomy/dependence. Separation property is a reflex of the possibility of extracting the thematic relation from the whole causal chain representation.

intrinsic to the autonomous core, can be realized by itself whether the logical subject is present or not. In sum, the logical subject can be a possessor when the notion of logical object is in some way realized. This phenomenon is regarded as a straightforward reflection of conceptual autonomy/dependence.

Besides, the possibility is open to the explanation on the difference between sentential passives and nominals with objective possessor, i.e., passive nominals. It is often observed that passive nominals are more restricted than passive sentences, as shown in (61).

(61) a. The cliff was avoided by the climbing party.
b. ??the cliff's avoidance by the climbing party.

In terms of causal chain analysis here, some answers are ready. It is due to the difference of the path traced in each construction. Passives are realized in clauses, which involve temporal scanning along the causal chain path, while nominalizations, suspending the temporal scanning and thus weakening the causal chain view, take conceptual autonomy/dependence primarily in their base. Details, however, should await further research.[7]

6 Concluding Remarks

The topic of this paper has been possessive expressions headed by deverbal nouns with special reference to objective possessor. The central issue has been to investigate the semantic relation between the predicates from which derive nominals and their logical object in terms of causal chain representation. Based on the causal chain representation of events, I proposed the Lexically Framed Affectedness Constraint in (25), and have shown that the BECOME arc plays a crucial role in admitting object possessors. Furthermore, the requirement of BECOME arc is motivated by conceptual autonomy/dependence of the event.

This study, when viewed from the perspective of previous proposals in cognitive linguistics on the importance of salience in possessor selection, gives new insight into the cognitive factors that constitute such salience. Specifically, the change of state, represented here in BECOME arc in causal chain representation, has been shown to be of sufficient significance within the system of human cognition to be recognized as bearing a crucial role in determining the possibility of object possessors. It is also argued that the importance of change-of-state is motivated by conceptual autonomy/dependence relations in the nominal structures. With the aid of causal chain representation adopted here, the notions previously proposed by predecessors such as informativity can be assessed theoretically.

[7] See also Taylor (1994: footnote 25).

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