

AN EXPLORATION INTO ACTION: THE CASE OF ENGLISH SOUND EMISSION VERBS*

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1. Introduction

The purpose of this article is twofold. One is to explore the conceptual structures of sentences involving action verbs with the main focus on English sound emission verbs. What are referred to as the ‘action’ verbs here are the unergative verbs (e.g. *laugh, work, walk*) plus transitive ‘surface-contact-by-impact’ verbs (e.g. *hit, push, kick*), or what are called the ‘activity’ verbs in Vendler’s (1966) terminology. The other is to develop the ‘causal chain’ model proposed in Inoue (2001a, 2001b) for the theoretical investigations of empty categories in conceptual structure (CS).

What follows is made up of six sections. Section 2 deals with the properties that characterize action verbs in semantic behavior. Section 3 gives an outline of the previous main approaches to the semantic representation of action verbs. I will also point out in this section some problems and inadequacies of these approaches. Drawing on the ‘causal chain’ model as proposed in Inoue (2001a, 2001b), Section 4 presents some theoretical assumptions upon which the present analysis of action verbs will be made. Section 5 offers an alternative analysis of English sound emission verbs based on these assumptions. This analysis will show that we can eliminate the problems posed by the previous analyses in Section 3. Section 6 addresses what theoretical implications the present analysis entails for some empty categories in conceptual structure. It will be argued that there are two kinds of PRO-like empty categories in conceptual structure: controlled PRO and uncontrolled PRO.

2. Some Semantic Properties Involving Action Verbs

What semantic properties determine the behavior of sentences involving action? Examples are given in (1):

- (1) a. The rats ran.
 b. How many hours do you work?
 c. Do you skate?
 d. Tony sneezed.
 e. He pushed the cart.

Or, what semantic properties differentiate action from other event types? Let us consider these questions in this section.

As noted in Vendler (1966), one of the important properties that characterize action expressions is that they denote processes going on in time, that is, they do not indicate any terminal point in time. Thus they admit progressive aspect, as in (2):

- (2) What is he doing?
 a. He is running/writing/working ...
 b. *He is knowing/loving/recognizing ...

Verbs like *know*, *love*, *recognize*, which indicate states but not processes going on, fail this test.

Moreover, action expressions can occur in questions using *For how long ...?*:

- (3) a. For how long did he run?
 b. For how long did you skate?
 c. For how long did Tony sneeze?
 d. For how long did you work?
 e. For how long did he push the cart?

On the other hand, accomplishment expressions like *draw a circle*, *build a house*, which indicate a terminal point in time, cannot occur in questions like:

- (4) a. *For how long did he draw a circle?
 b. *For how long did they build a house?

On the other hand, these accomplishment expressions can occur in

questions using *how long did it take to ...?*:

- (5) a. How long did it take him to draw a circle?
 b. How long did it take him to build a house?

The same can be said of the corresponding answers to the question *For how long ...?*:

- (6) a. He ran for an hour.
 b. I skated for half an hour.
 c. Tony sneezed for a couple of minutes.
 d. I worked for 5 hours.
 e. He pushed the cart for an hour.
- (7) a. *He drew a circle for a minute.
 b. *They built a house for two months.

Conversely, action expressions cannot occur with *in*-phrases, which indicate a terminal point in time, whereas accomplishment expressions can. Compare (7) and (8):

- (8) a. He drew a circle in 5 seconds.
 b. They built a house in a month.
- (9) a. *He ran in an hour.
 b. *I skated in an hour.
 c. *Tony sneezed in a couple of minutes.
 d. *I worked in 5 hours.
 e. *He pushed the cart in an hour.

Furthermore, since action expressions indicate no terminal point in time, they can permit quantifiable modifiers like *a lot* and *hard* while accomplishment expressions cannot:

- (10) a. He ran a lot/hard.
 b. I skated a lot/hard.
 c. Tony sneezed a lot/hard.
 d. I worked a lot/hard.
 e. He pushed the cart a lot/hard.
- (11) a. *He drew a circle a lot/hard.
 b. *He broke the vase a lot/hard.

Likewise, action verbs can repeat themselves while accomplishment

and achievement verbs cannot. Observe the following:

- (12) a. He pushed and pushed the cart.
 b. He ran and ran.
 c. We laughed and laughed.
- (13) a. *We broke and broke the window.
 b. *We painted and painted the house.
 c. *I arrived and arrived at the town.
 d. *She lost and lost the wallet.

It should be noted that, as noted by Kageyama (1996), action verbs can occur in the *give (NP) a V* construction, as shown below:

- (14) a. give a cry/laugh/cough/sigh/moan ...
 b. give (NP) a kick/kiss/blow/push/punch ...

In contrast to (14), accomplishment expressions fail to occur in this construction:

- (15) a. *He gave a draw/drawing of a circle in a second.
 b. *He gave a run of a mile in an hour.

The construction *hito V-suru* in Japanese corresponds precisely to *give (NP) a V* construction. Observe the following:

- (16) a. hito hasiri-suru/oyogi-suru/suberi-suru/warai-suru/naki-suru ...
 b. hito oshi-suru/keri-suru/tataki-suru ...

As noted by Levin and Rappaport Hovav (1995), Kageyama (1996) *et al.*, there is an important syntactic property that distinguishes action verbs from other types of event verbs: they cannot undergo adjectival passives. Notice the following:

- (17) a. *a run man, *coughed patients, *a laughed clown ...
(Kageyama1996: 95)
 b. *a hit boy, *the kicked man, *a wiped table ... (Ibid.: 102)

Compare (17a, b) with (18a, b), respectively, which employ unaccusative verbs and change of state transitive verbs:

- (18) a. our *fallen* bridges, some *wilted* vegetables, Lawrence
 Ferlinghetti 's Picture Of The *Gone* World, *collapsed* stems ...
(from British National Corpus)
 b. a broken glass, cooked food, boiled eggs, baked potatoes ...

As far as intransitive verbs are concerned, it is to be noted that, as pointed out by Kageyama (1996) and others, unergative verbs undergo word-formation using the suffix *-able* while unaccusative verbs do not, as shown below¹:

- (19) a. a laughable suggestion, runnable stretch of white water, a singable tune, swimmable water, walkable hills, workable solutions ... (from British National Corpus)
 b. *goable days, *fallable leaves, *arrivable packages, *appearable books ... (Kageyama 1996:97)

There is another syntactic property that differentiates unergative from unaccusative verbs: the former allow cognate objects, whereas the latter do not, as the contrast between (20) and (21) shows:

- (20) a. He laughed a hearty laugh.
 b. She danced a beautiful dance.
 c. She slept a sound sleep.
 d. He sighed a deep sigh.
 e. He lighted the lights.
- (21) a. *He fell a nasty fall.
 b. *I collapsed an utter collapse.
 c. *He slipped an embarrassing slip.
 d. *He sank a deep sink.

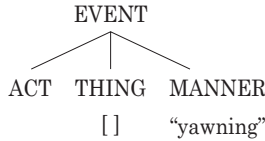
To summarize, this section shows that since action indicates no terminal point in time, expressions involving action exhibits contrasting behaviors with those involving achievement and accomplishment. These behaviors concern co-occurrence with time adverbials; co-occurrence with the quantifiable modifiers like *a lot* and *hard*; occurrence in *give (NP) a V* construction; the undergoing of adjectival passives, etc.

3. Some Semantic Approaches to the Semantic Representation of Action Verbs

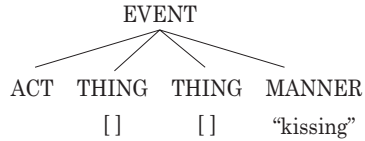
It has long been a matter of controversy how to represent actions semantically. More specifically, whether or not the representation of actions can be differentiated from that of causation has been the focus of dispute.

To start with, let us now review some of the main previous approaches to this issue. Pinker (1989), for example, describes intransitive actional events in terms of the function ACT, which takes one argument, an actor as exemplified in (22a), or transitive actional events in terms of two arguments, an agent and a patient, as in (22b):

(22) a. yawn:

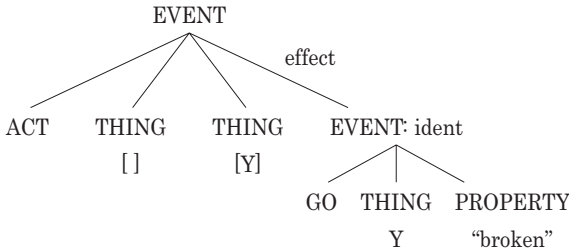


b. kiss:



In contrast to (22b), he analyzes accomplishment verbs like *break* in terms of three arguments of the function ACT, as shown below:

(23) break:



As shown above, it is clear that there is no category of CAUSATION here as distinct from ACTION.

Likewise with Pinker (1989), Nakau (1994) offers an analysis of CAUSATION as subtypes of the general action schema as in (24)-(25).

(24) ACTION SCHEMA:

DO (ACTOR, THING)

(25) THREE SUBTYPES OF ACTION:

a. AFFECT (ACTOR, PATIENT)

b. EFFECT (ACTOR, RESULTANT)

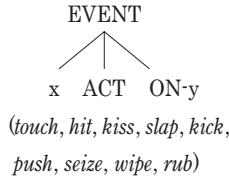
c. ACT (ACTOR, RANGE)

(25a-c) are called AFFECT, EFFECT, ACT types, respectively. They provide underlying patterns for representing sentences (26)-(28), respectively:

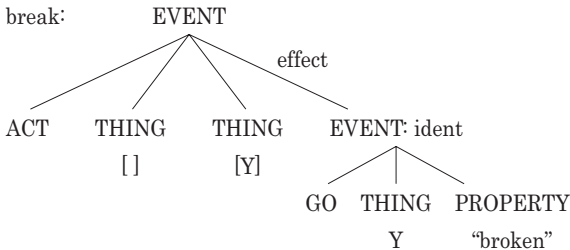
- (26) a. John dug the ground.
- b. Mary painted the wall.
- c. Cats chase rats.
- (27) a. John dug a hole.
- b. Mary painted a picture.
- c. Tom proposed a theory.
- (28) a. I was doing your shopping.
- b. When do you do your exercises?
- c. Ann slept a sound sleep.

Drawing on Pinker (1989), Kageyama (1996) gives a similar analysis, as illustrated below:

- (29) a. unergative verb:
- b. surface-contact-by-impact verb:



- c. accomplishment verb:



Levin and Rappaport Hovav (1995) are similar to Pinker (1989) in the representation of unergative verbs but differ in that of accomplishment verbs. They represent the former in terms of monadic predicates, as illustrated in (30a), while they represent the latter in terms of the function CAUSE, which involves two subevents, as in (30b):

- (30) a. *laugh*: [x laugh]
- b. *break*: [[x DO SOMETHING]CAUSE [y BECOME BROKEN]]

With regard to the transitive 'surface-contact-by-impact' verbs, they do not seem to draw a distinction from accomplishment type of transitive verbs.

The above analyses, although different from each other, have one assumption in common: the unergative verbs are semantically represented in terms of monadic function ACT or DO, which take ACTOR argument and THING argument. That is to say, there is no function CAUSE involved in the semantic representation of unergative verbs.² Since the detailed examination of the analyses sketched above is beyond the scope of this article, I intend to show in what follows first that there are some problems and inadequacies with the analyses based on the above assumption and secondly that the function CAUSE is involved in the representation of action verbs as well as accomplishment verbs. It is taken for granted in this discussion that the function CAUSE consists of two arguments, the first one being CAUSER or a causing event and the second one being a caused event.^{3, 4}

One piece of evidence that indicates the presence of the caused subevent of the function CAUSE is provided by cognate objects, as seen in (20). Moreover, unergative verbs sometimes take objects such as the following:

- (31) "My father frowned away the compliment and the insult."
(Stephen McCauley *Easy Way Out*, 1993) (Goldberg 1995:10)
- (32) Pauline smiled her thanks/approval/disapproval/assent/
admiration/yes/no. (Levin and Rappaport 1988:98)
- (33) Sandra beamed a cheerful welcome. (*Ibid.*)
- (34) She mumbled her adoration. (*Ibid.*)
- (35) He yawned good-night.

Another piece of evidence concerns the Path argument of the function GO. Observe the following sentences:

- (36) a. He ran/walked *across the bridge*.
- b. He ran/walked *through the wood*.
- c. They ran *into difficulties*.
- d. She smiled *into the camera*.

- e. She sneezed *into her handkerchief*.

That these sentences have Goal arguments, which indicates a terminal point in time, as do Accomplishment and Achievement verbs, is confirmed by the *how long did it take ...* test:

- (37) a. How long did it take him to run/walk across the bridge?
 b. How long did it take him to run/walk through the wood?
 c. How long did it take them to run into difficulties?
 d. How long did it take her to smile into the camera?
 e. How long did it take her to sneeze into her handkerchief?

A third piece of evidence for the GO-function comes from the interaction of unergative verbs with *away*, *out*, *in*, *down*, etc. Consider the following:

- (38) a. Sweat ran *down*.
 b. I ran *out* to see the parade.
 c. Don't knock; just walk *in*.
 d. Jump *in*. The water's fine.
 e. He jumped *out* and opened the hood.
 f. Can you jump *over(across)*?
 g. He laughed *out* loud.
 h. She sighed *out* in ecstasy.
 i. The couple danced *in(out)*.
 j. She cried *out* in pain.

According to Gruber (1976:87-90), *away*, for example, is assumed to be a form that lexicalizes a *TO*-phrase. He notes that in sentence (39), we actually have a Source-Goal pattern.

- (39) The duck swam *away* from the boat. (Gruber 1976:87)

Thus, as in sentence (40), there are two Source-Goal patterns in sentence (41), each of which has only the *TO*-phrase expressed:

- (40) The duck swam to shore to the boy. (Ibid.)

- (41) The duck swam away to the boy. (Ibid.)

He also notes that the same can be applied to *down*, *up*, *out*, *in*, etc., all of which are involved in GOAL. Notice the following:

- (42) a. The ball floated *up* from the bottom of the well.

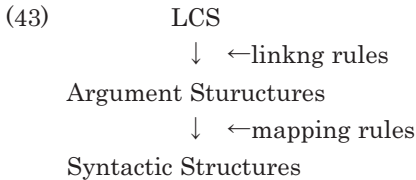
(Gruber 1976:89)

- b. The ball floated *down* from the surface. (*Ibid.*)
 c. John ran *up* from the basement. (*Ibid.*)

If it is assumed that sentences from (38) to (42) have lexical semantic representations involving a monadic function like ACT, how do we account for the occurrence of these particles with unergative verbs?

4. Some Assumptions for the Semantic Representation of the Verb

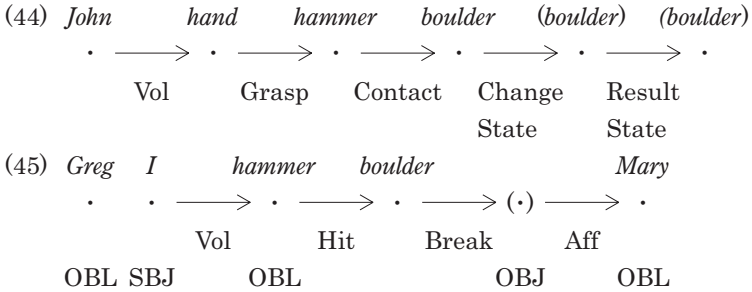
The general framework, adopted in this article, of relating lexical conceptual structures to syntactic structures is diagrammed as in the following:



Whether the conceptual structure is directly mapped to the syntactic structure or indirectly mapped through the mediation of argument structure is open to argument. Following much current work (Marantz (1984), Pinker (1989), Levin and Rappaport Hovav (1995), etc.), I assume the latter approach. Thus, as in previous literature, it is assumed that there are three variables in the argument structure: the external argument, the direct internal argument and the indirect internal argument. It is also taken for granted that the external argument is mapped to the subject of a transitive verb as well as that of an unergative intransitive verb in syntactic structure; that the direct internal argument is mapped to the object of a transitive verb as well as the subject of an unaccusative verb in accordance with the Unaccusative Hypothesis; and that the indirect internal argument is mapped to a locative prepositional phrase.

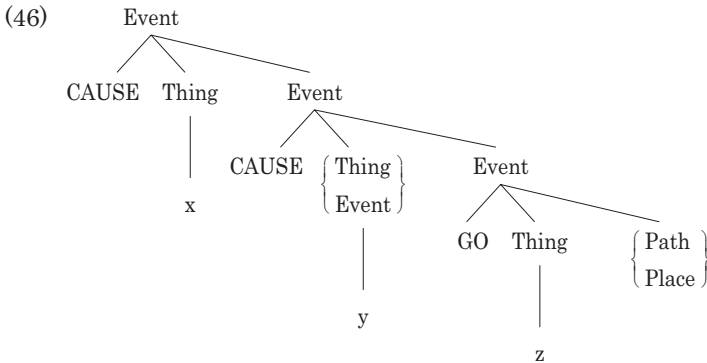
The model proposed here to represent the conceptual structure of the verb incorporates Croft's (1991) notion of 'causal chain.' He defines this notion as follows: "a series of causally related events such that the

endpoint or affected entity or the causally preceding atomic event is the initiator of the next atomic causal event” (p.169). The meaning of sentences ‘John broke the boulder with a hammer,’ and ‘I broke the boulder with Greg for Mary by hitting it sharply with a hammer’, for instance, are represented as follows:



The point which has crucial relevance to the model to be shown below is concerned with the positions of Instrument/Means/Manner: while the thematic roles of Agent and Patient are defined as “the initiator of an act of volitional causation,” and “the endpoint of an act of physical causation” (p.176), respectively, those of Instrument, Means and Manner are defined relative to their positions in the causal chain. It is this conception of these roles as occupying intermediate positions in causation that is adopted into the model to be presented below.

We can represent these positions by duplicating a CAUSE-function in conceptual structure, as given in (46):



In (46), x is the argument corresponding to Agent, y the argument for Instrument/Means/Manner, and z the argument for Theme. Just as in Croft's (1991) causal chain model, potentially causal chains "extend indefinitely into the past and the future" (p.172), so it might be reasonable to assume also in terms of this model that there is more than one inner CAUSE-function, depending upon the properties of the verb. Thus, the indefiniteness of causal chains is correlated to the optional character of these syntactic adjuncts.

A variable, x, as an argument of the outermost CAUSE-function, is linked to the subject on the syntactic level. By contrast, a variable, y, corresponds to a *with*-PP or an adjunct on the syntactic level. When only a single CAUSE-function is projected, its structure provides a framework to represent the conceptual structures of sentences with 'impersonal' actors, such as:

- (47) a. The key opened the door.
 b. A typhoon hit Japan.
 c. Excessive drinking injured his health.
 d. Carelessness led him to make a mistake.

Given the assumption that the argument for instrument/means/manner occupies an intermediate position in a causal chain, one might naturally raise questions such as the following: (i) what kind of structure does each CAUSE-function have?, i.e., what specifications make each function distinct from the others?; (ii) when more than one inner CAUSE-function co-occurs in a chain, what order do they maintain? Although a discussion on these questions must take place elsewhere, I assume what follows throughout this article. Let us begin with question (i). With regard to Instrument, a physical entity appears as a variable y. Compared to instrument, what characterizes manner is its orientation to the subject. For example, the (a) sentence in (48) and (49) entails its corresponding (b) sentence:

- (48) a. John drives his car carelessly.
 b. John is careless in driving his car.
 (49) a. John beat his wife enthusiastically.

b. John was enthusiastic in beating his wife.

Thus, it seems that a manner CAUSE-function has as its first argument a clausal element associated with x's property, hence a State. A means CAUSE-function differs from a manner CAUSE-function in that it permits both a non-clausal and a clausal element as its argument and that when it takes a clausal element, the element is associated with action. Observe the following:

- (50) He flew to Europe *by British Airways*.
 $\neq >^*$ He was by British Airways.
- (51) He stopped the machine by pressing the button.
 $= >$ He pressed the button.

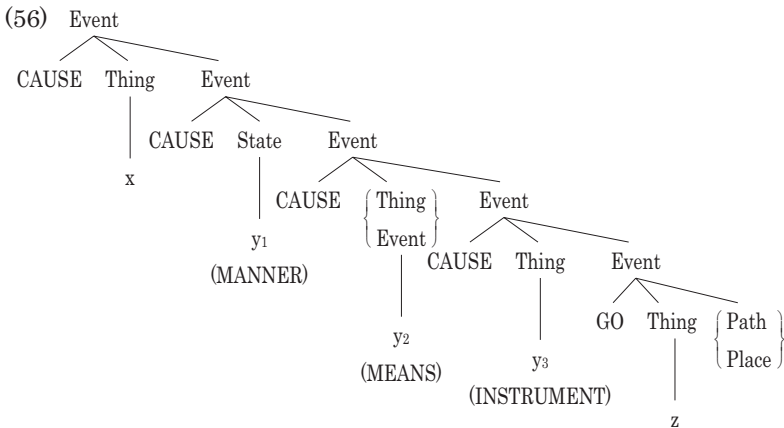
When it comes to question (ii), the following order is assumed here:

- (52) Manner > Means > Instrument

This assumption comes from Quirk *et al.*'s (1985:561) description of the co-occurrence restrictions of these process adjuncts, as seen below:

- (53) He *frugally* traveled *economy (class)*. [manner + means]
- (54) He travels *economy (class)* *by air* but *first (class)* *by train*.
[means + instrument]
- (55) She was *accidentally* struck *with a racket* by her partner.
[manner + instrument]

Therefore, it follows from the above that the y position in (46) will be elaborated into the form in (56):



Regarding the linking rules to argument structure, I propose that at least the following three rules are responsible for determining the argument structures of event type sentences:

(57) Outermost Cause Linking Rule

The first variable argument of the outermost CAUSE-function is linked to the external argument of the verb.

(58) Directed Change Linking Rule

The first variable argument in a GO-function structure is linked to the direct internal argument of the verb.

(59) Path/Place Expression Linking Rule

The variable argument of a Path/Place-function is linked to the indirect internal argument of the verb.

The application of these rules is ordered as follows:

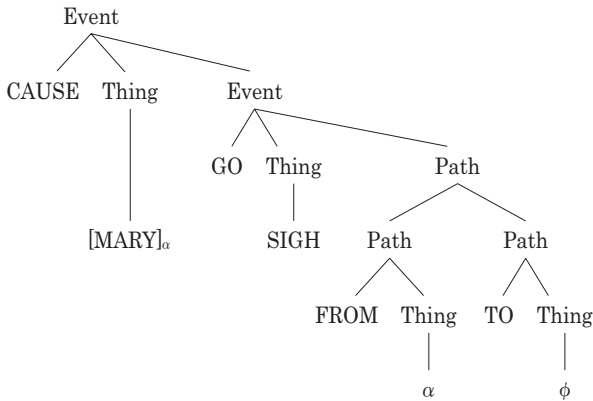
(60) Outermost Cause Linking Rule > Directed Change Linking Rule
> Path/Place Expression Linking Rule

With regard to the external arguments, rule (57), for instance, will be applied to the variable 'x' argument of the top CAUSE-function in (46). Once the 'x' is linked to the external argument, the 'y' argument of the inner CAUSE-function is demoted to an adjunct. When only a single CAUSE-function is projected as seen in (47), the first argument of the CAUSE-function is linked to the external argument. With regard to the direct internal arguments and indirect arguments, the unmarked application of rules (58) and (59) will be given to the variable 'z' argument of the GO-function and to the variable argument of the Path/Place function in (46), respectively. The account of the marked application of (58) and (59) must be given for elsewhere.

5. On the Semantic Representation of the English Sound Emission Verb

On the basis of the above assumptions, now let us consider how the semantic representation of English sound emission verbs will be made. I suggest that a sentence associated with the verb *sigh*, for instance, will have the following representation:

(61) Mary sighed.



In the above diagram the argument in a square bracket represents a variable, and the argument without it a constant. Hence, [MARY], which works as the first argument of CAUSE, is a variable and 'SIGH', which occurs as the first argument of GO, a constant. 'α' in the argument position of FROM represents an empty category bound by [MARY], the first argument of CAUSE. The complex of binder and bindee(s) enables us to avoid the repetition of conceptual materials represented by arguments; at the same time it permits us to explicitly represent the same entity carrying out multiple roles. 'φ' also represents a PRO_{arb}-like empty category for the unspecified argument. The nature of these empty categories is to be discussed in Section 6. Thus what is represented by (61) is something like 'Mary caused (a) sigh to go from within herself.'

One might raise a question at this point as to why a single CAUSE-function structure is employed rather than a dual CAUSE-function structure like (46) for the sound emission verb. This is due to the fact that the subject of most sound emission verbs (*e.g. sigh, sneeze, cough, snort, etc.*) is not a willing actor.

Now let us begin with the question of whether or not the function GO should be included in the semantic representation of sound emission verbs, as shown in the configuration (61).

The next pieces of evidence concern the Path embedded in the GO-function. A first piece of evidence for the presence of the FROM-function is provided by the fact that English sound emission verbs can optionally take a *from-within* phrase. Notice the following:

- (62) a. “Come in,” he shouted *from within*. (from British National Corpus)
 b. Jay sighed deeply *from within*.
 c. “O God,” I groaned/cried *from within*.
 d. He laughed *from within*.
 e. “Oh no,” she screamed *from within*.

Moreover, you will find cases in which these *from*-phrase or *from within* can take objects, as seen below:

- (63) a. Jay sighed *from her guts*.
 b. “Oh no,” she screeched/cried *from her guts*.
 c. He laughed heartily *from his guts*.

It should be noted that these objects are allowed to occur only when they express x's body part related to sound emission. That is to say, when the body part is not specified, the FROM-function has as an argument an implicit element controlled by the variable x. This is confirmed further by the unacceptability of sentences such as (64), in which the FROM-phrases takes objects denoting other than x's body part related to sound emission:

- (64) a. *Jay sighed from her purse.
 b. *John cried from his leg.

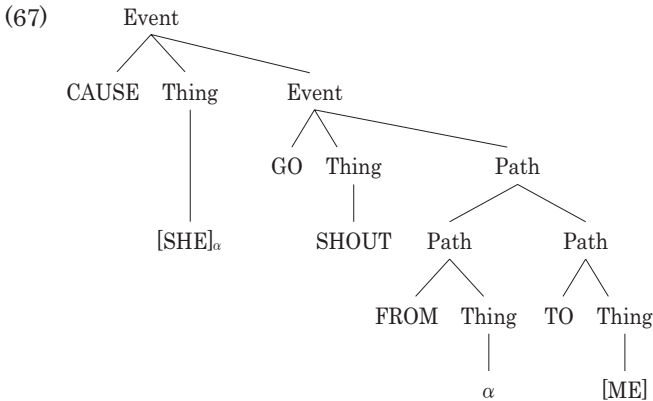
A further piece of evidence for the presence of a Path function is supported by the fact that as in (65), sound emission verbs can optionally permit Goal phrases or particles indicating Goal, as in (66):

- (65) a. I used to sing *to her*.
 b. He chuckled *to himself* over what he was reading.
 c. Each laughed *into each other's face*.
 d. “Me and all the other old ducks,” I muttered *to myself*.
 e. She shouted *to me* across the valley.
 f. The wind shrieked *across the plains*.

- g. He cried *to heaven* for vengeance.
- (66) a. “Shame on you!,” he cried *out* angrily.
 b. “Ready?” he sang *out*.
 c. She shrieked *out*.
 d. She yelled *up[down]* at him.
 e. She sighed *out* in ecstasy.

(Kenkyusha Dictionary of English Collocation)

These Goal-functions together with the Source-function inherent in the verb's LCS are assumed to make up a composite Path-function. For example, sentence ‘She shouted to me’ has the following representation:



Another piece of evidence comes from the considerations of a well-known fact that verbs of sound emission frequently take directional phrases which describe the directed motion of an entity.

- (68) a. The cart rumbled down to the end of the street.
 b. The car buzzed along the road.
 c. Water thundered into the gorge.

Where does this sort of implication come from? What is characteristic of these examples is that the motion of an entity denoted by the subject is necessarily concomitant with the sound emitted by that entity.⁵ That is, where there is no motion, there is no sound emission. Therefore, the implication is assumed to come from the conjunction of this implicit knowledge with the structural configuration as in (61). In other words,

sentences like (68) constitute, albeit indirect, evidence for the presence of a Path-function in the semantic structure of the sound emission verb.

Now let us turn to argumentation for the presence of a constant in (61). A first piece of evidence is provided by cognate objects occurring with sound emission verbs, as seen in (19), partly repeated here as (69):

- (69) a. He laughed a hearty laugh.
 b. He sighed a deep sigh.
 c. They talked small talk.
 d. Bill shrieked a painful shriek.

The types of constructions with cognate objects are most felicitous when the objects convey new information. Thus, sentences in (69) are more natural than the ones in (70) below:

- (70) a. *He laughed a laugh.
 b. *He sighed a sigh.
 c. *They talked a talk.
 d. *Bill shrieked a shriek.

For the objects in (70) simply repeat the events which the verbs are describing. This clearly indicates a constant incorporated in the lexical representation of the sound emission verb, as we have seen in (61).⁶

A similar argumentation can be applied to a *give a V* construction, as noted with sentences in (13). These examples are repeated here as (71):

- (71) a. He gave a piercing shriek of joy.
 b. He gave a hysteric laugh.
 c. He gave a sigh of relief.
 d. He gave a peremptory cough to declare his presence.

(Kenkyusha Dictionary of English Collocation)

The paraphrase relation holding between a *give a V* construction and its corresponding simple verb construction can be accounted for in terms of the verb *give*, which indicates possessional transfer. Its LCS is as in the following:

- (72) *give*: [CAUSE([]_α, [CAUSE([]), [GO([]), [[FROM([α]),
 [TO([])]]]]]]]]

Structures (72) and (61) are basically identical. The difference merely lies in that the former has a variable as the first argument of GO while the latter has a constant; and that the former has dual CAUSE-functions whereas the latter has a single CAUSE-function; and that the argument of a TO-function in the former is obligatory but that in the latter is more often than not left unspecified.

Next let us consider some aspectual phenomena associated with the unergative verb, as we have seen in Section 2. In particular, how can we account for the atelic reading of a sentence associated with the sound emission verb? The structural configuration (61) will provide a clue to the question. This structure has no variable linked to the direct internal argument and, in addition, usually no argument of the Goal-function. It follows then that in Tenny's (1994) terminology, there can be no overt argument which measures out the event, thus creating the atelic reading. The structural configuration (61), therefore, enables us to account for aspectual properties associated with sentences (2)-(13).

What is correlated to this atelic reading is the adjectival passive formation of sound emission, as shown in (17a). Kageyama (1995:118) formulates this formation as follows:

$$(73) \text{ [EVENT ... [EVENT } y \text{ BECOME [STATE } y \text{ BE AT-Z]]]} \rightarrow \\ y_1 \text{ BE WITH [EVENT ...} y \text{ BECOME [STATE } y_1 \text{ BE AT-Z]]]}$$

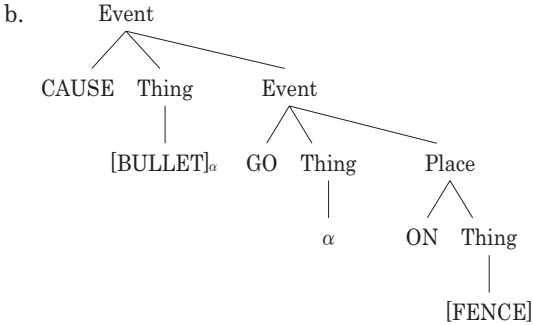
What (73) shows is an operation to pick up an entity (y) undergoing a change of state from the change of state structure and to promote the entity to the subject of the newly-introduced predicate BE WITH. Although I will not go into the details of this analysis, what is crucially important is the presence of an overt argument denoting that entity. There is no such overt argument in (61), since the GO-function has a constant as its argument. Thus, the adjectival passive formation is not applicable to the sound emission verb.

6. On the Nature of Empty Categories in Conceptual Structure

In the previous section we have introduced two kinds of empty category to account for the conceptual structure of the sound emission

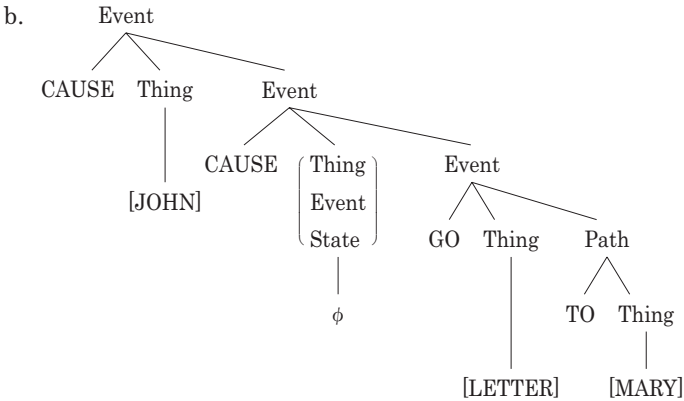
verb. That is to say, (i) α , β , γ ..., (ii) ϕ . The former category is, for example, employed in the analysis of the verb *hit* in Inoue (2001a), as shown in (74):

(74) a. A bullet hit the fence.



The latter category is also found, for example, when the argument of an inner CAUSE-function is unspecified in sentences like (75):

(75) a. John sent a letter to Mary.



Since a full account of empty categories in conceptual structure is premature, let us explore in what follows the nature of these empty categories in comparison with empty categories on the syntactic level in GB framework.

In GB framework there are four kinds of empty categories available: (i) PRO; (ii) *pro*; (iii) NP-trace; (iv) *wh*-trace. These are

characterized in terms of $[(\pm a(\text{naphor}))]$ and $[(\pm p(\text{ronominal}))]$ features as follows:

- (76) a. $[+a, +p]$: PRO
 b. $[+a, -p]$: NP-trace
 c. $[-a, +p]$: *pro*
 d. $[-a, -p]$: *wh*-trace

The first question will be what the conceptual two categories are like. At first glance the answer will be: ' α ...' is like PRO_{obl} and ' ϕ ', PRO_{arb}. α is anaphoric in that it obligatorily requires an antecedent. This is clearly observed in the structures (61) and (74b). It is also anaphoric in that it can have a remote antecedent. In (61), α , the argument of a Path-function has a remote antecedent in the first argument position of a CAUSE-function. This is a similar situation to the one we see below:

- (77) They_i thought [that I said [that it would be difficult [PRO_i to feed each other]]]

Thus, α might be specified as $[+a, +p]$. Identical though they might be in feature composition, the two categories are by no means the same. A crucial difference concerns the well-known PRO theorem:

- (78) PRO theorem
 PRO must be ungoverned.

The above theorem restricts PRO to occur in the subject position of the non-finite clauses, such as the following:

- (79) a. Poirot_i is considering [_{CP} whether [_{IP} PRO_i to abandon the investigation]].
 b. Poirot_i needed a lot of courage [_{CP} [_{IP} PRO_i to abandon the investigation]].
 c. Poirot_i was glad [_{CP} [_{IP} PRO_i to abandon the investigation]].

(Haegeman 1991:263)

On the other hand, α is not restricted to the argument which is to be linked to the subject of a clause. α in the structure (61), which serves as the argument of a Path-function, is a case in point. Where does this difference come from? This is due to the distinction between the NPs on the syntactic level and the elements occurring as the arguments of a

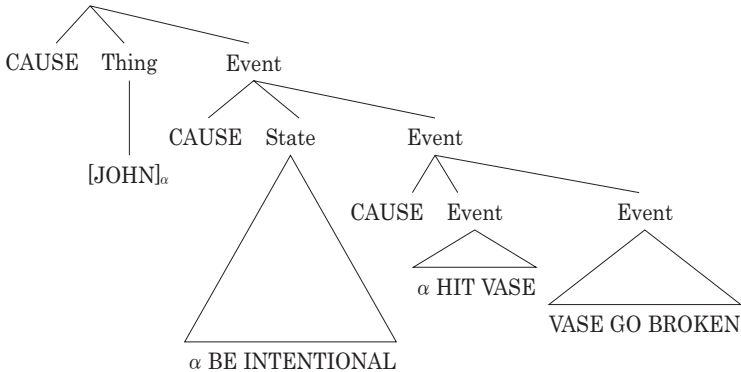
function on the semantic level. All the NPs in a syntactic configuration, whether overt or not, are subject to case theory. On the other hand, all the elements in the argument position in a conceptual structure lack a phonetic form and thus, are exempt from case assignment.

The difference in case assignment is correlated to another difference in distribution. PRO is in complementary distribution with an overt NP. This is not the case with α and a variable in conceptual structure. As shown in the contrast between sentences like 'Mary sighed' in (61) and sentences like 'Mary sighed from her guts' in (63), the two can be employed interchangeably.

Another important difference between α and PRO concerns the relation between the antecedent and its anaphors. The antecedent can control more than one anaphor in conceptual structure, as shown in (80):

(80) a. John intentionally broke the vase by hitting it.

b. Event



However, this situation is not applicable to syntactic structure. Then, what relation holds between the antecedent and its bindee(s)? It is clear that there is a c-command relation between them, as we have observed in the structures (61), (74b) and (80b). What other relationships and restrictions there are between them must be left to further research.

Now let us turn to the category ϕ . It is pronominal like PRO_{arb} in that it has no referent within the clause structure. In (61), for example, ϕ does not refer to any specific place but rather any place other than 'within Mary's body'. In (75b), ϕ does not refer to any specific medium to send a letter.

Except the relation between the binder and the bindee(s), what has been said of the differences between α and PRO_{obl} can be applied to ϕ and PRO_{arb} as well. First of all, unlike PRO_{arb} , the occurrence of ϕ is not restricted to the argument position that is to be realized as the subject of a clause. For example, in (61) its occurrence is found in the argument position of a Path-function. Moreover, it is not complementary distribution with a variable argument. This is witnessed by the contrast of (61) and (67), where ϕ in (61) is replaced by an overt element [ME] in (67).

7. Conclusion

In this article, after pointing out the properties that characterize action verbs in their semantic behavior, I have shown that there are some problems and inadequacies in the previous approaches to the semantic representation of action verbs. I have also presented an alternative analysis of English sound emission verbs, in terms of 'causal chain' model introduced in Inoue (2001a), within the framework of conceptual semantics. It is shown through the present study that sound emission verbs can semantically be represented as causal events; that the present analysis enables us to clear up the problems of the previous approaches; that it makes it possible to account for the semantic properties of sound emission verbs including the undelimited reading and the incapability of adjectival passive formation; and finally, that there are two kinds of PRO-like empty categories available in conceptual structure.

FOOTNOTES

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¹This is not to say that all unergative verbs do undergo the *-able* word-formation. This formation is not applicable to most of the spontaneous sound emission verbs: **sighable*, **sneezable*, **coughable*, **snortable*, **hiccupable*, etc.

²Levin and Rappaport Hovav (1995:90) term verbs like *break* and *open* that participate in causative alternation as external causation, while verbs like *laugh*, *play*, and *speak* that show intransitive uses but never show transitive causative uses as internal causation. Nevertheless, they do not analyze the latter in terms of the function CAUSE.

³I will leave open in this section whether or not the first argument of the function CAUSE must be an event.

⁴I assume that the caused subevent is expressed by the function GO, which serves for the representation of change of location as well as that of change of state, since, as is widely assumed, concepts of the latter can be captured as an extension of concepts of the former.

⁵The implication of this kind seems to hold for light emission verbs as well. Note the following:

- (i) a. The rocket streaked into the sky.
- b. Fireflies flickered across the river.

⁶It should be noted in passing that the construction with a cognate object and the corresponding simple verb construction differ in that the latter can take a delimited reading, as shown below:

- (i) a. Mary laughed (for an hour/*in an hour).
- b. Martha sang (for an hour/*in an hour).
- c. Mary sneezed (for a minute /*in a minute).
- (ii) a. Mary laughed a mirthless laugh (in one minute/for one minute).
- b. Martha sang a joyful song (in five minutes/for five minutes).
- c. Mary sneezed a horrific sneeze (in one minute/for one minute).

(Tenny 1994:39)

This telicity condition on the cognate object, however, holds for most of the object arguments of transitive verbs. Thus, it cannot be a counterargument to the claim made here.

REFERENCES

- Chomsky, Noam (1981) *Lectures on Government and Binding*, Foris, Dordrecht.
- Croft, Williams (1991) *Syntactic Categories and Grammatical Relations*, University of Chicago Press, Chicago.
- Goldberg, Adele (1995) *Constructions: A Constructional Grammar Approach to Argument Structure*, University of Chicago Press, Chicago.
- Gruber, Jeffrey S. (1976) *Lexical Structures in Syntax and Semantics*, North-Holland, Amsterdam.
- Haegeman, Liliane (1991) *Introduction to Government and Binding Theory*, Basil Blackwell, Oxford.

- Inoue, Kazuko (2001a) "Verb Meaning vs. Construction Meaning: The Cases of *Hit*, *Spray and Load*." (Review Article: *A Lexical Network Approach to Verbal Semantics*, by Seizi Iwata, Kaitakusha, Tokyo, 1998,) *English Linguistics* 18, No.2, 670-695.
- Inoue, Kazuko (2001b) *Misekake Mokutekigo Koubun ni okeru Tougoron to Imiron no Musubitsuki ni kansuru Kenkyu* (A Study on the Linking between the Syntax and Semantics of Fake Object Constructions) A Report on a Grant-in-Aid for Scientific Research from the Ministry of Education, Culture, Sports, Science and Technology.
- Kageyama, Taro (1996) *Doushi Imiron* (Verbal Semantics), Kuroshio Publishers, Tokyo.
- Levin, Beth (1993) *English Verb Classes and Alternations*, University of Chicago Press, Chicago.
- Levin, Beth and Malka Rappaport Hovav (1995) *Unaccusativity: At the Syntax-Lexical Semantics Interface*, MIT Press, Cambridge, MA.
- Marantz, Alec (1985) *On the Nature of Grammatical Relations*, MIT Press, Cambridge, MA.
- Nakau, Minoru (1994) *Ninchi Imirin no Genri* (Principles of Cognitive Linguistics), Taishukan, Tokyo.
- Pinker, Steven (1989) *Learnability and Cognition*, MIT Press, Cambridge, MA.
- Quirk, Randolph, Geoffrey Leech and Sidney Greenbaum (1985) *Comprehensive Grammar of the English Language*, Longman, London.
- Tenny, Carol L. (1994) *Aspectual Roles and the Syntax-Semantics Interface*, Kluwer Academic Publishers, Dordrecht.
- Vendler, Zeno (1967) "Verbs and Times," *Linguistics in Philosophy*, by Zeno Vendler, 1967, 97-121, Cornell University Press, Ithaca, New York.