

## An Event Structure Account of the Unique Path Constraint

Masaki Yasuhara

It has been observed that expressions denoting change of state and location cannot co-occur in a single clause (Goldberg (1991, 1995), Levin and Rappaport (1995)). For example, Goldberg (1991:368) points out that the co-occurrence of a resultative and a directional phrase is prohibited:

- (1) a. Sam kicked Bill black and blue.
- b. Sam kicked Bill out of the room.
- (2) a. \*Sam kicked Bill black and blue out of the room.
- b. \*Sam kicked Bill out of the room black and blue.

In (1), either the resultative phrase *black and blue* or the directional phrase *out of the room* can appear in a single clause. The co-occurrence of them, however, is prohibited, as shown in (2).

The purpose of this study is to propose that the co-occurrence restriction on expressions denoting change of state and location can be adequately accounted for in the framework of the event structure analysis (cf. Levin and Rappaport (1995)). More specifically, we argue that a change of state and that of location cannot co-occur in a single event (a causing event or a result event), and that the co-occurrence restriction shown in (2) is attributed to this constraint.

To begin with, we will outline Goldberg (1991), which is one of the most influential studies relevant to the topic in this study, and point out its problem.

In order to explain the co-occurrence restriction, as exemplified in (2), Goldberg (1991:368) proposes the following constraint:

- (3) The Unique Path (UP) Constraint: if an argument X refers to a physical object, then more than one distinct path cannot be predicated of X within a single clause. The notion of a single path entails two things:
  - 1) X cannot be predicated to move to two distinct locations at any given time *t*.
  - 2) The motion must trace a path within a single landscape.

She argues that a change of state is a metaphorical change of location, and therefore, this constraint prohibits the co-occurrence of expressions denoting either a change of state or location. What is crucial in the Unique Path Constraint (henceforth, the UPC), then, is that a single clause cannot include both expressions denoting a

change of state and that of location at the same time when the events denoted by them occur simultaneously. Apparently this assumption explains why sentences (2) are unacceptable. According to the UPC, these sentences are ruled out because a resultative and a directional phrase co-occur in a single clause, and furthermore, the events of change of state and location denoted by them occur simultaneously.

It is true that the sentences in (2) are unacceptable in the interpretation where both of the two events (i.e. *Bill became black and blue* and *Bill went out of the room*) occur simultaneously. However, even in the interpretation where there is a time lag between Bill's change of state and location, the sentences in (2) are ruled out. Then, it is more reasonable to think that the co-occurrence of the resultative and directional phrase itself makes the sentences in (2) unacceptable, regardless of whether or not both the change of state and that of location occur at the same time.

Furthermore, verbs of change of state such as *burn* and *squash* can appear with PPs which express paths, even though both the change of state and that of location of an entity occur simultaneously, as in (4) and (5):

- (4) The meteor burned through the sky.  
 (5) He squashed the apple through the sieve into the bowl with the mixed cereal and made-up formula, and stirred the concoction.

(Melissa James, *One Small Miracle*)

In (4), burning of the meteor occurs in the process of its motion through the sky, and therefore, the change of state and motion of the meteor occurs simultaneously. In (5), likewise, the apple becomes squashed in the process of its motion through the sieve, so the change of state and location of the apple occurs at the same time.

Examples (4) and (5) are crucially problematic for the UPC, which is based on the time relation (i.e. whether or not two events occur simultaneously). Then, we should consider how we can explain the co-occurrence restriction on change of state and that of location expressions: It is the event relation (i.e. whether or not one event causes the other), not the time relation, that is relevant to this restriction.

Now let us examine sentences (4) and (5) more closely in terms of PPs denoting causing events. In (4), for example, *through the sky* denotes friction between the meteor and the sky, which causes the burning of the meteor. Likewise, *through the sieve* in (5) denotes a means by which the apple is squashed. Thus, the PPs in these examples express means for change of state denoted by the verbs. Specifically, these means imply the contact between two entities (i.e. *the meteor* and *the sky* in (4), and *the apple* and *the sieve* in (5)).

This observation can be confirmed by a selectional restriction on the PPs

shown below, where a PP which does not denote the contact between two entities cannot express a means for squeezing of the rubber ball:

- (6) a. John { squeezed / squashed } the rubber ball through the crack.  
 b. \*John { squeezed / squashed } the rubber ball toward the wall.

Sentence (6a) includes both the motion and change of state of the rubber ball in terms of transformation. In this sentence, the PP *through the crack* involves the meaning of contact between the rubber ball and the crack. Thus, this sentence describes the situation where the rubber ball changes its shape by moving through the crack, and the PP denotes the means for transforming the shape of the ball. In sentence (6b), on the other hand, the PP *toward the wall* is not compatible with the verbs. The sentences in (6) are unacceptable because this PP does not involve the meaning of contact, which is necessary for the transformation of the rubber ball. Thus, the PPs in sentences (4), (5) and (6a) denote the means for a change of state.

It is widely observed that certain PPs can express a means (Nilsen (1973)):

- (7) a. John broke the window with a hammer.  
 b. Jerry cracked the dish over Martha's head.  
 c. Karl splintered the china against the wall.

All of the sentences above include change of state verbs and PPs which represent a means for the change of state. In (7a), for example, the PP *with a hammer* denotes a means for breaking the window. Likewise, in sentences (7b) and (7c), the dish was cracked by hitting it *over Martha's head*, and the china splintered by dropping it *against the wall*, respectively.

The PPs including *over* and *against* apparently seem to be locative phrases. However, there exist three pieces of evidence which demonstrate that this kind of PPs denote a means, and they can be distinguished from true locatives.

First, although a true locative phrase can be substituted by *there*, PPs denoting a means cannot (Levin (1977:44)):

- (8) a. John put the book on the table.  
 b. John put the book on the table and Bill put one there too.  
 (9) a. John saw the stars through the telescope,  
 b. #and Bill saw them there too.  
 (10) a. John broke the dishes against the wall,  
 b. #and Bill broke the glasses there too.

*There* can be used as an anaphoric form which refers to a true locative, so it can substitute for the PP in (8), but cannot in (9) and (10).

Secondly, although a true locative phrase cannot be questioned by *how*, PPs denoting a means can (Levin (1977:43-44)):

- (11) a. #How did John put the book? On the table.  
 b. How did John break the vase? With the hammer.  
 c. How did John break the vase? On the hammer.

*How* can question a means, as in (11b, c), but cannot question a place, as in (11a).

Thirdly, PPs with the same function cannot co-occur (Levin (1977:47)):

- (12) a. John put the log in the fire with tongs.  
 b. #John saw Mary with the telescope in the mirror.  
 c. #John broke the vase against the wall with the hammer.

The locative phrase *in the fire* and the instrumental phrase *with tongs* have different functions, so they are compatible in (12a). Sentence (12b), however, includes two instrumental phrases, which makes this sentence unacceptable. On the basis of this observation, we can ascribe the unacceptability of (12c) to the co-occurrence of PPs with the same function. That is, both of the PPs in (12c) involve a means function.

Thus, we observed that, under certain circumstances, PPs which denote motion can also represent means. This observation allows us to claim that when a PP expresses a means for a change of state, the PP is compatible with a verb denoting the change of state, as in (4) and (5). That is, there has to be a causal relation between a causing and a result event when an expression denoting a change of state and that of location co-occur in a single clause.

Returning to the unacceptable sentences in (2), we find that the PP *out of the room* in these sentences does not express a cause for a result event. This means that the change of location event denoted by the PP *out of the room* and the change of state event expressed by the resultative phrase *black and blue* cannot form a causal relation between the two events, which crucially makes the sentences in (2) unacceptable.

In this study, we have dealt with the co-occurrence restriction on change of state and that of location expressions. It has been argued that the UPC is inappropriate because it is based on the time relation. What is crucially relevant to the co-occurrence restriction is the event relation, which allows us to explain a much wider range of examples including those which the UPC cannot cover.