The semantics of measure phrases in the verbal domain

Introduction: This paper focuses on the distribution of measure phrases headed by *by* (*by*-MPs) in the verbal domain, arguing that it is governed by the same principle as the one proposed by Sawada and Grano (2011) for adjectives. It has been noted in the literature that MPs show a cross-categorial behavior. Winter (2005) proposes the modification condition to explain the cross categorial property of MPs in adjectives and prepositions. The aim of the present paper shows a paradigm of a different type of MPs to argue for the unified analysis of MPs in different domains.

Data *By*-MPs are allowed in the adjectival and verbal predicates, as shown in (1)-(2), while they are excluded in some contexts, as shown in (3).

Huddleston and Pullum (2002) observe that *by*-MPs complementarily distribute to *for*-MPs with respect to the types of verbs they co-occur. According to them, the key factor is whether the verb describes a spatial movement or a scalar change: *by*-MPs are allowed only with a scalar change, while *for*-MPs are associated with a spatial movement. The counterexample to this 'spatial/scaler' dichotomy comes from a class of rotation verbs, such as *revolve*, *rotate*, *tilt*, and *turn*, which do describe a spatial movement AND license *by*-MPs, as shown in (2b).

Furthermore, Huddleston and Pullum (2002)'s generalization does not answer why by-MPs may appear only in a subset of gradable adjectives, because these adjectives have been argued to have a 'scaler' semantics (e.g., Cresswell 1976, a.o.).

Analysis The key to a solution to this problem is given by Sawada and Grano (2011)'s analysis on MPs in adjectival phrases. Building on the measure function analysis of gradable adjectives (Kenney 1999), they assume that a degree head that introduces a MP (=Meas) places the minimum element condition on the scalar structure of the adjectives they take. Their contention is to explain the interpretations of Japanese MPs, but the generalization here is that only the minimum element adjectives allow *by*-MPs. The gradable adjectives that are sensitive to the minimum element can be detected by the compatibility of *slightly* (= (5), (6)). So-called open scale adjectives do not allow *slightly*, while lower-closed and comparative adjectives permit it.

The same contrast is observed in the verbal domain (=(7)). The proposal is that this minimum element condition is extended to the verbal domain (=(8)).

The difference between (3c) and (2a,b) is thus reduced to the minimum element. I claim that the minimum element is posited only when the paths/scales are presupposed to exist independently of the event itself. In (2a,b), the scales are temperature and degrees, and their existence is independent of the falling or rotation events. In (3c), on the other hand, the movement path is created by the movement event itself. Only in the former cases, the minimum element on a scale/path can be assumed 'before' the event starts.

Conclusion This paper proposes the distribution of *by*-MPs in verb phrases is governed by the 'minimum-element' condition, which is originally proposed by Sawada and Grano (2011) for MPs in adjectives.

[500 words]

(1) a. John is taller than Bill by five centimetres.

b. This rope is too long by five centimetres.

c. This rod is bent by five degrees.

d. The train is late by five minutes.

(2) a. The temperature fell by 10 degrees.

b. John turned the image by 90 degrees.

(3) a. *John is tall by 180 centimeters.

b. *This rope is long by 2 meters.

c. She cycled/walked/ran {*by/for} ten miles.   (adapted from Huddleston and Pullum (2002: 692)

(4) [[*Meas*]] = $\lambda g_{<e,d>}$: g is a function from objects to measurable degrees and g has a minimum element $\lambda d \lambda x.g(x) \geq d$.   (Sawada and Grano (2011: 211))

(5) a. John is slightly taller than John.

b. The rope is slightly too long.

c. The rod is slightly bent.

(6) a. *John is slightly tall.

b. *The rope is slightly long.

(7) a.*John walked around the room slightly.

b. *Galileo slightly dropped the ball.

c. The temperature has slightly dropped today.

d. John slightly rotated the figure on the slide so that it looked clearer.

e. His test score slightly exceeds the average.

(8) [[*Meas*]] = $\lambda g_{<s,<e,d>>}$: g is a function from events to functions from objects to measurable degrees and g has a minimum element $\lambda e \lambda d \lambda x.g(e)(x) \geq d$.   (cf. [3])

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