Lexicalized Scales and Verbs of Scalar Change

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1 Calculating telicity: Incremental themes, measures, and scales

• Dowty's (1991) notion "incremental theme" instantiates the insight that certain verbs show a homomorphism from a participant in the event they denote to the time course of the event (Krifka's 1989 "Mapping-to-Subevents"); as Tenny (1987) puts it, the argument "measures out" the event.

(1) Kelly ate an apple.
→ The event's progress can be determined by examining how much of the apple is eaten.

• Subsequent researchers show the more general role of what Tenny calls "measuring out", proposing a unified approach to the determination of telicity for three previously recognized types of verbs with variable telicity.

(2) Incremental theme verbs:

a. Sam ate ice cream (for 10 minutes). (atelic)
b. Sam ate an ice cream cone (in 3 minutes). (telic)

(3) Change of state (COS) verbs:

a. The icicle lengthened (over the course of a week). (atelic)
b. The icicle lengthened two inches. (telic)

(4) Inherently directed motion (IDM) verbs:

a. The plane ascended (for 20 minutes). (atelic)
b. The plane ascended to its cruising altitude. (telic)

• For each verb type, the "measure" of the event involves a property of an argument of the verb, though the particular property depends on the verb type.

(5) a. Incremental theme verbs: The spatial extent (i.e. volume, area) of the argument
b. COS verbs: A gradable property of the argument
c. IDM verbs: The path of motion of the argument

• The notion "measuring out" is now often formalized using the notions "scale" and "scalar change", with recent theories of aspect emphasizing these notions and the key role they play in determining the telicity of a predication (HKL 1999, Kennedy & Levin 2008, Krifka 1998, McClure 1994, Ramchand 1997, Rappaport Hovav 2008, RH&L 2010, Tenny 1994).

• Studies of telicity recognize three types of scales, corresponding to the three types of verbs figuring in discussions of telicity (e.g., Beavers 2008, Borer 2005, HKL 1999, Krifka 1998, Ramchand 1997, Rappaport Hovav 2008, Tenny 1994).

(6) a. PROPERTY SCALES: most often found with change of state verbs
b. PATH [spatial] SCALES: most often found with inherently directed motion verbs
c. EXTENT [volume, area] SCALES: most often found with incremental theme verbs

CALCULATING TELICITY: A predication containing a scale with a specified bound will be telic, while a predication containing a scale with no specified bound will be atelic.

2 The contribution of the verb to the calculation of telicity

• At least in English, telicity is a property of a predication, calculated from the lexical properties of its head in combination with properties of its arguments and adjuncts (e.g., Verkuyl 1972, 1989, 1993, Filip 1999, 2005, 2008, HKL 1999, Krifka 1989, 1998, Rappaport Hovav 2008).

A LONGSTANDING QUESTION: Is a predication's telicity at all lexically determined by its head?

THE FOLLOW UP QUESTION: If so, which properties of the head contribute to calculating telicity, i.e. what ingredients of telicity are lexicalized in verbs?

• LEXICALIZED MEANING: Those components of a verb's meaning that are specified and entailed in all uses of the verb, regardless of context.

— This notion can be considered an elaboration of Dowty's lexical entailments (1989, 1991).

— A verb's lexicalized meaning must be distinguished from what can be inferred from a use of that verb in context, that is, the properties of the event in the world referred to by the predication consisting of the verb and its arguments.

EXAMPLE: *break* lexicalizes a particular change in the material integrity of an entity, one that can be contrasted with being cracked, shattered, splintered, or split; the verb is silent about how this change of state comes about, although in a given event it must have come about in a particular way.

Goals of this talk:

• To investigate the semantics of verbs lexicalizing scales, showing that:
— Property scales are fully lexicalized in verbs: a change of state verb may specify all components of such a scale;
— Path scales are generally partially lexicalized in verbs: an inherently directed motion verb specifies at least some components of such a scale;
— Extent scales are not lexicalized in verbs at all: incremental theme verbs do not specify any components of a scale.

• To support the three-way distinction: COS and IDM verbs share argument realization and interpretive properties which incremental theme verbs lack.

3 The notion of scalar change

• Aspectual classifications make a basic distinction between dynamic and stative predicates (Dowty 1979): those that denote situations which involve change over time and those that do not.

• Equally basic is a distinction between those dynamic predicates which lexicalize a SCALAR change and those that do not (McClure 1994, Rappaport Hovav 2008, RH&L 2006, 2010).

(7) a. SCALAR CHANGE VERBS: warm, ripen, cool, fall, rise, ...
b. NONSCALAR CHANGE VERBS: flap, exercise, writhe, scream, laugh, rain, ...

• A SCALE is constituted by a set of degrees—points or intervals indicating measurement values—on a particular dimension (e.g., cost, depth, height, temperature), with an ordering relation. The dimension represents an attribute of an entity, with the degrees indicating the possible values of this attribute (Kennedy 2001, Kennedy & McNally 2005).

• A SCALAR CHANGE in an entity involves a change in the value of one of its scalar-valued attributes in a particular direction on the relevant scale.

Scalar change is a privileged form of change as it figures systematically in the calculation of telicity.

• Concomitantly, there is a privileged set of verbs which lexically specify a scale, and, hence, are SCALAR CHANGE VERBS.

• But verbs can be associated with a scale without lexicalizing a scale.

EXAMPLE: *roll*, although it does not lexicalize a scale (e.g., a rolling event need not lead to an inference of change of state), may be associated with an XP which denotes a scalar attribute, and, thus adds a scale. Comparable XPs may appear with scalar change verbs such as *freeze*, but with such verbs they further elaborates on a scalar change lexicalized in the verb.

(8) a. We rolled the lump of butter smooth.
b. We froze the ice cream solid.

4 Building scalar change verbs

• Events of scalar change are built upon attributes of entities whose values constitute points on a scale—attributes that themselves do not involves a change.

• Such attributes are of two types, giving rise to the two major types of scalar change verbs (RH&L 2006, 2010, Rappaport Hovav 2008):
— property concepts (Dixon 1982), which give rise to COS verbs.
— locational concepts, which give rise to IDM verbs.

4.1 The scalar changes lexicalized by COS verbs

4.1.1 The foundation of COS verbs: Scalar attributes lexicalized by gradable adjectives

• Certain property concept predicates—typically, gradable adjectives in English—lexicalize a SCALAR ATTRIBUTE—an attribute whose values constitute a scale—which lacks any notion of change.

(9) cool, deep, fast, large, long, old, short, warm, . . .

• Establishing the applicability of such an adjective to an entity requires invoking a STANDARD—a contextually determined value on the associated scale.

— Depending on the property lexicalized, the adjective attributes a value on the scale to the entity that it is predicated of which is either higher or lower than the standard.

— The standard is necessary—especially for scales with no inherent bound—for determining the part of the scale that the predicate covers.

EXAMPLES:
If someone has long eyelashes, then the value of the length attribute on the relevant dimension is greater than the standard for eyelashes.
If someone has short eyelashes, then the value of the length attribute on the relevant dimension is lower than the standard for eyelashes.

— The standard is context dependent: long eyelashes are much shorter than long hair as hair on one's head has a different standard of length.

• EVIDENCE FOR THE SCALARITY OF THESE SCALAR ATTRIBUTES:
They may appear in the comparative and superlative and with degree modifiers.

(10) longer, longest, quite long, very long, 3 inches long, . . .

4.1.2 From scalar attributes to scalar change

• What a SCALAR CHANGE in an entity involves: a change in the value of one of its scalar attributes in a direction lexically established with respect to the standard of comparison.

• Typically, scalar change verbs are deadjectival: if the base adjective specifies a value above the standard, the change involves an increase in value on the scale; if the adjective specifies a value below the standard, the change involves a decrease in value.

• A scalar change verb (in contrast to an adjective—a stative scalar predicate) does not invoke the standard: the points on the scale are inherently ordered, and a scalar change need only be a change consistent with the ordering.

4.1.3 Types of COS verbs: A reflection of the scalar attributes

There are subtypes of COS verbs, reflecting the types of scales associated with property concepts:

Two-major types of COS verbs stand out:
— COS verbs based on inherently multi-valued, scalar attributes
— COS verbs based on two-valued attributes

COS VERB BASED ON INHERENTLY MULTI-VALUED SCALAR ATTRIBUTES
(Cruse 1976, 1986, Kearns 2007, Kennedy & McNally 2005, KL 2008, Rotstein & Winter 2004):

• the associated scale is open, lacking a maximal value (i.e. unbounded)

(11) a. ADJECTIVES: cool, deep, glad, long, rough, warm, wide, ...
b. VERBS: cool, deepen, gladden, lengthen, roughen, warm, widen, ...

EXAMPLE: *warm* specifies that the value of the attribute of temperature for an entity is above the contextually determined standard; a warming event necessarily involves an entity showing an increase in value along this dimension.

(12) *warm:*
Dimension: temperature
Degrees: conventionalized degrees of temperature
Relation to standard: above
Ordering: increasing
Scale: unbounded

EXAMPLE: *cool* specifies that the value of the attribute of temperature for an entity is below the contextually determined standard; a cooling event necessarily involves an entity showing a decrease in value along this dimension.

(13) *cool:*
Dimension: temperature
Degrees: conventionalized degrees of temperature
Relation to standard: below
Ordering: decreasing
Scale: unbounded

• the associated scale is upper-bound closed, i.e. the attribute has a maximal possible value which constitutes the upper bound of the scale

(14) a. ADJECTIVES: flat, empty, clear, dry, straight, ...
b. VERBS: flatten, empty, clear, dry, straighten, ...

Such attributes can be modified by *completely, entirely*, ...

(15) completely flat/empty/clear ...

The maximal value constitutes a default standard, invoked when no other standard is specified or provided by context (KL 2008, Kearns 2006).

EXAMPLE: *flat* specifies that the value of the attribute of flatness is either above a contextually determined standard, or, in the absence of such a standard, is the maximal degree of flatness. A flattening event involves an increase in value along the dimension of flatness—by default, a change in which the maximal degree of flatness is reached.

• the associated scale is lower-bound closed; thus, there is necessarily a non-zero value of the measured property

(16) a. ADJECTIVES: wet, impure, dirty, dangerous, ...
b. VERBS: wet, dirty, ...

Such attributes hold of an entity once the smallest value of the attribute is instantiated;
something is dirty as soon as there is somedirt on it.

COS VERBS BASED ON TWO-VALUED ATTRIBUTES

• Properties giving rise to multi-valued scales of change enter into CONTRARY oppositions.

(17) a. # This table is both long and short.
b. This table is neither long nor short.

• There are other properties which enter into CONTRADICTORY oppositions;
these are are associated with scales with only two values.

Some of these scales give rise to verbs of nongradual change.

(18) a. ADJECTIVES: dead, false, cracked ...
b. VERBS: crack, die, explode, ...

Following Beavers (2002, 2008), we consider these verbs to lexicalize a two-point scale,
the points being the two possible values, e.g., not dead vs. dead.

• Such verbs give rise to punctual events, involving a near instantaneous transition between the state of being not associated with a property and being associated with that property.

NOTE: Once the notion of a scale is generalized to include two-point scales, the notion of scalar change is NOT equivalent to gradual change. (The inclusion of punctual and gradual changes in the same linguistically relevant class is supported by shared properties; see section 5.)

4.2 Scalar changes in IDM verbs

4.2.1 The foundation of IDM verbs: Spatial attributes that do not involve change

Languages typically express the location of an entity—a theme or figure—relative to a reference object (RO) or ground (e.g., Jackendoff 1983, Levinson 2001, Talmy 1985)

(19) Where are my glasses? [They]$_{\text{theme}}$ are [next to]$_{\text{relation-of-theme-to-RO}}$ [the phone]$_{\text{RO}}$.

• Predicates expressing location are typically prepositions; they specify something about the relation between the theme and the RO.

— TOPOLOGICAL RELATION PREPOSITIONS (Levinson 2001): the most basic set of prepositions, representing static relations of near contiguity between a theme and RO

(20) at, on, in, . . .

The attribute of being located somewhere is built compositionally from a preposition and its object.

Those attributes built from the prepositions in (20) are not gradable and cannot appear with degree expressions.

(21) a. ∗ very at, further at, two meters at, . . .
b. ∗ very on, two meters on, . . .

— ANGULAR LOCATION PREPOSITIONS (Levinson 2001): encode a relation between the theme and RO when they are displaced in space

(22) above, below, far, near, behind, . . .

The set of contiguous points of location between the theme and RO in such a relation form a path, and the path can be seen as a type of scale as the points of location are ordered (Dowty 1991, Krifka 1998, Svenonius 2008, Zwarts 2005); predicates lexicalizing this relation denote scalar attributes without a notion of change.

Such predicates can appear with degree modifiers, but as prepositions, they cannot appear with a bare comparative, but can be compared with the help of *further*.

(23) two meters above/below/behind, far/further above, far/further below, . . .

• The RO is the correlate in the motion domain of the standard in the state domain:
The standard is a point on a property scale which the value of an attribute of an entity is compared to; the RO is a point on a path which the location of the theme is compared to.

4.2.2 From spatial attributes to scalar change

• In events of scalar change based on spatial attributes, change in the value of an attribute is realized as movement along the path to the RO:

— In the property scale domain, the relation to the standard correlates with the direction of change; options: increase or decrease in value of the attribute

— In the path scale domain, the relation to the RO correlates with the direction of movement; options: increase or decrease in distance to the RO

• A significant difference between property scales and path scales:

— The degrees on the dimensions of property scales are often inherently valued:
10 degrees is a value on the temperature scale which is inherently lower than 11 degrees.

— The points on a path scale are not inherently ordered: a path consisting of a set of contiguous points of location can only be ordered in relation to another point on the path, usually the RO.

• Thus, reference to a RO is typically required with IDM verbs, unlike with COS verbs.

(24) IDM VERB GENERAL TEMPLATE:
Dimension: location
Degrees: points of contiguous locations
Relation to reference object: towards or away from
Ordering: increasing or decreasing distance from reference object
Scale (i.e. path): bounded or unbounded

4.2.3 Types of IDM verbs

In the motion domain, too, verbs can be distinguished by the nature of their associated scale—i.e. path: bounded or unbounded (*approach* vs. *rise*), bounded at the lower end (*leave*, *depart*), bounded at the upper end (*approach*, *reach*), and paths with only two points (*enter*, *exit*).

Striking similarities in the structure of the scales encoded by IDM and COS verbs justify considering them to be two instantiations of the same kind of change: scalar change (Rappaport Hovav 2009).

Ways in which the components of a directed change of location are lexicalized in English:

• IDM verbs lexicalizing all components of their scale: Verbs of motion along a vertical axis

(25) ascend, descend, drop, fall, lower, rise, . . .

The points on the path lexicalized by these verbs are inherently ordered—towards or away from the source of gravity—and, therefore, such verbs do not require a cooccurring preposition specifying the direction of motion or a cooccurring RO that can determine this direction; in fact, such verbs are sometimes classified as COS verbs.

(26) The balloon rose./The leaves fell./The rope dropped.

(27) *rise:*
Dimension: location
Degrees: points of location on path
Reference object: source of gravity
Relation to RO: away from
Ordering: increasing
Scale: unbounded

• The preponderance of IDM verbs do not fully lexicalize the components of the path of motion; rather, the RO is provided external to the verb, either explicitly by a constituent in the sentence or inferred from the context. The path is formed by the set of points between the theme and RO, with the ordering determined by the individual verb.

— The deictic motion verbs *come* and *go*

Their RO is a 'deictic center' which may be contextually determined or explicitly specified;
— *come* involves a movement toward the deictic center;
— *go* involves movement away from it.

(28) *come*:
Dimension: location
Degrees: points of location on a path
Reference object: 'deictic center'
Relation to RO: towards
Ordering: decreasing distance to RO
Scale: bounded

— Verbs whose direction of motion is determined with respect to an explicitly expressed RO:
— some verbs specify a two-point path: e.g., *arrive, depart, enter, exit, leave, reach*
— others verbs specify multi-point paths: e.g., *advance, approach, recede*

(29) a. Lindsay approached the gate.
b. Blake left the library.

• A salient difference between IDM verbs and COS verbs:

— There are no COS verbs based on a bounded property scale which entail the traversal of the entire scale: e.g., *Pat flattened the ball* does not entail that the ball became completely flat, and there are no such verbs with such an entailment.

— The motion domain distinguishes between *approach* and *return*, each of which lexicalizes a bounded path, but only *return* entails that the theme reaches the endpoint of the path.

• Since there is really only one dimension for path scales—location—there are many fewer verbs lexicalizing a path scale, and these are differentiated mainly in terms of the kind of path they encode.

5 Properties of scalar verbs

Further evidence for considering IDM and COS verbs—i.e. scalar change verbs—similar stems from a variety of properties they share, but nonscalar change verbs lack.

5.1 Nonscalar changes

A NONSCALAR CHANGE in an entity is any change which isn't characterizable in terms of an ordered set of degrees—i.e. values of a single attribute—along a dimension representing this attribute.

Two properties contribute to making a change nonscalar (RH&L 2010):
— lack of an ordering relation
— complexity

• A few verbs qualify as nonscalar change verbs because, although they describe a change, it lacks an ordering relation.

(30) float, move, roll, rotate, slide, spin, whirl, . . .

• The vast majority of nonscalar change verbs involve a complex combination of many changes at once, so that there is no single, privileged scale of change.

(31) bounce, crawl, exercise, flap, flutter, gallop, grimace, jog, knead, laugh, leap, rock, scribble, shudder, waltz, wave, wink, . . .

EXAMPLE: The verbs *jog* and *waltz* each involve a specific pattern of movement of the arms and legs that is repeated an indefinite number of times (Dowty 1979); collectively, these changes do not represent a change in the values of one attribute, nor is any one element in the sequence of changes the necessary starting point of motion.
They differ from *run* and *tango*, respectively, in the specification of the pattern of movement.

Not all nonscalar change verbs are so specific about the precise changes:
exercise requires an unspecified and unordered set of movements.

• Verbs which are said to be "manner" (as opposed to "result") verbs involve nonscalar changes.

(32) hit (vs. break), jog (vs. go), spray (vs. cover), whisk (vs. mix), wipe (vs. clean), . . .

5.2 Scalar change verbs and telicity

• Verbs with two-point scales are telic (Beavers 2002, 2008, Filip 2008, Rappaport Hovav 2008)

(33) a. Dale died in three hours/*for three hours.
b. Carson arrived in two minutes/*for two minutes.
c. Lane bottle cracked in two minutes/*for two minutes.

• Verbs with multi-valued scales rather easily give rise to telic predications:
the RO or standard provides a natural bound for the scale.

(34) a. The soup cooled in two minutes. → i.e. reached a desired temperature
b. Kim came in two minutes. → i.e. arrived at the deictic center

• Lacking a scale with a standard, a nonscalar change verb cannot, without heavy contextual support, give rise to a telic predication: compare *roll* with *run*, which could denote a habitual activity.

(35) a. # The ball rolled in two minutes.
b. Avery ran (in an hour). [ok, if there is a specific distance habitually run]

5.3 The range of scale-denoting XPs

• Both scalar and nonscalar change verbs can enter into telic predications when they appear with a scale-denoting XP specifying an explicit bound.

(36) a. Blake cooled the soup to room temperature.
b. Carey rolled the ball into the corner.

• Nevertheless, there is a difference: a scalar change verb lexicalizes a scale, so the XP further specifies it; a nonscalar change verb does not lexicalize a scale, so it is simply specified by the XP.

• This difference is reflected in the range of scales found with the two types of verbs:

— Nonscalar change verbs can appear with a wide range of scale-denoting XPs:

(37) a. We steamed the envelope **open**.
b. We steamed the tablecloth **flat**.
c. We steamed the clothes **clean**.
d. We steamed the clothes **stiff**.

(38) a. We rolled it **flat**.
b. Place butter square between two sheets of waxed paper and roll it **smooth**. (http://books.google.co.il/books?id=DFHKZ3iZgC&pg=PA262&lpg=PA262&dq)
c. Rinse out all the soap and roll it [=the sampler] **dry** between two towels, squeezing out the water as you go. (http://www.ehow.com/how_2077057_cross-stitch-sampler.html)
d. McKay grabbed the car door but Champ rolled the window **closed**. (G. Ehrlich, *Heart Mountain*, Viking Penguin, New York, 1988, p. 4)
e. Every evening when her train rolled out of the station, May's eyelids rolled **shut**. (N. Star, *Up Next*, Pocket Books, New York, 1998, p. 50)

— Scalar change verbs can appear with a much more restricted set of XPs: the XPs must specify a point on the same dimension that is the basis of the scalar change lexicalized in the verb.

(39) a. We froze the ice cream solid.
b. The biologist dimmed the room to the level of starlight.
c. We arrived at the airport.
d. The leaves fell to the ground.

(40) a. ∗ We dimmed the room empty.
b. ∗ We froze the people out of the room.
c. ∗ We broke the vases worthless.
d. ∗ The vase fell broken.

This restriction arises from a constraint that an event can have only one measure or scale (Tenny 1994, Goldberg 1995, L&RH 1995).

5.4 The availability of an event-delay reading

• COS and IDM verbs pattern like achievements, allowing '*in* X time' adverbials (Beavers 2008, Kearns 2007, Rappaport Hovav 2008) in that they receive an "event delay" reading.

(41) a. The interest rate was raised, and in a month the prices (*steadily/gradually) increased/decreased. ('after a month' reading)
b. The gap widened (*steadily/gradually) in a few minutes.
c. The orders were finally received and in three days, the troops advanced. ('after three days' reading)
d. Her temperature rose in two hours (*steadily/gradually).

• Nonscalar change verbs are not found with '*in* X time' adverbials.

(42) a. # The balls bounced in two minutes.
b. The boat rocked in five minutes.
c. # Lee sang in two days.

5.5 Manner/result complementarity

• COS and IDM verbs show similar lexicalization properties: neither encodes a notion of manner.

(43) a. COS verbs: break, crack, freeze, melt, clear, shatter, dissolve, ...
b. IDM verbs: arrive, enter, come, go, rise, ascend, descend, ...

— COS VERBS: even in their transitive uses, they specify the change that the theme undergoes, but do not specify anything about how this change comes about.

(44) a. I cleaned the tub by wiping it with a sponge/by scrubbing it with steel wool/by pouring bleach on it/by saying a magic chant.
b. We melted the chocolate by putting it out in the sun/by putting it into the microwave/by stirring it over a low flame.

— IDM VERBS: they specify a direction of motion, but not how the motion is effected.

(45) I came to the theatre, running/hopping/walking/strolling/by bus/by bike/by camel.

• In contrast, the majority of nonscalar change verbs are manner verbs.

Even when the verb lexicalizes a manner that is prototypically associated with a particular direction of motion, the verb does not strictly entail this direction.

(46) 'Bring the Governor's reply straight back,' shouted Master Mace as Mungo climbed the rope ladder into the ship's rowing boat. (J.Riordan and B.K. McCalla, *Rebel Cargo*, Frances Lincoln, 2007, p. 149)
(NOTE: climbing is from a ship to the ship's rowing boat, i.e. downward.)

6 Incremental theme verbs do not lexicalize scales

The extent scales typically associated with incremental theme verbs also figure in accounts of telicity, contributing to its calculation in the same way as property and spatial scales.

(47) INCREMENTAL THEME VERBS: drink, eat, read, write, ...

CLAIM: Incremental theme verbs do not lexicalize any scalar structure, making them systematically different from true scalar verbs, such as COS and IDM verbs (Rappaport Hovav 2008, 2009):

• Specifically, the extent scale associated with an incremental theme verb is introduced by one of its arguments.

• EVIDENCE: There is no classification of incremental theme verbs according to subtypes of extent scales (e.g., two-point, multi-valued, bounded, unbounded, lower bound closed, upper bound closed), nor is there an obvious way to suggest such a classification.

• A range of further evidence is now reviewed (from a larger discussion in Rappaport Hovav 2009).

6.1 Incremental theme verbs do not lexically specify an incremental relation

Most incremental theme verbs do not lexically require an incremental relation to the theme. The existence of a strict incremental relation between the theme and the event depends on the subject, the object, and real world knowledge of how actions are carried out (cf. Jackendoff 1996; Verkuyl 1993).

(48) a. The scanner read the bar-code.
b. Eye doctor to patient: Read this letter on the bottom of the chart.

(49) a. I ate from all the platters on the table.
b. I saw the entire house in half an hour.

There are a very few verbs which do not allow an incremental relation with their object, including *push*, *pull*, and *throw*. These verbs NEVER allow the event to affect the argument incrementally; they lack Krifka's (1989) Mapping-to-Subevents property.

6.2 Incremental theme verbs co-occur with other kinds of scales

• Verbs lexicalizing a path or property scale—i.e. IDM and COS verbs—cannot appear with an explicitly expressed scale of the other kind.

(50) a. $*$ Casey arrived breathless. (on the result interpretation)
(lexicalized path scale; property predicated of theme)
b. $*$ The heat ripened the nectarine into the trashcan.
(lexicalized property scale; path predicated of theme)

• In contrast, incremental theme verbs can appear with other than extent scales, allowing property/path scales to be predicated of their incremental theme.

(51) a. I wiped the entire table clean in three minutes.
(theme serves as incremental theme; property scale predicated of it)

b. I read myself to sleep.
(unexpressed theme is incremental theme; property scale predicated of another argument)

c. The goats ate the lawn bare.
(theme serves as incremental theme; property scale predicated of it)

• SIGNIFICANCE: Extent scales as introduced by incremental themes are qualitatively different from property and path scales.

6.3 Incremental themes co-occur with manner meaning components

Scalar change verbs do not lexicalize a notion of manner as well as scalar change (see section 5.5). Prototypical incremental theme verbs—i.e. creation and ingestion verbs—do lexicalize manner.

6.4 Incremental theme verbs and degree modifiers

• Many incremental theme verbs do not entail a change in the entity denoted by their direct object; therefore, it is not possible to identify a scalar dimension along with a change can be specified.

(52) act, dance, sing, play, memorize, read, peruse, study, rub, sweep, wipe, . . .

Thus, even if these verbs were lexically specified as being associated with some sort of scale, they would not be scalar change verbs.

• Concomitantly, degree modification works differently with these verbs than scalar change verbs.

(53) a. We cooled the soup some more. → The soup is cooler.

b. We lowered the rope some more. → The rope is lower.

c. We descended some more. → We are further down.

(54) a. Margie read the book some more.
↛ The book will be more read.
→ More of the book will be read OR Margie read the book again.

b. We perused the document some more.
→ More of the document is perused OR We perused the document again.

— For verbs like *read*, *peruse*, *study*, and *memorize*, if a change is specified for any entity, it is the entity denoted by the subject: to know if a sign was read, you examine not the sign, but the reader.

— Verbs like *mow* do involve change in their direct object: a mowed lawn has undergone a change.

However, mowing involves a complex interaction between the instrument and the theme, rendering the change complex and nonscalar in nature. In particular, if mowing a lawn involves shortening the height of the grass, there is no relation between the parts of the event of mowing and transition from (any of the grass) being tall to being short.

Strikingly, verbs like *mow* do not allow degree modification the way scalar change verbs do.

(55) a. ∗ My lawn was more mowed than yours.
(cannot be used if my lawn in shorter than yours)
b. More of my lawn was mowed than yours.

6.5 Incremental theme verbs realize their arguments like manner verbs

• RH&L (2002/2005) delineate distinct argument realization properties and interpretive properties for manner and result verbs.

• Incremental theme verbs show the properties of manner verbs, contrasting with scalar change verbs, which show the properties of result verbs.

(56) Unspecified objects:

a. Leslie read (the book).
b. ∗ Kelly broke again tonight when she did the dishes.

(57) Nonsubcategorized NP resultatives:

a. Leslie read us all to sleep.
Leslie read her eyes sore.
Leslie read herself quasi-blind.
b. ∗ The clumsy child broke the beauty out of the vase.
∗ The clumsy child broke his knuckles raw.
∗ Cameron broke his parents into the poorhouse.

(58) *out–* prefixation:

a. Andy outread Mandy.
b. ∗ Andy outbroke Mandy.

7 Conclusions

• The notion of scale, which is known to play a significant role in determining telicity, is key to the organization of verb meanings as classifiers of events. Therefore, the components of scales are significant components in the linguistic conceptualization of events.

• It is fruitful to distinguish lexicalized from non-lexicalized scales. It emerges that:
— Property scales are fully lexicalized in verbs;
— Path scales are generally partially lexicalized in verbs;
— Extent scales are not lexicalized in verbs at all.

• These differences in the scalar analysis of verbs correlate with facets of their interpretive and argument realization properties.

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