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# English Verbs of Quantitative Change

Yukio Tsuji

## 0. Introduction

This study is a tentative attempt at a description of the meanings and the lexical structure of those English verbs that refer to changes in quantity. Provisionally labelled “verbs of quantitative change”, these all fall under the definition of “to (cause to) become larger or smaller in number, amount, degree, or spatial dimensions”. Included are “increase”, “decrease”, “grow”, “reduce”, “multiply”, “diminish”, “lengthen”, “shorten”, “expand”, “contract”, etc.

## 1. Theoretical background

The verbs of quantitative change are understood to possess the meaning of [to (cause to) become larger or smaller] in common with other properties which characterize them as a group and differentiate them from other verbs. However, few of the features of each verb exist as necessary and sufficient conditions in a dichotomous manner, although they make a verb distinct from other verbs in a specific context. Semantic features in the present study are considered rather as an elastic set of conditions. Typical members of each category may satisfy the conditions, but less typical members may not necessarily meet all of the conditions. The peripheries of the categories are fuzzy, even if the typical verbs of a category are clearly distinguishable. The boundaries of a category often blur with and overlap one another, since many of the verbs may simultaneously belong to more than one category. Therefore, typical verbs will be listed together with some peripheral verbs. The complete set of verbs is not assumed beforehand. Only such typical

verbs are predetermined. Thus the present study takes the standpoint of prototype semantics in this regard.

At the same time, the basic methodology of a featural approach is accepted. Semantic description at some time requires a decomposition of a lexical item into its constitutive primes. Componential analysis has been criticized as being unable either to describe all the possible meanings of a lexical item or to explain the hierarchical relationship between features (Fillmore, 1975; Coleman and Kay, 1981). There is difficulty in deciding whether the alleged semantic features can be, so to speak, “ultimate or universal components” (Lyons, 1977). They may be decomposable into smaller constitutive primes, and may not be universally applicable to the lexicon of other natural languages.

But these shortcomings are not crucial flaws as long as semantic features are handled properly with great care (Leech, 1981: 121). In this study, semantic features are regarded as having the roles of both distinctive features and of some semantic criteria or “dimensions” in Coseriu’s term (Coseriu, 1975), which can be established in order to display some lexical structure. The componential analysis here is not contradictory to the prototype theory.

Before entering into an analysis of the verbs, some psychological aspects should be touched upon. Firstly, the core meaning of the verbs of quantitative change is closely related to the concept of “increase and decrease”. The term “concept” is here used as a general notion of a given object or event (henceforth, referred to as “object(s)”). It is obtained through categorization consisting of generalization and differentiation (Rosch, 1977). The former is a psychological activity whereby some common attributes are recognized, and it excludes those the distinctive; the latter refers to the mental operation of emphasizing the differences between objects. Together, these activities can be called conceptualization. The concept of “increase and decrease” is thus also recognized as the result of conceptualization. Among a great many phenomena in our perceptual world, those phenomena displaying the changes in size, number, amount, etc., are pertinent to our concept of “increase and decrease”.

It has been argued through a plethora of experimental findings that the concept of “increase and decrease” is based upon various thinking processes such as “groupement or grouping”, “classification” and “seriation” (Piaget, 1945). Furthermore, a series of mental operations—such as addition, division, and multiplication—are involved in the judgement of equivalence, relative magnitude and sequence of numbers, amount and size of objects. In developmental psychology the cognition of such quantitative dimensions as number, amount, and spatial size is inseparable from the concept of “increase and decrease”.

Another significant factor to be mentioned here is that we exist, physically speaking, in a four-dimensional world. As Clark propounds (1973: 30), we are inhabitants “of a world consisting of objects, people, space and time”. We perceive through our sensory apparatus a diversity of objects around us, which are either static or dynamic. The perception of space and time is also interrelated with the concepts of “increase and decrease” in this regard, because it is impossible to perceive changes in quantity or quality, state and locus of objects in terms of such dimensions as length, distance, height, depth, width, etc., unless we possess a systematic perception of time and space (Miller and Johnson-Laird, 1976).

Consequently, the concept of “increase and decrease” is understood roughly as the operational result of conceptualization obtained by the cognition or perception of both substantial and insubstantial objects changing in such quantitative aspects as number, amount, size, and spatial and temporal dimensions, and is closely related to the linguistic structure of the verbs of quantitative change.

Although some of the psychological findings regarding space perception and the concept of “increase and decrease” will be referred to for analytic purposes, the primary interest of the present study is in linguistic meanings and structure. Perception and language may construct a modular system with other cognitive systems, but they are regarded here as fundamentally different systems of mutual dependence.

## 2. Definition

The term “verb(s) of quantitative change” is tentatively being used in the present study because there is no established label at present. Although previously [to (cause to) become larger or smaller] was introduced as a core meaning, these verbs might also be defined as “verbs of increase or decrease”, since it is reasonable to expect that the concept of “increase and decrease” and the perception of quantitative change are closely connected, and the perception of quantitative changes may be reflected in the lexical structure in a comparatively orderly distribution.

In the present analysis, the componential marker of the verbs of quantitative change will be described either as [increase] or [decrease]. The characterizing markers [increase] and [decrease] do not refer to the lexical verbs “increase” and “decrease”, but to the semantic components having the feature [to (cause to) become larger] and [to (cause to) become smaller]. Some subordinate components, being combinative or selective, such as [number, amount, weight, size, (degree)], and some spatial categories, such as [length, height, depth, width, thickness, volume], will also be employed. These components refer to that aspect of the object undergoing change. Among the concomitant components are [gradually, rapidly, partially, additionally, etc.]; these mark conditions and phases of the change. Consequently, the prototypical meaning of each verb will be described by the combination of the core and other concomitant components.

It should be stressed that the purpose of description in this case is not to emphasize the differences between verbs or to list all the possible meanings—whether implicational or transferred—but rather to illustrate the existence of a category of verbs of quantitative change. Thus, the focus is put on those components held in common rather than the inherent features of each verb.

### 3. Verbs of quantitative change with non-dimensional components

“ Increase ” and “ Decrease ”

These are the most typical verbs of quantitative change. Both derive from Latin and still maintain old nuances in their present meanings. Their core meanings are [increase] or [decrease]+[number, amount, size, weight, (degree)]+[gradually]:

The number of accidents is unfortunately increasing.

The population of this city has decreased.

I increased the amount of water to be added during cooking. (LDCE)

The political influence of the former prime minister is gradually decreasing.

Both verbs are widely applicable and are often accompanied with adverbial phrases preceded by “ in ”, for example, which enable them to represent various qualities of change:

Brazilian coffee will increase *in* price because the drought ruined the coffee berries this year.

The members of the club have decreased *in* number.

They also refer to the source and goal of the change by collocating with “ from ” and “ (in)to ”:

The population of this town increased in one year *from* 10,000 *to* 12,000.

In intransitive use, “ increase ” specifically emphasizes progressive or proportionate growth:

The child’s wisdom increased with age. (LDEL)

“ Grow ”

Deriving from “ grōwan ” of Old English, meaning [to spring up or

become green (of plants)], “grow” replaced “wax” in the Middle English period. It is now used widely in diverse expressions. Its central meanings as one of the verbs of quantitative change are [increase] + [number, amount, size, weight, degree] + [(by natural development)]. “Grow” and “increase” are often interchangeable.

The population is growing/increasing.

“Grow” also carries the idea of the progressive and proportionate phases of change, and refers to various changes of states with “in”, and the source and goal with “from” and “(in)to”, in the same way as “increase”:

His influence over the children is growing (increasing) as they get older. (LDCE)

Tom has grown *in* stature but not *in* wisdom.

The village is growing *into* a town. (LDCE)

Plants grow *from* seeds.

“Grow” has the function of “resulting copula”; the subject complement has the role of resulting attribute (Quirk et al., 1985: 1171–2):

Time is growing short.

She grew pale.

In the above examples, the semantic function of “grow” equates with such copulative verbs as “become” or “turn”. But since “grow” possesses the component [increase], “some people dislike the combination grow smaller as illogical”. (LDEL)

“Multiply”

The core components of “multiply” are [increase] + [number] + [(by procreation)]. The subordinate components are [amount, degree] + [repeatedly].

Mice multiply rapidly.

Cares multiply as one gets older. (UED)

### “Proliferate ”

The core meaning is the same as “multiply ” except “proliferate ” has the component [rapidly].

During the past two years, tiny splinter groups devoted to single issues have proliferated. (Time, Aug. 1, 1983)

### “Augment ”

Like “increase ”, “augment ” derives from Latin. The French *augmenter* maintains the original meanings and is an approximate equivalent of the English “increase ”; however, the English “augment ” carries a different implication. The core components are [increase] +[number, amount, size, degree]+[additionally]:

The Tokyo task force was augmented by writers working in special areas . . . (Time, Aug. 1. 1983)

Although in this example it certainly denotes an increase, the different nuance still remains. “Augment ” implies that the task force was already substantial in size or number before it was strengthened by additional writers. “Increase ” does not have such an implication.

### “Enlarge ”

One of the typical verbs of quantity referring to becoming or making larger. The components are [increase]+[size, extent, degree]:

He has enlarged his business recently.

### “Dwindle ”

The verb “dwindle ” can often be replaced with “decrease ”:

The number of people on the island is dwindling/decreasing.  
(LDCE)

But as the next example illustrates, “increase ” implies a gradual change while “dwindle ” may denote rapid change:



The number of people on the island has decreased (dwindled) to three hundred.

However, “dwindle” is the only possible choice in some cases:

The number of people on the island has dwindled (\*decreased) from three hundred to nothing.

Thus the prototype meaning of “dwindle” has the following components: [decrease]+[number, amount, size, degree]+[rapidly, (to vanishing point)].

“Maximize” and “Minimize”

The meanings of this pair are [increase]+[number, amount, size, degree]+[to a maximum], and [decrease]+[number, amount, size, degree]+[to a minimum], respectively.

The government is trying to maximize educational opportunities.  
Many prosecutor’s offices are establishing special assault units to minimize the number of interviews that victims must face. (Time, Sept. 5, 1983)

In the latter example, “minimize” means “to decrease to the least possible number”.

“Lessen”

Another typical verb in this category, “lessen” is very close to “decrease” in its core meanings, but it does not collocate with numerals and does not carry the implication of gradual change. The core components are [decrease]+[amount, weight, size, degree]. (Notice that [decrease] does not signify “decrease” but [to (cause to) become smaller]). Thus “decrease”, which conveys gradual change, cannot in general be used:

You can’t book your luggage to New York unless you lessen (\*decrease) its weight.

### “ Diminish ”

This verb is a formal substitute for “ lessen ” and often suggests the result of the change. It also suggests subtraction by some external agent and occasionally refers to a change in appearance:

Disease had diminished their ranks. (WNWD)

His reputation had been diminished by his failure to deal with the crisis.

The core meaning is [decrease]+[amount, degree]+[(in appearance)]. The subordinate component [to below average] may be added, since “ diminish ” sometimes suggests that the object is in some respect below standard as a result of the changing process.

### “ Reduce ”

“ Reduce ” can be one of the typical verbs of the category since its core meaning is [decrease]+[number, amount, size, weight, degree]. It is easy to recognize, however, that “ reduce ” belongs to various semantic domains other than that of quantitative change. As a verb of quantitative change, it is typically used as follows:

The shoes were reduced from ¥5,000 to ¥3,500.

The \$420 million payback will reduce the agency’s need to borrow in the credit markets. (Time, Sept. 5, 1983)

### “ Wax ” and “ Wane ”

These verbs are not typical verbs of quantitative change as they used to be. The components of “ wax ” may be [increase]+[(number), size, degree] and those of “ wane ” may be [decrease]+[size, (degree)]:

The moon waxes and wanes.

As we have seen, verbs of quantitative change refer to [to increase or decrease in size, amount, number, (degree), etc.]. In many cases those states seem to be combined together:

The army was augmented by reinforcement.

The above example infers that the army was made larger in both number and size, because an increase in amount and number often presupposes an enlargement in size. A similar example can be seen in the verb “swell”, which was originally referred to changes in cubic measure. Its central meaning is [increase]+[volume]. In the next sentence, however, besides [volume], components such as [amount] and [degree] can be observed:

The river was swollen by the flood water.

This semantic association will cause the verbs of quantitative change to refer to degree. For instance, “the army” increased not only in number or in size but also in its functional strength; “the army” was strengthened by additional troops. On the other hand, “water” increased not only in volume and amount but also in level. The concept of degree is often expressed quantitatively since quantity is easy to associate with degree, and vice versa. This is supported by the next example:

Reagan and Gorbachev also are expected to close the deal on last week’s preliminary agreement to *increase* the safety of civilian airliners in the North Pacific. (Newsweek, Aug. 12, 1985)

Your hunger *decreases* as you eat. (OALD)

Here, “increase” and “decrease” are being used to refer to changes in degree of safety and hunger, respectively. Typical verbs of quantitative change may be used in order to express changes in degree, and the range of application is wider.

Some verbs, however, refer to the stages of degree, and do not typically imply [to increase or decrease in number, amount, size, etc.]:

Mature trees *enhance* the beauty of any garden. (LDEL)

But thanks to those effects, the image of Japan as a menace is *fading*. (Time, Aug. 1, 1983)

Such verbs can be classified as, so to speak, “verbs of degree”. Other typical examples are “intensify”, “strengthen”, “abate” and “weaken”:

In the meantime the government has intensified its push against pushes. (Newsweek, Aug. 12. 1985)

His absence only intensified her longing. (WNWD)

The ship waited till the storm abated before sailing out to sea. (LDEL)

The strain of the last few days has weakened him considerably. (CULD)

The verbs of degree, however, are less typical members of the category of “ verbs of quantitative change ”. Typical verbs of quantitative change can imply some changes in degree, but verbs of degree such as “ soften ” do not refer to quantitative change. This is because quantitative change is often substantial, while change in degree is often insubstantial. Thus, expressions of substantial change are easy to transfer to metaphorical expressions.

#### **4. Verbs of quantitative change with dimensional components**

In this section, the verbs of quantitative change will be described in terms of spatial dimension. The meanings of spatial dimension have often been investigated (Leisi, 1961; Greimas, 1966; Bierwisch, 1967; Kunihiro, 1970; Clark, 1973; Hattori, 1968; Miller & Johnson-Laird, 1976; Lyons, 1977; etc.). Although the present study will make use of the relevant findings of the above studies, componential notation will not be applied; this is in order to keep the description simple and clear. Spatial categories which are pertinent to this study are: Length, Distance, Height, Thickness, Depth, Width, Area, Volume, etc.

“ Lengthen ” and “ Shorten ”

These are typical of the one-dimensional space category deriving from nouns and adjectives. Other major verbs of this dimension are “ elongate ”, “ extend ”, “ prolong ”, “ protract ”, “ stretch ”, “ abbreviate ”, “ abridge ”, “ curtail ” and “ contract ”.

The core meaning of “ lengthen ” is [increase]+[length, time], while that of “ shorten ” is [decrease]+[length, time].

Length is usually understood as the linear measurement of distance

from one end of an object to the other. It is sometimes regarded as the longer side of a two-dimensional object, or the longest side of a three-dimensional object. Temporal expressions are natural, since time is also perceived as being one-dimensional.

He lengthened the rope by tying another piece to it. (LDCE)

John shortened his jeans by an inch.

The days begin to lengthen in March.

[He was] forced to shorten his lunch hour because of the pressure of work. (MGS)

“ Prolong ” and “ Protract ”

Both of these derive from Latin and possess the components [increase] + [length, time].

He has instructed his physicians not to take any “ heroic ” measures to prolong his life. (Newsweek, Aug. 12, 1985)

The government decided to prolong the amnesty.

They protracted their stay in London by two weeks.

“ Curtail ”

“ Curtail ” is an approximate opposite of “ prolong and protract ”, though stylistically rather literary and figurative. The core components are [decrease] + [length, time].

Since he is busy preparing for the examination, he had to curtail his holidays.

“ Abbreviate ” and “ Abridge ”

The core meaning of both verbs is [decrease] + [length, time] + [(by cutting)]. Both are restricted to transitive function:

The ceremony, held during the annual Alumni Day, was abbreviated by rain. (N.Y. Times—WEB3)

They are often used metaphorically as follows:

The novel was abbreviated (abridged) for youngsters.

“ Extend ”

The core meaning is [increase]+[length, (area), time]. Although “extend” may be able to express changes in state of objects of two or more dimensions, its typical meaning is close to “lengthen”, and it can often be replaced:

The JNR extended (lengthened) the Shinkansen Line to Morioka city.

Can't you extend your visit for a few days? (OALD)

But “extend” sometimes denotes simultaneous expansion both in the first and second dimensions:

Mr. White extended (\*lengthened) his garden.

“ Stretch ”

“Stretch” possesses the same components as “lengthen”: [increase]+[length, time]:

Tom stretched the rubber band until it broke.

The opponent unduly stretched out the debate.

It should be noted that “stretch” has other typical meanings of its own:

The man stretched the wire between the two posts along the road.

She got out of bed and stretched. (LDCE)

“Stretch” in the former example refers to [to cause to reach between two points] and does not mean lengthening the wire by pulling. The latter can be paraphrased as: She got out of bed and stretched her body to full length. This is close to the central meaning of “lengthen”, although still peripheral.

Most of the verbs of this dimension refer to change in length in terms of time and space. There is, however, another spatial dimension

involved in matters of time and space—namely, distance. One might expect English to possess some verbs having the components [increase] or [decrease]+[distance, time], but it does not, although there are several verbs which imply [to (cause to) become distant or close], such as “approach”, “close”, “near”, and “recede”. None of these fit exactly into the category under discussion. The phenomenon cannot be explained simply as a lexical gap.

Length and distance interrelate in expressing the space between two points but differ in denoting either extent or position. Length is the extent of an object belonging to the first dimension. Distance, by contrast, is a positional relation of one point with another. Thus “lengthen” refers to the change in state of an object, while distance refers to a change in position or locus leading to a consequent change in the degree of separation between two points. This is probably the reason why changes in distance are often expressed by verbs of motion, such as “approach”, “come”, “go (away)”, and by expressions of a “copulative verb plus complement” configuration:

The time will come when you (will) see the result.

The holiday season went quickly.

According to a recent discovery, the nebulae of the universe are getting further away from each other.

Christmas is getting near.

“Heighten” and “Lower”

The core components of these verbs are [increase]+[height] and [decrease]+[height], respectively. Height ordinarily presupposes three-dimensional objects even if they can be measured one-dimensionally. It is primarily based upon the perception of gravity, ground level, and verticality (Clark, 1973; 39):

The building was heightened by another storey. (LDEL)

The water level in the bath is lowering.

“Thicken” and “Thin”

Thickness is a three-dimensionally oriented category as the following example shows:

About the *length* of a video cassette but only four inches *wide* and one-half-inch *thick*, the unit can be slipped into a brief case or jacket pocket. (Newsweek, Aug. 12, 1985)

The core meaning of “thicken” and “thin” are [increase]+[thickness] and [decrease]+[thickness], respectively:

You need to thicken the wall of this hall to get better acoustics.  
One end of a pencil is thinned off to a point.

The second example illustrates that thickness is applicable not only to regular hexahedrons or rectangular solids, but also to cylindrical objects. “Thin” specifically possesses another meaning as in:

Her face thinned because of her long illness.

This “thin” is an antonym of “fatten”. Therefore, “thin” can carry the same component [fatness] as verbs like “attenuate”, “emaciate”, and “slenderize”. In this semantic domain, “thicken” can rarely be used.

The other important meaning of “thicken” and “thin” is concerned with density, and this is more generally observed in present-day English than the meanings mentioned above:

The mist is thickening/thinning.  
The crowd thickened. (LDEL)  
His hair is thinning gradually.

The core components of this domain are [increase] or [decrease]+[density]. Changes in density do not necessarily imply changes in volume, size, or contents. When expressing an increase or decrease in those aspects, such verbs as “inflate”, “swell”, “deflate” tend to be used.



These verbs all belong to the volume dimension in the present study.

“ Deepen ” and “ Shallow ”

The core components of this pair are [increase]+[depth] and [decrease]+[depth]. The COD provides us with an illustrative definition of depth: “ Being deep; measurement from top down, from surface inwards, or from front to back ”. According to this definition, depth refers to both vertical and horizontal distance. This can be seen in such adjectival expressions as “ a deep well ” and “ a deep cupboard ”. The expression “ a deep gash ” exemplifies the meaning of “ from the surface inwards ”.

As far as verbal expressions are concerned, the “ from top downwards ” use is the most typical:

We'll have to deepen the well in order to get more water.

The river channel is deepening. (UED)

The slow current of the silt-laden water shallowed the canal. (E. L. Sabin—WEB3)

“ Deepen and shallow ” in this respect can be considered as the approximate opposites of “ heighten and lower ” when spatial direction is concerned, since both pairs often require ground or water level as the reference level.

“ Widen ” and “ Narrow ”

Both verbs belong to the dimension “ width ”, which refers to a distance from side to side. The core components are, therefore, [increase]+[width] and [decrease]+[width], respectively:

A river widens as it flows towards the sea.

This valley narrows and deepens about 2 kilometres ahead.

“ Broaden ”

In general, “ broaden ” equates with “ widen ”:

The street broadens into an avenue. (WEB3)

It often implies another dimension—"area"—and is likely to be used in a literary context. In this semantic domain of area, "extend", "expand" and "spread"—all of which typically refer to different dimensions—may be used to fill the lexical gap, since the quantitative change of area or plane surface is actually expressed only by such "copulative verb plus complement" configurations as "become (make) longer or smaller".

"Expand", "Inflate" and "Swell"

These three possess such components as [increase]+[volume] in common when their central meanings are realized; in such cases they can replace one another:

A balloon expands (inflates, swells) with gas.

"Swell" may sometimes suggest [by internal force]:

The balloon swelled (out) to bursting point.

"Distend" and "Bloat"

Each has the same components as "swell". "Distend" is a formal substitution of "swell" and may be accompanied by the subordinate component [beyond normal limits]:

The stomach was distended by malnutrition.

"Bloat", having unpleasant implications, may carry the subordinate component [abnormally]:

Cucumbers sometimes bloat me. (WEB3)

"Dilate"

"Dilate" is another substitute for "expand" and "distend". As it often refers to two-dimensional expansion, the core meaning is [(increase)+[(volume), (diameter)]]:

Her eyes dilated in terror when she saw that horrible accident.

“ Bulge ”

“ Bulge ” refers to swelling out:

His pockets were bulging with presents. (LDCE)

My stomach's bulging with all the food I've eaten. (CULD)

The components are [increase]+[volume]+[by internal force, (partially)]. It can be seen from the examples that it refers to the curving outward of a part of an object and can be replaced by the more technical “ protuberate ” in an intransitive meaning.

“ Contract and Deflate ”

These are the approximate opposites of “ expand ”, “ dilate ”, “ inflate ” and “ swell ”; therefore, the components of both are [decrease]+[volume]:

A balloon contracts (deflates) when gas is released.

There are several less typical verbs of quantitative change in terms of volume, such as “ compress ”, “ condense ”, “ shrink ”, “ shrivel ”, “ wither ” and “ wizen ”. “ Compress ” and “ condense ” do not necessarily refer to change in cubic measure and often overlap with “ thicken ” in expressing density. The other four verbs may refer to change in volume, but are less typical than other verbs of quantitative change in cubic measure.

## 5. Conclusion

Needless to say, the description of verbs of quantitative change in this study is incomplete; however, although the notation and choice of components may be usefully revised, it is to be hoped that this paper has effectively argued for the existence of a semantic field of increase and decrease, as well as a verb group semantically connected by the common features discussed above. Further study on syntactic elements pervasive in the verb group will make the description more precise and thorough, but that is beyond the scope of the present study.

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