

THE MOLECULAR LEVEL OF LEXICAL SEMANTICS

Eugene A. Nida

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Abstract

Although most publications dealing with lexical semantics during the last twenty-five years have recognized the role of contexts in determining the meaning of lexical units, this paper goes beyond such modest claims and takes the position that (1) there is no meaning of a lexical item apart from some context, linguistic or cultural, and (2) the relevant conceptual level consists of a focal term and the corresponding context. The paper concludes with a sample dictionary entry for *run* as an activity/event.

Modern dictionaries are paying more and more attention to words in context, for example, Longman's *Language Activator Dictionary*, the *Word Selector* series published by Cambridge Press, and the Collins Cobuild series. This focus on words in phrases is even more prominent in *El Inglés Jurídico* by Enrique Alcaraz Varo (1994), where in four pages selected at random only twelve of eighty-five entries are single words, and in the *Diccionario de terminos económicos, financieros y comerciales* by Alcaraz and Hughes (1996) most key terms are treated as parts of phrases. For example, the term *index* is treated only once as a single term, but twenty-eight times as an integral part of a phrase.

An even more significant development is the work of terminologists working with translators in the European Community. At first, most terminologists did little more than provide glossaries of terms with specialized meanings in the areas of commerce, jurisprudence, political science, and technology, but translators found such specialized glossaries inadequate. As a result

terminologists began using longer and longer phrases so as to provide translators with more extensive contexts in order to indicate more clearly the meanings of combinations of words. At present a number of data banks employ phrases with seven to nine terms so as to pin down the relevant area of meaning of specialized terminology.

A number of seminal books and articles have also indicated some of the underlying problems in present approaches to lexical meaning, e.g. Dwight Bolinger's article on "The atomization of meaning" (1965), Paul Friedrich's *Language, Context, and the Imagination* (1979), Martin Joos' "Semantic axiom number one" (1972), George Lakoff and Mark Johnson's *Metaphors We Live By* (1980), Geoffrey N. Leech's *Semantics* (1974), (1977), and Anna Wierzbicka's *Semantic Primitives* (1972). These publications have been particularly important in pointing out some of the failures and limitations in traditional lexicographical practice and have suggested both directly and indirectly that much greater attention must be given to the role of contexts.

Although most publications dealing with lexical semantics during the last twenty-five years have recognized the role of contexts in determining the meaning of lexical units, this paper goes beyond such modest claims and takes the position that (1) there is no meaning of a lexical item apart from some context, linguistic or cultural, and (2) the relevant conceptual level consists of a focal term and the corresponding context.

All this should tell us something about the need for examining more carefully the relevant levels of lexical semantics, especially in view of words in context as the basis of concepts. But before examining specific examples of a word in combination with other words, it is important to review briefly a number of fundamental factors in determining lexical meaning.

1. The meanings of words are largely known from syntagmatic contexts, that is, from accompanying terms that help to define meanings by indicating the types of contexts in which such words may occur. Persons may have an active vocabulary of ten thousand words and a passive vocabulary of twice that much, without ever having looked up a single word in a dictionary. In fact, the verbal inventory of illiterate people is often astonishingly large. They not only understand the meanings of words but they also know precisely the contexts in which they fit.

The relevant syntagmatic contexts need not be words in the same sentence or even paragraph. How a person has used particular words in other texts and on other occasions is also relevant. In fact, much can also be learned from texts by other persons who have written about similar themes. The syntagmatic contexts are as wide as the use of language.

A few people also learn something about the meanings of certain terms by noting distinctive differences of meaning when different words occur in the same or similar syntagmatic contexts. These so-called "paradigmatic contrasts" can be significant for analytical purposes because one can compare the occurrences of such terms as *run* and *walk* by noting the differences in

such statements as *he was running around the track* and *he was walking around the track*. But the contrast is not simply the words *running* and *walking*, since these two words already occur in the same syntagmatic context. Paradigmatic contrasts are always secondary to syntagmatic contexts, because they depend upon these syntagmatic contexts to provide a basis for determining similarity and contrast. And although paradigmatic sets are very useful for lexical semanticists, they are not the primary means by which people master the appropriate use of the lexical resources of a language.

2. The areas of meaning of a term are defined by other terms, and these defining terms must also be defined by still other terms, and these additional terms by even further words and phrases. Accordingly, there is no absolute definition of any verbal unit, because a word is only one element within a comprehensive system and because each element must depend on all other elements in the system. In a sense, we can not completely know the meaning of any item until we know the meanings of all items, but this dependency presents a seemingly unsolvable problem. Although the process of defining terms is seemingly circular, it is hopefully spiral and in this way capable of providing increasing breadth of insight.

A further complicating factor for research in lexical semantics is the fact that no one person ever controls a language completely. This makes language a distinctly shared and interactive phenomenon. But the additional fact that every language is constantly in the process of change makes all analyses essentially tentative.

3. The referents of lexemes of any language represent primarily the different elements of a culture, which may be defined as the totality of beliefs and practices of a society. There may, of course, be subcultures within a particular culture, and in fact most large language-cultures are heterogeneous. But the structures and classes of a language are no more regular or logical than those of the culture that they reflect.

Both cultural practices and language patterns are rational, that is, we can state after the event the apparent reasons for cultural events and language use. But this does not mean that human behavior and the system of a language are logical in the technical sense of this term. Human behavior can be even self-destructive and language patterns may be strangely illogical, e.g. the fronting of the negative in English, e.g. *He didn't want to come*, when in reality what the person wanted was not to come.

4. Many people mistakenly imagine that languages "exist" in dictionaries and grammars, but such books are only limited attempts to describe some of the more obvious features of a language. Languages really exist only in people's minds, not, however, as mental images (a popular idea in the past), but as intricate series of neural synapses that can be readily activated. In fact, as Damasio and Damasio (1992) have indicated, there are probably three sets of neural networks that are involved in language: (a) an input-output set of neural templates in the left hemisphere of most right-handed

persons, (b) a conceptual network in the conceptual area of the brain, and (c) a mediating network that links the input-output set with the conceptual network.

5. In order to understand how languages function, it is important to recognize both formal and referential classes, and the two are not necessarily coordinate. In Indo-European languages there are a number of formal classes of words: nouns, pronouns, adjectives, articles, verbs, adverbs, participles, prepositions, particles, and conjunctions, and in many other families of languages there are similar types of formal classes, although in some languages there are a number of basic differences. For example, what seem so obviously adjectives in English, e.g. *red*, *sick*, *happy*, are verbs in many Bantu languages, and the common coordinating conjunction in Maya is actually a possessed noun. But the most fundamental distinctions in languages are the differences between formal and referential classes. Certain referential classes exist in all languages because these reflect the manner in which humans experience reality, but the referential aspects of language do not necessarily coincide with the formal classes. For example, *his arrival* and *he arrived* refer to an entity participating in an event, although in the first case the event is represented by a noun and in the second case by a verb. In certain phrases, the distinction between formal and referential classes is even more obvious. For example, in the phrase *good dancer* the characteristic suggested by *good* does not refer to the person as a moral individual, but to the activity of dancing. The term *dancer* belongs to two different referential classes: entities and activities. Compare also *excellent musician* and *molecular biologist*. The term *excellent* qualifies the activity of producing music, and *molecular* is not a characteristic of the *biologist*, but a reference to the entities with which the biologist works. The terms *musician* and *biologist* must be recognized as being referentially complex because they refer to entities and to activities.

The basic referential classes include (1) entities (both numerable and mass), e.g. *person*, *machine*, *sugar*, *lake*, *chair*, (2) activities (also often referred to as events), e.g. *run*, *walk*, *think*, *eat*, *fight*, (3) states (usually the result of activities), e.g. *sick*, *dead*, *happy*, *tired*, (4) processes (changes of state or characteristics), e.g. *die*, *improve*, *complete*, *beautify*, (5) characteristics (inherent features), e.g. *tall*, *round*, *heavy*, *green*, and (6) links (or relationals) that link words and sets of words, e.g. *and*, *or*, *because*, *during*, *in order to*, *furthermore*. Most of these linking words are semantically complex in that they not only serve to relate words to each other, but they may also express certain characteristics, e.g. *during* in *during the cavalry attack*, (linkage and time), but some links are mere markers of grammatical relations, e.g. the conjunction *that* which optionally introduces indirect discourse, e.g. *he said that he would go* and *he said he would go*.

As Joos (1972) has so clearly pointed out, in any symbolic system the role of the context is maximized and the role of focal elements is minimized.

That is to say, the context actually contributes more to the meaning of particular lexical units than the units themselves. Since the relevant contexts of a word may consist of a number of diverse words, it is only reasonable that the contexts would be a major contributor to the meaning of any verbal sequence. The implications of this principle have already been indicated in the second principle stated in this section, but it will be further explained in the examples in the following section.

An example of the molecular level of lexical semantics

In the *Random House Dictionary of the English Language*, Second Edition Unabridged (1987), which is more linguistically sophisticated than most dictionaries, the word *run* is listed as having 97 meanings as a verb, with additional occurrences in 25 idioms, and 49 meanings as a noun, with 5 additional occurrences in idioms, and two uses as an adjective, e.g. *a running battle*. But this listing of many different "meanings" is misleading. All of these "meanings" are primarily different contexts in which *run* occurs in English. Accordingly, on the basis of types of contexts the actual distinctive usages are reduced to about fifteen, or sixteen, depending upon the so-called "delicacy" of the classificatory grid.

The canonical or prototypical context for *run* involves such contexts as *the man was running* and *the horse was running*, and the definition of the meaning of *run* in such contexts is usually given as "rapid movement in space by an animate being using the lower limbs in such a way that for repeated instances no foot is in touch with the supporting surface." This type of definition seems to work well in many cases, but what about the statement *the crab was running along the beach*, in which at least two feet are touching the supporting surface at any one instant of time? Or what about the statement *the snake ran across the lawn*? There are no feet, and the body is in touch with the surface continuously. And yet for most speakers this rapid movement of a snake seems to "fit" with that of quite different animate creatures.

The meaning of *run* becomes more problematic in contexts involving aquatic creatures, e.g. *the salmon are running*, *the grunion are running*, *the blue fish are running*. With these fish there is not only movement in water, but the focus is usually on the extensive numbers of fish, the fact that the movement may be related to breeding, and in some cases the implication is that the fish are biting. There is no way to decide definitively whether the movement of terrestrial or aquatic creatures should be combined or separated. And even if such movements are combined, one must also recognize their differences, and if they are separated by some sort of logical manipulation, certain similarities still persist. The real world and the language world are both fascinatingly untidy.

Another set of contexts involving *run* seems even more marginal. For example, one often hears such statements as *he ran over to the store to get*

some ice cream or *she ran to the neighbors to borrow some sugar*. In neither statement is the person likely to have physically run. Rather, the meaning of the entire expression suggests that the movement was for a relatively short period of time and probably did not involve actual running. In American society it would almost certainly have been by car or by walking rapidly.

There are also a number of contexts in which continuous internal movement takes place, but it is also referred to as *running*, e.g. *the motor is running*, *the clock is running*, *his heart is still running*, *the machine stopped running*. We realize that the contexts involving a motor, a clock, a heart, and a machine indicate rather different kinds of running, but for most people the similarities outweigh the differences and so these somewhat different movements seem to be related. It is important to realize, however, that every different combination of words involves at least some distinctions in meaning. In fact, a word such as *run* never makes precisely the same semantic contribution in two different contexts. Nevertheless, we feel intellectually compelled to note similarities and differences in the meanings of words as we do for the differences and similarities of sounds and of distinctions in grammar.

Any round or semi-round object may run down a slope because of the force of gravity or some initial thrust, e.g. *the boulder ran down the side of the hill*, *the wheel ran into the ditch*.

One can also speak of vehicular movement, often with an additional feature of being scheduled, e.g. *the bus runs from New York to Washington D.C.*, *the ship runs from Hong Kong to Seattle*, *the train runs fast*, and even *a plane runs from New York to Phoenix*. In all these contexts the movement is also quite different, and though previously most people spoke of planes flying from one place to another, the pressure of the pattern for vehicular travel has extended the range of usage of *run* to airplanes.

The functioning of institutions may also be referred to by the verb *run*, e.g. *this business runs efficiently*, *this enterprise runs poorly*, and *this office is run by three women*. Clearly, the nature of the *running* is somewhat different in each case, but the contexts are sufficiently alike so that speakers sense that there is considerable similarity in what is being talked about.

In some contexts movement may be referred to directly or indirectly. For example, in the context *the water is running* the reference to movement is direct, because the water is actually moving, but in the statement *the faucet is running* the movement is indirect. The faucet does not move, but the water normally associated with a faucet does move. Compare also the statement *his nose is running*. But note also certain movements of a dry mass, e.g. *the flour is running into the bin*, *the sand runs in very slowly*.

Closely related to the running of a liquid is the loss of color in dyed fabrics when being washed, e.g. *the color ran and ruined the blouse*, *most dyed fabrics run*.

In some sets of contexts, however, the states or processes are very different, e.g. *the line ran off the page, the play ran for five weeks, the bill runs to 59 dollars*. There is no movement, but rather a state of extension, and in some instances there may be a combined meaning of movement and extension, e.g. *the red climbing rose ran all the way along the fence*, in which case the focus may be on the growth or on the resulting state.

In addition to these rather wide-ranging types of contexts, *run* also occurs in a number of restricted contexts. For example, the process of publication is often indicated by means of the verb *run*, e.g. *the book was run on a German press, he ran 3,000 copies of the monograph*. And the use of *run* in contexts involving elections is, however, relatively common, e.g. *he is running for reelection, they are running him for the job of mayor of the town*.

The process of change in state involves a number of contexts, e.g. *the cow ran dry, the funds ran low*, but *run* also occurs in contexts indicating a continuation of a state, e.g. *he is running a fever* and *the machine always runs hot*.

The unraveling of knitted wear also occurs in contexts having *run*, e.g. *her stocking is running, the sleeve of his sweater is running*.

One rather limited context involves *run* referring to the activity of tending cattle, e.g. *he is running 600 head of cattle on his ranch*.

There are undoubtedly some additional minor types of contexts in which the verb *run* may occur, but what is important about the above set of different types of contexts is the fact that the resulting concepts are in each case the result of a combination of *run* and the contexts. The verb *run* apart from some context really has no meaning, and what meaning it has is a combined meaning of the focal verb *run* and the various types of contexts.

Some persons find such a series of uses of *run* somewhat confusing, because of the traditional view that a word has an inherent number of different meanings and that the context in each case points to the appropriate meaning. But the reality is quite different. The different meanings are the result of combinations of the focal unit *run* and the diverse contexts.

This view of language permits a semantic analyst to move up from the atomic level of isolated words to the molecular level of words in combinations. Furthermore, classifications need not be neat pigeon holes, because the enormous variability of human experience cannot be categorized in this manner. Modern science is concerned more with constellations of relations and with so-called "family resemblances". The Aristotelian view of rigid yes/no classifications is no longer appropriate for a modern view of the reality of either form or content.

Most of these uses of *run* can also occur in causative constructions, either with or without a causal verb, e.g. *he ran the horse* and *he made the horse run*. In all such causative expressions there are always two events: what the causative agent does to cause the running and the actual running by an animate being, a mechanism, or an institution, e.g. *he ran the horse in the*

second race, they ran the machine, he runs a truck to town each Friday, he runs the business very efficiently, he ran the line off the page.

The term *run* also occurs as a noun, e.g. *his run each morning*, in which *run* is referentially an activity, while in the statement *he built a run for his chickens* the word *run* is an entity, i.e. what was built, but there is an implied activity, i.e. what the chickens will presumably do. However, in the statement *he lives up the run* the reference is only to a relatively narrow valley, while in the context *the run overflowed its banks* the reference is to a particular stream.

There are, however, further problems in connection with *run* because there are contexts which are ambiguous. For example, the statement *he ran into the house* can mean that he used two limbs to run physically inside of a house, but if a wider context indicates that he was driving an automobile, then it is the impact of the auto against the house that is being referred to. Similarly, the statement *he ran into his friend in the parking lot* can refer to an accident, but it is much more likely to refer to greeting his friend, in which case the phrase *ran into* must be treated as an idiom, since the combination refers neither to running nor to an entrance into an entity. Note also the idiom *run down* in the statement *they are constantly running down the opposition* and the figurative use of *run* in *she runs her husband*.

The use of *run* in baseball involves a large semantic gap in a phrase such as *he hit a run*. What was hit was a baseball, but it was hit far enough so that the batter was able to touch all three bases and return home to score a point for the team.

One can also argue that the meaning of a word is only the minimal amount that such a word contributes to the meaning as a whole, but it is much more relevant to think of meaning as always being a combined meaning of the focal element and the context, because this is the primary basis for the intended concept. And since the context contributes so much to the lexical combinations, it seems much more relevant to classify contexts rather than the presumed semantic differences as being the "possession" of particular lexical items. It is this focus on the context mentioned in the first part of this article that seems to suggest the relevance of lexical meaning classified primarily by types of contexts. This approach becomes all the more relevant when people realize that this combinative approach correlates so much better with the use of paradigmatic sets.

Although the traditional practice of assigning a number of meanings to a word and then leaving the distinguishing features to the contexts seems so easy and natural in view of traditional dictionary practice, it is much more relevant to move up from a focus on the atomic level of individual words to a level of words in combination, the molecular level. As in physiology, the focus is not primarily on the atoms but on the distinctive molecular combinations of atoms, because the vital processes are matters of activity on the molecular level. The analogy between physiology and lexicology is

applicable to language in that the conceptual level is predominantly a matter of combinations of lexical items.

This approach to lexical semantics reverses the trend to set up distinctive features based largely on the referents of words (a level which might be called subatomic) by shifting to a higher level of meaning, namely, the conceptual level. And in order to proceed systematically with lexical meaning in this way, the following procedures may prove useful: (1) determine the referential class or classes of the terms in each phrase containing a focal element and the context, (2) analyze the semantic relations between these terms, (3) test for any overlooked combinations existing in any applicable data base, (4) classify the combinative meanings on the basis of the focal elements and the related contexts, and (5) add such relevant information, e.g. potential problems of ambiguity or obscurity, as may be useful to the user of such information.

Sample of a dictionary entry for *run* as an activity/event

In the following series various types of *running* are illustrated in groups that seem to share certain important features, but the complexity and diversity of contextual elements preclude any rigid classification. In addition the letter (c 'causative') in parentheses is added with those contextual elements that may occur in "transitive constructions", in which the so-called "object" of the verb actually does the running, e.g. *the owner ran his horse in the second race*.

1. *run* + terrestrial animals, e.g. *man(c)*, *dog(c)*, *camel(c)*, *spider*, *crab*, *snake*; relatively fast movement by using the legs (except in the case of a snake), e.g. *his run was before breakfast*, *they ran the camels in a mock battle*, *the snake ran across the grass*.
2. *run* + marine animals, e.g. *salmon*, *cod*, *tuna*, *blue fish*, and in some cases related specifically to egg-laying (*salmon*, *grunion*); swimming in schools and/or in large numbers, e.g. *the tuna are running*, *the bluefish are running*.
3. *run* + rapid or brief period of movement without running, e.g. *she ran to the neighbors to borrow some sugar*, *he ran down town to get a special edition of the newspaper*; rapid movement, for a limited period of time, usually involving a return and without actual running.
4. *run* + mechanical devices, e.g. *clock(c)*, *engine(c)*, *motor(c)*, *pump(c)*, *windmill(c)*, as well as a machine-like organ, the *heart*; primarily internal movement, e.g. *the clock stopped running*, *he ran the motor too fast*, *the pump is still running*.
5. *run* + a more or less round or spherical entity, e.g. *tire(c)*, *ball(c)*, *wheel(c)*, *boulder*; the action of rolling down or along a surface, e.g. *the tire kept running down the hill*, *the boulder ran all the way down the mountain*.

6. *run* + a self-propelled mechanical device, e.g. *car(c)*, *bus(c)*, *boat(c)*, *train(c)*, *plane(c)*; spatial movement of a self-propelled vehicle, often with the implication of regular schedule, e.g. *he ran the car too fast*, *the boat ran up onto the beach*, *planes run regularly between London and Moscow*.
7. *run* + an organization, e.g. *business(c)*, *enterprise(c)*, *office(c)*, *government(c)*; functioning of an organized activity, e.g. *the business runs very efficiently*, *he runs the office by working nights*, *they run the government by controlling the party structure*.
8. *run* + a mass, as well as instruments associated with masses, e.g. *water(c)*, *syrup*, *flour*, *hose(c)*, *nose*; movement of a liquid or dry mass, e.g. *he ran water on the lawn*, *he ran flour out of the bag*, *his nose is running*.
9. *run* + color of dyed fabric, e.g. *the color ran and ruined the blouse*, *the dye ran*.
10. *run* + expressions involving extension, e.g. *play(c)*, *line(c)*, *vine(c)*, *bill(c)*; extension in time, space, and quantity, e.g. *the play ran for three months*, *he ran the line off the page*, *the vine ran over the fence*, *the bill ran to 500 dollars*.
11. *run* + references to printing, e.g. *print*, *press*, *copies*, *book*, *brochure*; the printing or publication of texts, e.g. *he ran the book on a German press*, *he ran 3,000 copies*, *a print run of 3,000 copies*, *the press ran the brochure on glossy paper*. This use of *run* is undoubtedly related to expressions such as "he ran the press," an illustration of combinative meaning 4.
12. *run* + an electoral process, e.g. *for office(c)*, *for election(c)*, *for mayor(c)*, *for president(c)*; seeking an elective office, e.g. *he ran for mayor of town*, *they ran him for president of the association*. It is possible that *ran for* should be considered as a low-grade idiom.
13. *run* + terminal states such as *dry*, *low*, e.g. *the cow ran dry*, *the funds ran low*; a change of state, equivalent to *become*.
14. *run* + knitted wear, e.g. *stocking*, *sweater*; the unraveling of knitted wear, e.g. *her stocking is running*, *the sleeve of his sweater is running*.
15. *run* + a continuous state such as *fever*, *hot*, e.g. *the child is running a fever*, *the motor runs hot*.
16. *run* + cattle(c), sheep(c), e.g. *he is running 600 head of cattle on his ranch*, *2,000 sheep are running on his one thousand acres*.

Not only is this type of treatment of certain meanings of *run* more economical, but it also highlights relations which are often obscured by the manner in which traditional dictionaries deal with the role of context in contributing to meaning. This type of system is unusually valuable to the person who uses a dictionary to understand an existing usage, but it is even more helpful to the person who wants to determine the range of usage of a particular term.

The relevance of different contexts may seem obvious in the case of lexical units with multiple meanings, but what about highly technical terms in which more than one meaning seems to be rare or simply non-existent? The term *parthenogenesis* might well be cited as such a term meaning “birth by a virgin”, and so what is the relevance of contexts? But this term does occur in two quite different types of contexts: (1) humans or semihumans in the Greek and Roman religious legends and in the Christian tradition of the birth of Jesus, and (2) an important stage in the development of some insects, e.g. aphids, that reproduce by parthenogenesis when it is not necessary to fly to another source of food. But the term *parthenogenesis* contains a built-in context, namely, “birth by a virgin”. These two types of contexts are certainly relevant.

Although at first glance this combinative approach to lexical meaning may appear to be either radical or totally unnecessary, it is neither. It only tries to do justice to what is really happening in lexicology, in which increasingly the roles of contexts are being recognized as crucial. Formalizing such relations in lexicography could serve an important purpose of helping people realize the combinative nature of lexical meaning.

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