Meaning is at once the most obvious and most mysterious feature of human language. We can’t claim to know a language without knowing the meanings of words and yet more than 3,000 years of speculation by philosophers and linguists has failed to provide a theory of meaning. In this section we investigate whether Alice or Humpty Dumpty has a better theory of meaning. We devise several semantic tests for different theories of meaning. We end with some examples of a linguistic approach to the study of meaning.

Alice v. Humpty

What are the main features of Alice’s theory of word meaning?
What are the main features of Humpty’s theory of word meaning?

Reference Theories of Word Meaning

Alice’s main concern is with the relation between meaning and reference. Ask anyone about the meaning of a common noun such as chair or carburetor and chances are they will point to an instance of such an object if it is handy. This type of [ostensive definition](#) satisfies our intuitions about what words mean by pointing to something the word denotes, and has prominent advocates.
such as John Stuart Mill. Does reference provide a valid theory of meaning?

Reference theories of meaning define the meaning of words or phrases in terms of the things (or actions, qualities, relations, etc.) that the word or phrase denotes. If we ask someone for a cup and they hand us a sponge, we are apt to think they did not understand the word cup. More precisely, we can equate the meaning of a noun with the set of things that are that object.

\[
\text{CUP} = \text{the set of things that are cups} \\
\text{SPONGE} = \text{the set of things that are sponges}
\]

Verbs, other words and even sentences can be defined in terms of their reference sets as well.

\[
\text{RUN} = \text{the set of things that run} \\
\text{BARK} = \text{the set of things that bark}
\]

\[
\text{JOHN RUNS} = \text{true if and only if John is one of the things that runs} \\
\text{MARY BARKS} = \text{false if and only if Mary is not one of the things that barks}
\]

Reference theories of meaning define meaning in terms of the semantic extension of a word or phrase. The semantic extension of a word or phrase is the set of things, actions, etc. that define the reference or the word or phrase. The semantic extension of a declarative sentence is its truth value.

Just to keep things straight, I will put a word in italics when I mention it and will use capital letters to refer to the meaning of a word. So CUP stands for the meaning of the word cup. A cup is the thing referred to by the English word cup.

A Compositional Theory

One goal of semantic theory is to show how the meaning of sentences can be constructed from the meanings of the parts of the sentence. Extensional semantics provides a simple semantic framework for composing the meaning of a sentence from the meaning of its parts. The following is an example of a compositional theory based on the extensional semantics for a fragment of English.

The Lexicon

\[
\begin{align*}
\text{John} & \quad \text{SV}(\text{John}) & = & \text{John} \\
\text{Mary} & \quad \text{SV}(\text{Mary}) & = & \text{Mary} \\
\text{barks} & \quad \text{SV}(\text{barks}) & = & \text{the set of creatures that bark} \\
\text{runs} & \quad \text{SV}(\text{runs}) & = & \text{the set of creatures that run}
\end{align*}
\]

The Syntax
The semantic valuation (SVal) for the sentence (its interpretation) is given by checking to see if the named creature is a member of the set specified by the verb, i.e.:

\[
(1) \text{SVal}(S) = \text{true} \iff \text{SVal(name)} \in \text{SVal(IV)}
\]

The syntax produces a sentence such as:

\[
\text{Mary barks.}
\]

We can interpret this sentence by applying the semantic valuation rule (1) to it:

\[
\text{SVal(Mary barks)} = \text{true} \iff \text{SVal(Mary)} \in \text{SVal(barks)}
\]

This statement is just a formal way of stating the ordinary sentence:

\[
\text{Mary barks is true if and only if Mary is a member of the set of things that bark.}
\]

What happens when you add the word *and* to the lexicon?

**Testing Reference Theories of Meaning**

**Problem 1: Words without a Semantic Extension**

A reference theory of meaning accounts for our ability to point to the things that words denote, but it has critical shortcomings. Not all words or phrases have a semantic extension in the real world, e.g. *unicorn*, *witch*, *phlogiston*, and *nothing*. The meaning of verbs would change continuously as, for example, some organisms stop running and others start running. We are investigating whether the word *meaning* has a semantic extension. Sentences create other contexts in which words are used in non-referential expressions.

\[
\text{No dog misses a treat.}
\]

\[
\text{Where did you find your cat?}
\]

How do such words and sentences invalidate reference as a theory of meaning?

**Problem 2: Referential Change**

The things that words refer to seem to be changing constantly. A good example of this change is the name of a town, e.g., *Lawrence*. Lawrence has been continuously expanding since its beginning. It was burnt to the ground once and rose from its ashes. Individual buildings in the
town are constantly changing shape and color. The entity denoted by the name *Lawrence* is not the same from one day to the next. A strict interpretation of a reference theory of meaning would predict that the meanings of most names is constantly changing.

The philosopher *Hilary Putnam* pointed to an interesting case of semantic change in scientific theories. One of the major advances in physics occurred when Newton equated momentum with the product of mass and velocity. We say that Newton defined momentum as mass times velocity. This equation held true until Einstein predicted that it would break down for objects at relativistic speeds. Einstein redefined momentum by adding a relativistic adjustment to Newton’s original equation. Intuitively, we feel that Newton and Einstein were talking about the same concept, but a strict referential theory of meaning would claim that they were talking about different things.

Pluto was demoted from planet to dwarf planet by the International Astronomical Union in 2006.

**Problem 3: Semantic Expertise**

Putnam alleges that many people cannot pick out the referents for all the words they use. He claims that he cannot tell the difference between beech trees and elms even though he has used the words *beech* and *elm* for most of his life. A referential theory of meaning suggests that anyone would know the difference if they knew the words *beech* and *elm*. How would you define the difference between the meanings of the words *walk*, *amble*, *shuffle*, *saunter*, *stroll*, *slouch*, *slink*, *slip* and *mosey*?

**Other Reference Theories of Meaning**

To this point we have evaluated a simple reference theory that equates meaning with semantic extensions in the real world. Other reference theories equate meaning with other types of semantic extensions. The following sections discuss a few of these other reference theories.

1. **Mental Images**

If Frege is correct then meaning is something more than reference. The philosopher *John Locke* proposed equating meaning with the pictures of objects in our mind. While this idea has a certain appeal, it also suffers from a number of problems.

**Problem 1: Internal Reference**

If we use mental images of objects as the basis for meaning then we are equating meaning with mental referents rather than external referents. To the extent that our mental images for *morning star* are similar to *evening star* then we just have a mental image version of a referential theory of meaning. To the extent that our mental images are different for these two concepts, we would need to add a new component to the mental images to explain why these phrases have the same referent.
Problem 2: Different Images

A mental image theory cannot insure that speakers of the same language carry the same mental image for any given concept. To the extent that one speaker’s mental image for grandmother is different from that of another speaker, the theory cannot explain our ability to communicate via language.

A mental image theory predicts the possibility that every speaker has their own private language. The philosopher Wittgenstein pointed out that it would be impossible to prove that someone had a private language to the extent that it was private.

2. Prototypes

Wittgenstein offered his own version of a mental image theory built around prototypes. The idea is that we only require a family resemblance between objects to consider them the same. Wittgenstein pointed out that words like game refer to many different types of contests which lack any common features across their whole range of use. A game may involve multiple players or just one. The players may play strictly for enjoyment or profit. We recognize what counts as a game because it has one or more features of a game. Prototypical games have most of what we think of as game features.

Problem 1: Prototype Reference

Prototype theories of meaning are based on reference to a prototype. Prototype theories encounter all the problems that we discussed for reference theories. How would you apply Frege’s Morning Star/Evening Star critique to a prototype theory of reference?

Problem 2: Non-prototypical Examples

Although many experiments suggest that we recognize prototypical members of a category faster than we recognize non-prototypical members, and recall prototypical members faster as well, we still include non-prototypical members in every semantic category. The set of dogs includes Chihuahuas and Great Danes in addition to Labradors and retrievers. All prime numbers are prime numbers even though 3 and 7 may be prototypical primes. Prototype theory does not explain how we draw the boundaries between different concepts rather than just recognizing the most typical members.

Problem 3: Prototypical Features

Prototype theories typically rely on a list of features that speakers use to define the prototype for any concept. Prototypical features for a bird, for example, include a beak, wings, flight and feathers. We recognize a prototypical bird to the extent that it has most of the prototypical features. This process invites the question of how we recognize the prototypical features of birds. They would be features that we observe on prototypical birds. We then have a circular definition that relies on prototypical features to define the prototype, but also relies on the prototype to define its prototypical features.
Problem 4: Combining Features

A theory of meaning has to predict how the meanings of individual words combine to produce the meaning of a phrase. Prototype theories of meaning lack the ability to predict how to combine the meanings of words. For example, prototypes for the word pet would include dogs and cats. Prototypes for the word fish would include salmon and trout. But these prototypes do not predict the prototype for the phrase pet fish.

3. Semantic Features

If mental images do not supply the critical distinctions necessary for meaning another possibility would be that humans rely on a set of innate semantic features to construct meaning. The philosopher, Jerry Fodor, maintains this Language of Thought is the only explanation of our ability to communicate ideas. The innate semantic features would be akin to a table of atomic elements. Once we define each semantic element, we will be able to explore how they combine to produce meaning. Needless to say, the theory of innate semantic features also runs into reference difficulties.

Problem 1: Feature Reference

Semantic Feature theories must explain how speakers fix the reference of each feature. Lyons (1973) pointed out that semantic features never seem to provide enough power to explain word meaning. A theory that tells us the meaning of mare has the feature ANIMAL won’t take us very far if the theory doesn’t supply a meaning for ANIMAL. If the feature theory uses reference to fix the meaning for ANIMAL, it is just another type of reference theory with an intermediate mental vocabulary. We might assume, with Fodor, that ANIMAL refers to a mental concept or brain state. Does this version of feature theory evade Frege’s problem?

Problem 2: Feature Arbitrariness

Semantic feature theories have been criticized for their arbitrary nature (Burling, American Anthropologist 1964 ‘God’s truth or hocus pocus?’). Does the meaning of the word man contain a semantic feature [+MALE] or the feature [-FEMALE]. Either feature would allow you to distinguish the meanings of the words man and woman, but there is no reason to prefer [+MALE] over [-FEMALE].

Mathematicians have devised various definitions for the concept NUMBER. Dedikine proposed a ‘cut’ in the number line, while Russell & White proposed a definition using set theory. Both definitions are equally valid, but we have no reason to prefer one over the other.

Semantic Intension

In the book Naming and Necessity, Kripke discusses the meaning of words that are introduced by definition. A meter, for example, was defined by reference to the length of a certain bar S in Paris. The kilogram, likewise, is defined by the weight of a certain lump of metal in Paris.

The difficulty with such definitions is that real objects change their properties over time, whereas
the concepts referred to by the words *meter* and *kilogram* are expected to have uniform properties no matter what external factors are in play, e.g. the time, temperature, humidity, air pressure, phase of the moon, etc.

Kripke distinguishes the use of the bar S to give the meaning of *meter* from its use to fix the reference of *meter*. Kripke states that fixing the reference of meter is accomplished by reference to an accidental property of the bar S – its semantic extension. Kripke claims that the word *meter* rigidly designates a certain length in all possible worlds – its semantic intension. The extension of *meter* is the length equal to that of the bar S, whereas the intension of *meter* is a fixed length in all possible worlds (and not the length of the bar S in all possible worlds).

The semantic extension of a word is the set of things the word denotes, while its semantic intension is the concept or meaning of the word. The meaning of a word determines the things it refers to, but it cannot be equated with its reference. One way to think of semantic intension is as a mode of presentation or a small story. Two phrases with the same reference such as *Barack Obama* and *the president of the United States* provide different presentations or stories about the same referent. In cases like *Hesperus* and *Phosphorus*, we may not know that the perspectives have the same referent. In cases like *unicorns* and *phoenixes*, we may have perspectives without real referents. In cases like *elms* and *lychees*, we have perspectives with vague referents.

### Biological Nomenclature

Scientific terms provide a rich set of examples that illustrate the distinction between extension and intension. The general approach is to use an accidental correspondence to some object to fix the reference of a scientific ideal. The Linnaean system of nomenclature is established on the basis of this correspondence. Linnaeus’s system begins with the definition of a species as the basic biological unit. As described by Stephen Jay Gould:

Linnaeus’s binomial method has been used, ever since his *Systema Naturae* (first edition published in 1735, definitive edition for animal taxonomy in 1758), as the official basis for naming organisms. Linnaeus gave each species a two-word (or binomial) name, the first (with a capital letter) representing its genus (and potentially shared with other closely related species), and the second (called the trivial name and beginning with a lowercase letter) as the unique and distinctive marker of a species. (Dogs and wolves both reside in the genus *Canis*, but each must have a separate trivial name to designate the species—*Canis familiaris* and *Canis lupus* respectively, in this case.) (1995:421-422).

Gould notes that Linnaeus’s system derives from a pre-existing convention of naming species by a string of Latin words that list their distinctive features. (In this system, the first word was capitalized since it comes at the beginning of the phrase!) Note how the pre-existing naming convention used the description to give the meaning of the name.

Linnaeus simplified this system by shortening the phrase to just two words. At first he regretted jettising the previous convention of using descriptive phrases, but he eventually realized his binomial convention establishes a name for each species rather than a description. A name establishes a semantic intension, whereas a description refers to extensions of the name. Gould is
fond of noting that Linnaeus’s name for his own species (*Homo sapiens*) was one of his biggest mistakes.

The accidental component enters the Linnaean system through the use of type specimens. Each name in Linnaeus’s system is attached to a specimen housed in a natural history collection somewhere—“a single preserved creature that becomes the official name-bearer for the species” (279). The type specimen for Gould’s favorite snail, *Cerion uva*, resides in the Linnean Society’s Burlington House, on Piccadilly in the center of London. Linnaeus, himself, established *Cerion uva* as the type species of the genus of snails on the basis of this specimen. Gould observes:

> We need such types because we often later discover that a named “species” really includes specimens from two or more legitimate species. We must then retain the original name for one of those species, and coin new designations for the others. But which population gets to keep the old name? By the rules of nomenclature, the original name belongs to the type specimen in perpetuity—and its population retains this first designation. (p. 279)

The beauty of the Linnaean system is that it provides a systematic procedure that responds to the discovery of accidental designations.

**Artifacts**

Artifacts provide another illustration of the distinction between extension and intension. The old engineering adage maintains that form follows function. Supposedly, the **purpose** of any artifact is to serve some function, and some forms are ideally suited to each function. The purpose defines the intension of the artifact, whereas its form defines the extension of the artifact.

The function that is supposed to give rise to form is ridiculed by engineers. David Pye maintains that “function is a fantasy” and adds:

> The concept of function in design, and even the doctrine of functionalism, might be worth a little attention if things ever worked. It is, however, obvious that they do not. Indeed, I have sometimes wondered whether our unconscious motive for doing so much useless work is to show that if we cannot make things work properly we can at least make them presentable. Nothing we design or make every really works. We can always say what it ought to do, but that it never does. The aircraft falls out of the sky or rams the earth full tilt and kills the people. It has to be tended like a new born babe. It drinks like a fish. Its life is measured in hours. Our dinner table ought to be variable in size and height, removable altogether, impervious to scratches, self-cleaning, and having no legs.... Never do we achieve a satisfactory performance... Every thing we design and make is an improvisation, a lash-up, something inept and provisional.

Henry Petroski has written a series of books and articles that illustrate how the interplay between form and function leads to the evolution of artifacts. The telephone illustrates how an artifact changes to fulfill an original function better as well as in reaction to external factors.
What was the phone’s original function?
How was this function connected to its form?
What did the rotary dial contribute to the phone’s function?
How did push buttons improve on the rotary dial?
What did the cordless phone add in functionality?
Is the iphone a phone?

The extension of the word telephone continues to change over time as new technologies become available. A Fregean would assert that the intension of the word telephone remains unchanged. Borrowing Kripke’s discussion of meter, we can say that each implementation of a telephone helps to fix the reference of the word, but they do not define what constitutes a telephone. New telephone designs reveal different dimensions of the telephone’s potential.

### Intensional Contexts

I introduced an extensional semantics for a fragment of English to show how the meaning of a sentence could be derived from the meanings of its parts. Intensional operators produce contexts that lack a simple extensional semantics. One class of intensional operators, propositional attitude verbs, (dream, believe, want) create opaque/intensional contexts where the truth value of the embedded clause is unrelated to the truth of the whole sentence. We need something more than the reference of the embedded clause to understand meaning in opaque contexts.

I dreamed that Mary barks.

We have already analyzed the extensional semantics of the sentence Mary barks as:

$$SVal(Mary \text{ barks}) = true \iff SVal(Mary) \in SVal(barks)$$

Applying a similar analysis to the sentence I dreamed that Mary barks yields roughly:

$$SVal(I \text{ dreamed that Mary barks}) = true \iff Sval(Mary \text{ barks}) \in SVal(I \text{ dreamed})$$

Assuming that Mary barks, the \(SVal(Mary \text{ barks}) = true\). Substituting ‘true’ for Sval(Mary barks) yields:

$$SVal(I \text{ dreamed that Mary barks}) = true \iff true \in SVal(I \text{ dreamed})$$
In other words, the semantic extension of the clause *Mary barks* (‘true’) does not predict the content of the dream; it only yields a sentence saying that I dreamed something true. The meaning of the lower clause is opaque in sentences with propositional attitude verbs.

One way to recognize an intensional context is to substitute different phrases with the same referent in a sentence. If the truth of the sentence depends solely upon the referent of the phrase then the context is extensional. If the truth of the sentence changes with the substitute phrase then the context is intensional, e.g.

I dreamed that *Barack Obama* came to KU.
I dreamed that the *president of the United States* came to KU.

**Usage Based Theories of Meaning**

We investigated several types of reference theories of meaning of the sort Alice would approve and found that they all face difficulties discussed by Frege, Putnum, Quine, Fodor and other philosophers. The basic problem is that reference-based semantic theories do not account for intensional meaning. Intensional meaning is based on the stories that we use to make sense of words. As Humpty Dumpty claims, our stories give us mastery over word meanings.

Frege offered a Humpty Dumpty or usage theory of meaning as an alternative to reference theories. A usage theory of meaning equates meaning with the ways that words are used. Dictionaries commonly employ a usage approach in their definitions of word meaning. Linguists and philosophers sneer at dictionary definitions, but they have yet to offer a viable alternative. Linguists have much to learn from exploring the practical approach that lexicographers use to construct definitions. We will explore some criticisms of dictionary definitions before looking at how a usage based theory meets the tests we used for reference theories.

**Problem 1: Dictionary Definitions Use Words in Definitions for Other Words**

A common complaint about dictionary definitions is that you have to know the meanings of the words the dictionary uses before you can understand the meaning of the word you are looking up. The American Heritage College Dictionary provides the following definitions:

**opossum**
1. Any of various nocturnal, usually arboreal marsupials of the family Didelphidae, ... of the Western Hemisphere, having a thick coat of hair, a long snout, and a long prehensile tail.
2. Any of several similar marsupials of Australia belonging to the family Phalangeridae.

**diapir**
An anticlinal fold in which a mobile core, such as gypsum, has pierced through the more brittle overlaying rock.
The philosopher Willard Van Orman Quine proposed a dictionary type theory of meaning as a basis for his thesis of semantic holism. Semantic holism assumes that the meaning of every word depends on the meanings of other words, tying word meanings into a semantic net. The more stories that we learn, the more we know about the meaning of each word. A change in our understanding of a word will affect our understanding of the stories we tell. Quine’s semantic theory reflects his view of science where a single discovery can radically transform our understanding of everything.

A usage theory provides a dynamic theory of meaning. It recognizes that we do not know everything (a state Putnam labels logical omniscience). New discoveries lead to changes in our stories. We need to discover that Phosphoros and Hesperus refer to the same planet. A usage theory explains why we can use words such as elm or beech the way other people use them without being able to identify their exact referents. A usage based theory ties meaning to a linguistic community rather than to the mind of individual speakers.

**Problem 2: Dictionary Definitions Include Function Words**

Dictionary definitions cannot avoid using common function words such as the, of or to in their definitions. This practice seems to create a problem of accounting for our understanding of these words. Function words actually provide strong evidence in support of usage theories since these words lack obvious referents and differ considerably in use from language to language. Some languages lack pronouns, articles or prepositions altogether. Quine observed that the meaning of articles like the depends on whether languages also have plural markers or noun classifiers.

**Linguistic Semantics**

It is possible to use linguistic methods rather than philosophical arguments to investigate semantics. Linguists employ a usage-based approach to map the semantic distribution of words. Words, like sounds, have overlapping and complementary contexts of use. Synonyms such as sofa and couch or purchase and buy have overlapping contexts of use, e.g.:

I sat on the sofa in the living room.
I sat on the couch in the living room.
**Antonyms** such as *dark* and *light* or *hot* and *cold* have complementary contexts of use, e.g.:

The stove is too hot to touch.
?? The stove is too cold to touch.

The use of English words is different from the use of words in other languages.

*Berlin & Kay*’s (1969) work *Basic Color Terms* provide a classic model of the linguistic approach. The color domain seems easy to describe. The visible spectrum contains an infinite number of different wavelengths that languages typically divide into a more manageable finite number of basic color terms. Linguists distinguish between **basic color terms** such as *green* and *red* from nonbasic color words such as *burnt umber* and *olive drab*. Basic color words are known by every speaker and can be easily identified. They are not restricted to certain domains (as are the English words *brunette* and *sorel*), they are not included in the range of another term (as are the English words *lemon* and *scarlet*), and their meaning cannot be derived from other basic color terms (*bluish*).

Compare how the basic color terms of English, Shona and Bassa divide the basic color space:

<table>
<thead>
<tr>
<th>English</th>
<th>Shona</th>
<th>Bassa</th>
</tr>
</thead>
<tbody>
<tr>
<td>red</td>
<td>cipswuka</td>
<td>ziza</td>
</tr>
<tr>
<td>orange</td>
<td>cicena</td>
<td></td>
</tr>
<tr>
<td>yellow</td>
<td>citema</td>
<td></td>
</tr>
<tr>
<td>green</td>
<td>cipswuka</td>
<td></td>
</tr>
<tr>
<td>blue</td>
<td></td>
<td>hui</td>
</tr>
<tr>
<td>purple</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Berlin & Kay* (1969 *Basic Color Terms*) discovered that although languages have different numbers of basic color terms, they add terms in a definite progression:

light  < red  < green  < yellow  < blue  < brown

They also found that the focal color for each term was very similar across languages.

Although research on color terms reveals some differences in the extensions of color terms across languages, it does not provide information about differences in intensions across languages. Research in other semantic domains shows how intensional differences lead to fundamental differences in extension.
The expression of spatial location would appear to be one of the most fundamental semantic notions that can be described by reference to semantic extension. After all, we seem to have a good idea of where we are most of the time. Spatial language turns out to be anything but a simple reflection of an objective reality. Recent cross-linguistic research has revealed a surprising degree of variation exists in spatial expressions between languages.

Languages locate objects in relation to some reference point. Herskovits (1986) refers to the located entity as the located object. She calls the noun phrase that specifies the location the reference object. Talmy (1983) refers to these notions as figure and ground, respectively. Spatial locations are essentially relations between the located object and a reference object:

1. The cup is on the table.
   - Located Object
   - Reference Object
   - Figure
   - Ground

Talmy ([1983] 2000: 184) figure and ground as:

“The Figure is a moving or conceptually movable entity whose site, path, or orientation is conceived as a variable the particular value of which is the relevant issue.”

“The Ground is a reference entity, one that has a stationary setting relative to a reference frame, which respect to which the Figure’s site, path, or orientation is characterized.”

Talmy introduces the notion of relevance into his definition of figure since the speaker’s perspective determines what is picked out at the figure. In many cases, either object in a spatial relation can be picked out as the figure:

2a. The lamp is over the table.
   - Figure
   - Ground

b. The table is under the lamp.
The Geometry of Linguistic Space

Objects can be located through topological or projective relations. **Topological locations** are invariant with respect to changes in the reference object. The three basic topological locations are proximity, containment, and exteriority. They are topological because they remain the same no matter what angle the located object is viewed from. **Projective locations** change with the perspective of the speaker. Two basic projective locations are left and right.

**Containment** denotes the inclusion of a located object in the reference object. Containment may be: i. either partial or total, ii. apply in any dimension, and iii. be either real or virtual:

- The books are in the box.
- There’s a crease in the bedspread.
- What do you have in mind?

The books may be completely or only partially contained by the box. The box may also be opened on its top, or on its side. What matters is whether the books are in contact with the box’s interior in some fashion. Two-dimensional objects such as paper and blankets have interiors within their boundaries. Their interiors are simultaneously potential supports. What counts as an inherent part of a located object is not obvious:

- There is a blemish on your skin.
- I found a scratch on my car.

**Cross-linguistic Encoding of Topological Relations**

Melissa Bowerman pioneered the cross-linguistic study of topological encoding. She initially looked at the encoding of *in* and *on* in English, Berber, Dutch and Spanish.
I. Nyoman Aryawibawa (2008) explored the semantics of spatial relations in Rongga, Balinese, and Indonesian. These languages employ unmarked prepositions to express normal relations.
between objects and marked prepositions to express abnormal relations.

Rongga

Kain meja one meja
cloth table on table
‘The table cloth is on the table’

Li’e munde one mok
that orange in bowl
‘The orange is in the bowl’

Changing to an abnormal relation between the figure and ground results in the use of a marked preposition. The marked form is used if the table cloth is folded and then put back on the table or if a ribbon is put in the bowl instead of an orange.

Kain meja zheta wewo meja
cloth table on table
‘The table cloth is on the table’

Pita zhale one mok
ribbon in bowl
‘The ribbon is in the bowl’

Aryawibawa contrasts Levinson et al’s topological categories with those of Rongga, Balinese, and Indonesian:

Levinson et al: attachment superadjacency full containment subadjacency

Aryawibawa: function location

Projective Locations

**Projective locations** depend upon the viewer’s perspective or properties of the reference object. A ball could be in front of a desk from one perspective, beside the desk from another, and behind the desk from a third perspective.
Some objects have conventional features that speakers treat as fronts or backs. The back of a chair provides back support. The front of a house is marked by the main entry way. Objects may be located in relation to the fronts, backs or sides of reference objects. Speakers must decide whether to use their own perspective or the features of reference objects to encode projective locations.

**Front**

The ‘front’ of an object depends on properties of the reference object and/or the perspective of the viewer. Languages chose different vantage points to determine a viewer’s perspective. English uses the side of the reference object facing the viewer as the ‘front’. Hausa uses the opposite side of the reference object, the side facing away from the viewer as the ‘front’ (Hill 1974, 1982). In the situation shown below, an English speaker would say the spoon is in front of the pumpkin. A Hausa speaker would say (Hill 1982:21):

\[
\text{Ga cokali can baya da k’warya.}
\]

look spoon there back with pumpkin

‘There’s the spoon behind the pumpkin’

There is more variation between languages in the attribution of ‘front’ and ‘back’ to inanimate objects. The front of vehicles is the part facing the forward motion. Even though ships have bows rather than fronts, we can still locate an object in front of a ship. The fronts of chairs and houses are determined by the convention point of access. This convention applies to appliances such as tvs and radios whose access point – the ‘on’ button, defines the front.
Marquesan, a language of French Polynesia, has speakers that live almost exclusively on islands. As a seafaring people, the Marquesan speakers use the directionals “Seaward,” “inland,” and “Across” (or to:place name). The implications of this system are fascinating, in that a speaker must constantly know exactly where they are with respect to the ocean in order to have any frame of reference for where anything else is. Marquesan speakers use this system in both large scale and small scale directional referencing.

“For a speaker of Marquesan it is not unusual to say that the plate on the table is inland of the glass or to localize a crumb on another person’s cheek as being on the seaward or inland cheek.” (Cablitz p.41)

**Semantic Fieldwork**

The basic procedure for semantic investigation is to pick a semantic domain and investigate the words that a language uses to mark semantic contrasts within the domain. One early paper that illustrates this approach is Labov’s study of cups (‘The Boundaries of Words and Their Meanings’, in R. Fasold, ed. 1973). Labov explored the semantic boundaries of the words cup, mug, bowl and vase. He provided subjects with line drawings of containers that varied in width and height.

![Figure 5. Series of cup-like objects.](image-url)
He also presented the drawings to his subjects in two contexts. In the first, or ‘neutral’ context, he merely presented the drawings. In the second, or ‘food’ context he presented the drawings and said they contained rice or mashed potatoes.

![Consistency profiles denoted as cup and bowl in Neutral and Food contexts, Group B, N = 11.](image)

**References**


Brown, Penelope. 1994. The INs and ONs of Tzeltal locative expressions: The semantics of stative descriptions of location. Linguistics 32.4/5.743-790.


