UNIT 10 SENSE RELATIONS (1)
IDENTITY AND SIMILARITY OF SENSE

Entry requirements SENSE (Units 3 and 9) and ANALYTICITY (Unit 9). If you feel you understand these notions, take the entry test below. Otherwise review the relevant units.

Entry test Words such as *mean, meaning, meant*, etc. are used ambiguously in everyday language to indicate either sense or reference.

(1) Do the words *mean* and *meant* indicate sense (*S*) or reference
(*R*) in the utterance:
'I'm sorry to have disturbed you – when I said 'Will you
move your chair?', I didn't mean you, I meant Patrick here.' *S / R*

(2) Does the word *means* indicate sense or reference in:
'If you look up *ochlocracy*, you'll find it means *government
by the mob*.' *S / R*

(3) Which of the following is correct? Circle your answer.
(a) The sense of any word is its dictionary definition, in the form of a complete set of necessary and sufficient conditions for its use.
(b) The sense of a predicate is the set of all things it can be correctly applied to.
(c) The sense of a predicate is its indispensable hard core of meaning.

(4) Are the following sentences analytic (*A*), synthetic (*S*), or a contradiction (*C*)?
(a) *John is simultaneously a man and not a human being* *A / S / C*
(b) *Mussolini was an Italian* *A / S / C*
(c) *Every female dog is a bitch* *A / S / C*

Feedback (1) R (2) S (3) (c) (4) (a) C (b) S (c) A
If you had only one incorrect answer or had all correct, proceed to the introduction. If not, review Units 3 and 9 before continuing.

Introduction In previous units you were introduced to the notion of sense. We now proceed to the examination of sense relations. What we have referred to previously as the sense of an expression is the whole set of sense relations it contracts with other expressions in the language. We shall be mainly

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concerned with the sense relations which involve individual predicates and whole sentences.

Definition (partial) SYNONYMY is the relationship between two predicates that have the same sense.

Example In most dialects of English, *stubborn* and *obstinate* are synonyms.
In many dialects, *brigand* and *bandit* are synonyms.
In many dialects, *mercury* and *quicksilver* are synonyms.

Comment Examples of perfect synonymy are hard to find, perhaps because there is little point in a dialect having two predicates with exactly the same sense. Note that our definition of synonymy requires identity of sense. This is a stricter definition than is sometimes given: sometimes synonymy is defined as similarity of meaning, a definition which is vaguer than ours. The price we pay for our rather strict definition is that very few examples of synonymy, so defined, can be found. But the strict definition is useful as an ideal and we will still use it and assume that relatively good instances of synonymy are possible for the purpose of furthering our investigation into how to describe sense relations.

Practice In the following sentences, do the capitalized pairs of words have the same (or very nearly the same) sense in the ways they are used here?

(1) *The thief tried to CONCEAL/HIDE the evidence*   *Yes / No*

(2) *I'm going to PURCHASE/BUY a new coat*   *Yes / No*

(3) *These tomatoes are LARGE/RIPE*   *Yes / No*

(4) *This is a very LOOSE/SHORT definition*   *Yes / No*

(5) *You have my PROFOUND/DEEP sympathy*   *Yes / No*

(6) *It is a very WIDE/BROAD street*   *Yes / No*

Feedback (1) Yes (2) Yes (3) No (4) No (5) Yes (6) Yes

Comment Clearly the notions of synonymy and sense are interdependent. You can't understand one without understanding the other. These concepts are best communicated by a range of examples. In general, when dealing with sense relations, we shall stick to clear cases. (We admit the existence of many genuinely unclear, borderline cases.) In considering the sense of a word, we abstract away from any stylistic, social, or dialectal associations the word may have. We concentrate on what has been called the cognitive or conceptual meaning of a word.

Example *How many kids have you got?*
How many children have you got?

Here we would say that *kids* and *children* have the same sense, although clearly they differ in style, or formality.

Practice   In the following sentences, do the pairs of words in capitals have the same sense? (They do seem to differ in their dialectal, stylistic, or social associations.) Circle *S* for 'same' or *D* for 'different'.

(1)   *He comes to see us every FALL/AUTUMN*   S / D

(2)   *Nothing is more precious to us than our FREEDOM/LIBERTY*   S / D

(3)   *The body was found in the BOOT/TRUNK of the car*   S / D

(4)   *We've just bought a new HOUSE/APARTMENT*   S / D

(5)   *John got a bullet wound in his HEAD/GUTS*   S / D

(6)   *A BLOKE/CHAP I know has pickled onions for breakfast*   S / D

Feedback   (1) S (2) S (3) S (4) D (5) D (6) S

Comment   Synonymy is a relation between predicates, and not between words (i.e. word-forms). Recall that a word may have many different senses; each distinct sense of a word (of the kind we are dealing with) is a predicate. When necessary, we distinguish between predicates by giving them subscript numbers. For example, $hide_1$ could be the intransitive verb, as in *Let's hide from Mummy*; $hide_2$ could be the transitive verb, as in *Hide your sweeties under the pillow*; $hide_3$ could be the noun, as in *We watched the birds from a hide*; and $hide_4$ could be the noun, as in *The hide of an ox weighs 200 lbs*. The first three senses here (the first three predicates) are clearly related to each other in meaning, whereas the fourth is unrelated. It is because of the ambiguity of most words that we have had to formulate practice questions about synonymy in terms of sentences. The sentence *The thief tried to hide the evidence*, for example, makes it clear that one is dealing with the predicate $hide_2$ (the transitive verb). $Hide_2$ is a synonym of *conceal*.

Practice   The following pairs of words share at least one sense in common, but do not share all their senses (i.e. they are like *hide* and *conceal*). For each pair: (a) give a sentence in which the two words could be used interchangeably without altering the sense of the sentence – use a slash notation, as we have done in practice above; (b) give another sentence using one of the words where a different sense is involved. As a guide, we have done the first one for you.

(1)   *deep/profound*

(a)   *You have my deep/profound sympathy* ....

(b)   *This river is very deep* (*This river is very profound* is unacceptable.)

(2) *ripe/mature*

   (a) ....

   (b) ....

(3) *broad/wide*

   (a) ....

   (b) ....

(4) *earth/soil*

   (a) ....

   (b) ....

(5) *side/edge*

   (a) ....

   (b) ....

Feedback The following are just some possibilities: (2) (a) *After dinner we had a ripe/mature Camembert cheese*, (b) *She's a very mature person* (not *a ripe person*) (3) (a) *The river is very broad/wide at this point*, (b) *He speaks with a broad Scottish accent* (not *a wide accent*) (4) (a) *They filled the hole with good soft earth/soil*, (b) *The rocket fell back to earth when its motors failed* (not *back to soil*) (5) (a) *The house stands at the side/edge of the lake*, (b) *Britain and Australia are on opposite sides of the world* (not *edges*)

Comment The definition of synonymy as a relationship between the senses of words requires a clear separation of all the different senses of a word, even though some of these senses may be quite closely related, as with *hide*$_1$, *hide*$_2$, and *hide*$_3$, mentioned in the last comment.

   All the examples so far have been of synonymy between predicates realized grammatically by a word of the same part of speech, for example between adjective and adjective, as with *deep* and *profound*. But the notion of synonymy can be extended to hold between words of different parts of speech, for example between the verb *sleeping* and the adjective *asleep*. Examples like these are not the kind usually given of synonymy, but they help to make the point that the sense of a word does not depend entirely on its part of speech. Grammar and meaning are separate though closely related aspects of language.

   Let us now investigate how the notion of 'sameness' of meaning, which we referred to as synonymy in the case of individual predicates, can be extended to entire sentences in a language.

Definition A sentence which expresses the same proposition as another sentence is a PARAPHRASE of that sentence (assuming the same referents for any

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referring expressions involved). Paraphrase is to SENTENCES (on individual interpretations) as SYNONYMY is to PREDICATES (though some semanticists talk loosely of synonymy in the case of sentences as well).

Example   *Bachelors prefer redhaired girls* is a paraphrase of *Girls with red hair are preferred by unmarried men*

Comment   Look at the following pair of sentences, which are paraphrases of each other.
(A) *John sold the book to a grandson of W.B. Yeats*
(B) *A grandson of W.B. Yeats bought the book from John*
   It is not possible for (A) to be true while (B) is not (assuming that we are dealing with the same John and the same grandson of W.B. Yeats). Thus (A) has the same truth value as (B), so that if (A) is true, (B) is true, and vice versa; also, if (A) is false, then (B) is false, and vice versa.

Practice   Are the following pairs paraphrases of each other (assuming that the referents of the names and other referring expressions remain the same)? Indicate your answer by circling either *P* (paraphrase) or *NP* (not a paraphrase).

(1)   *John is the parent of James*
      James is the child of John   *P / NP*

(2)   *John is the parent of James*
      James is the parent of John   *P / NP*

(3)   *My father owns this car*
      This car belongs to my father   *P / NP*

(4)   *The fly was on the wall*
      The wall was under the fly   *P / NP*

(5)   *Some countries have no coastline*
      Not all countries have a coastline   *P / NP*

(6)   *Fred sent Mary a new book*
      Fred sent a new book to Mary   *P / NP*

(7)   *Jerry took out the garbage*
      Jerry took the garbage out   *P / NP*

Feedback   (1) P (2) NP (3) P (4) NP (5) P (6) P (7) P

Definition   HYPONYMY is a sense relation between predicates (or sometimes longer phrases) such that the meaning of one predicate (or phrase) is included in the meaning of the other.

Example   The meaning of *red* is included in the meaning of *scarlet.*
Red is the superordinate term; *scarlet* is a hyponym of *red* (scarlet is a kind of red).

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Comment   Note that the superordinate term, *red*, is more general or inclusive in
meaning than its hyponym *scarlet*, which is much more specific in the kind of
colour it describes. In other words, the predicate *red* describes a particular
region in colour space whose prototype (or focal) examples are fairly distinct
from those of other colours, though we have seen that more peripheral
members of the extension of *red* tend to fade into other colours. But the term
also subsumes (includes) more specific kinds of *red* within this region of
colour space, some of which have their own predicates to describe the
narrower sort of hue, including *scarlet*, *crimson*, etc. In general, sense
relationships involving hyponymy are usually structured in this way, with the
superordinate term more abstract, general, or schematic than its hyponyms.
This will become apparent as we examine more examples of hyponymy.

Practice   Look at the following, and fill in some missing hyponyms.
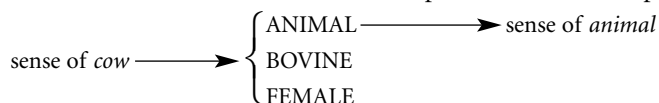
(1)   *pig*

sow
....

(2)   *tree*

beech
....

(3)   *virtue*

honesty
....

(4)   *emotion*

fear
....

(5)   *strike* (transitive verb)

....

(6)   *pleasant*

....

Feedback   (1) *piglet, boar* (2) *oak, ash, sycamore, fir*, etc. (3) *patience, wisdom, prudence,
generosity*, etc. (4) *love, anger, happiness, sadness*, etc. (5) *kick, hit, butt,
thump*, etc. (6) *tasty, pretty, soothing*, etc.

Comment   We have dealt with the clear cases. Note that even in the case of abstract
nouns, there are some quite clear things that we can say about their
meanings, or senses.
    Before we leave the discussion of hyponymy, a note should be made of its
relationship with extension (Unit 8). Hyponymy is a sense relation. Another
term for sense, preferred by logicians, is intension, a term deliberately chosen
for its implicit contrast with extension. Hyponymy is defined in terms of the
inclusion of the sense of one item in the sense of another. We say, for example,
that the sense of *animal* is included in the sense of *cow*. This inclusion can be

shown roughly by a diagram giving a list of the 'sense-components' of *cow*. It
will be seen that this list includes the component 'animal'. But paradoxically

$$\text{sense of } cow \longrightarrow \left\{ \begin{array}{l} \text{ANIMAL} \longrightarrow \text{sense of } animal \\ \text{BOVINE} \\ \text{FEMALE} \end{array} \right.$$

perhaps, if we draw a diagram of the extensions of *cow* and *animal*, the
inclusion relationship appears the other way around.

the set of all animals

the set of all cows
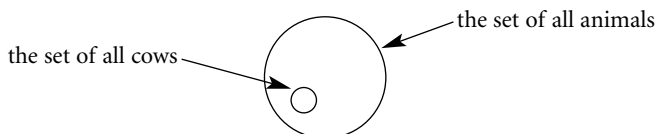
Practice (1) Which of the following descriptions is the more specific?
  (a) A man, 5ft 8in tall, with black hair, moustache, no beard,
      wearing a beige duffle coat, blue jeans, and lace-up shoes
  (b A man in a duffle coat   (*a*) / (*b*)

(2) Which of the above descriptions gives more information?   (*a*) / (*b*)

(3) Which of the above descriptions describes more men?   (*a*) / (*b*)

(4) In general, does giving more information increase or reduce
    the range of things described?   ....

Feedback (1) (a) (2) (a) (3) (b) (4) It reduces the range of things described.

Definition We define HYPONYMY in such a way that SYNONYMY counts as a special
case of hyponymy. For example, given two synonyms, such as *mercury* and
quicksilver, we say for convenience that these also illustrate the hyponymy
relationship, and that *mercury* and *quicksilver* are hyponyms of each other.
Thus synonymy can be seen as a special case of hyponymy, i.e. SYMMETRICAL
HYPONYMY.

Rule If X is a hyponym of Y and if Y is also a hyponym of X, then X and Y are
synonymous.

Comment Earlier in this unit we saw that it is possible to extend the notion of 'sameness'
of meaning between predicates (synonymy) to sameness of meaning between
propositions that are expressed by sentences (paraphrases). Similarly, the
notion of hyponymy, which involves meaning inclusion between individual
predicates, can be extended to a particular kind of meaning inclusion between
propositions in a language involving truth conditions called 'entailment'. We
investigate this below.

Definition A proposition X ENTAILS a proposition Y if the truth of Y follows necessarily
from the truth of X. We extend this basic definition in terms of propositions

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to cover SENTENCES in the following way. A sentence expressing proposition X entails a sentence expressing proposition Y if the truth of Y follows necessarily from the truth of X.

Example   *John ate all the kippers* (X) entails *Someone ate something* (Y).
John killed Bill (X) entails *Bill died* (Y).
  It is not possible to think of any circumstances in which sentence X is true and sentence Y false.

Comment   In all of our exercises on entailment it must be remembered that the truth of sentences (and of propositions) is relative to particular sets of circumstances, or states of affairs. Thus when we say, for example, that *John killed Bill* entails *Bill died*, we are in fact envisaging these sentences being uttered in circumstances where both instances of *Bill* have the same referent and the time indicated by the use of the past tense (in *killed* and *died*) is related to the same hypothetical time of utterance. Obviously *Bill died* could not be true any time before it was true that *John killed Bill*.

Practice   Look at the following and circle the statements of entailment as correct (*C*) or incorrect (*I*).

(1)   *John cooked an egg* entails *John boiled an egg.*   *C / I*

(2)   *John boiled an egg* entails *John cooked an egg.*   *C / I*

(3)   *I saw a boy* entails *I saw a person.*   *C / I*

(4)   *John stole a car* entails *John took a car.*   *C / I*

(5)   *His speech disturbed me* entails *His speech deeply disturbed me.*   *C / I*

Feedback   (1) I (2) C (3) C (4) C (5) I

Comment   Entailment applies cumulatively. Thus if X entails Y and Y entails Z, then X entails Z. (Technically, entailment is a transitive relation. See Unit 18.)

Example   X, *Some boys ran down the street* entails Y, *Some kids ran down the street*
Y, *Some kids ran down the street* entails Z, *Some kids went down the street*
Therefore,
X, *Some boys ran down the street* entails Z, *Some kids went down the street.*

Definition   Two sentences may be said to be PARAPHRASES of each other if and only if they have exactly the same set of ENTAILMENTS; or, which comes to the same thing, if and only if they mutually entail each other so that whenever one is true the other must also be true.

Comment   Note how this relationship between propositions neatly parallels the one we described earlier between individual predicates with respect to synonymy and hyponymy.

Example   *John and Mary are twins* entails *Mary and John are twins*;
Mary and John are twins entails *John and Mary are twins*.
Therefore,
John and Mary are twins is a paraphrase of *Mary and John are twins*.

Practice   Look at the following pairs of sentences and see if they have the same set
of entailments (*Yes*) or not (*No*) (i.e. see if they are paraphrases of each
other).

(1)   *No one has led a perfect life*
Someone has led a perfect life   Yes / No

(2)   *We've just bought a dog*
We've just bought something   Yes / No

(3)   *The house was concealed by the trees*
The house was hidden by the trees   Yes / No

(4)   *I ran to the house*
I went to the house   Yes / No

(5)   *It is hard to lasso elephants*
Elephants are hard to lasso   Yes / No

Feedback   (1) No (2) No (3) Yes (4) No (5) Yes

Comment   The relationship between entailment and paraphrase is parallel to the
relationship between hyponymy and synonymy, as you will have noticed. Just
as synonymy is symmetric (i.e. two-way) hyponymy, paraphrase is symmetric
(i.e. two-way) entailment.

Practice   Fill in the chart with the words *entailment*, *paraphrase*, *hyponymy*, and
synonymy in the appropriate boxes, thus summarizing their relationship.

	Relation between pairs of sentences	Relation between pairs of words
Not necessarily symmetric (i.e. can be 'one-way')		
Symmetric (i.e. 'both ways')		

Feedback
entailment	hyponymy
paraphrase	synonymy

Comment   Now we explore further the relationship between hyponymy and entailment.

Practice   (1)   In terms of the concepts you have now learned, what can you say about
the relationships between the words in column A below and those in
column B?

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A   B

tulip   *flower*
sheep   *animal*
steal   *take*
square   *rectangular*

....

(2) What can you say about the relationship between the A sentences and the B sentences below?

A   B

Henry was chewing a tulip   *Henry was chewing a flower*
Denis got savaged by a sheep   *Denis got savaged by an animal*
David stole a pound of beef   *David took a pound of beef*
Mary climbed through a square   *Mary climbed through a rectangular*
    hole in the roof   *hole in the roof*

....

Feedback (1) The A words are hyponyms of the B words. (2) The A sentences entail the B sentences.

Comment In simple cases such as these, there is a clear rule that can be stated about the relation between hyponymy and entailment.

Practice Given below are three attempts at stating this rule. Only one of them is actually correct. Which is the correct rule? Circle your choice.

(a) Given two sentences A and B, identical in every way except that A contains a word X where B contains a different word Y, and X is a hyponym of Y, then sentence B entails sentence A.

(b) Given two sentences A and B, identical in every way except that A contains a word X where B contains a different word Y, and Y is a hyponym of X, then sentence A entails sentence B.

(c) Given two sentences A and B, identical in every way except that A contains a word X where B contains a different word Y, and X is a hyponym of Y, then sentence A entails sentence B.

Feedback The rule is correctly formulated in (c). We will call this rule the Basic Rule of Sense Inclusion.

Comment The Basic Rule of Sense Inclusion does not work in all cases. There are systematic exceptions when certain logical words, such as *not* and *all*, are involved. We look first at cases with *not* (and *n't*), i.e. cases of negative sentences.

Practice   (1)   What is the relationship between the A sentences and the B sentences below?

	A	B
	Henry was not chewing a tulip	*Henry was not chewing a flower*
	Denis didn't get savaged by a sheep	*Denis didn't get savaged by an animal*
	David didn't steal a pound of beef	*David didn't take a pound of beef*
	Mary didn't climb through a square hole in the roof	*Mary didn't climb through a rectangular hole in the roof*

....

(2)   Below is an unfinished version of a rule of sense inclusion for negative sentences. Finish the statement of the rule correctly.

Given two negative sentences A and B, identical in every way except that A contains a word X where B contains a different word Y, and X is a hyponym of Y, then

....

Feedback   (1) In this case, the B sentences entail the A sentences. (For example, if it is true that Henry was not chewing a flower, then it must be true that he was not chewing a tulip.) (2) The correct completion of the rule is: 'sentence B entails sentence A'.

Practice   Now we look at sentences involving the word *all*. What is the relationship between the A sentences and the B sentences below?

	A	B
	Henry chewed up all my tulips	*Henry chewed up all my flowers*
	All Denis's sheep have foot-rot	*All Denis's animals have foot-rot*
	Mary coloured all the square shapes purple	*Mary coloured all the rectangular shapes purple*

....

Part of the answer is: the B sentences entail the A sentences. But there is an important qualification that must be added to this. Can you think what it is?

....

Feedback   The B sentences entail the A sentences. However, the entailment from B to A only holds when the set of things referred to by the phrase including *all* actually exists. For example, *All Denis's animals have foot-rot* entails *All Denis's sheep have foot-rot* only if Denis actually has some sheep, i.e. if some of his animals are in fact sheep.

Comment   Obviously a (somewhat complicated) rule of sense inclusion for sentences
involving *all* could be formulated, but we will not go into the details of it here.

   Clearly, rules stating the relationship between hyponymy and entailment
are somewhat complex, although most of the logical principles involved are
well enough understood. We will mention one more case which presents
problems, the case of gradable words, like *big*, *tall*, *small*, *expensive*, etc. We
will learn more about the gradability of words like these in the next unit. For
now just focus on the fact that the meanings of adjectives such as *big* and
small are not invariably fixed with respect to some absolute scale, but vary
depending upon the kind of noun they modify.

Practice   What are the entailment relations between the following sentences?

A	B
John saw a big mouse	*John saw a big animal*
A tall pygmy came in	*A tall person came in*
We went in a small bus	*We went in a small vehicle*
That was an expensive sandwich	*That was an expensive meal*

....

Feedback   There are no entailment relations between these sentences. Thus although a
mouse is an animal, a big mouse is not a big animal. The presence of gradable
words upsets the normal relationship between hyponymy and entailment.

Summary   Hyponymy and synonymy are sense relations between predicates. The latter is
a special, symmetric, case of the former. Entailment and paraphrase are
sense relations between sentences, the latter being a special, symmetric case
of the former. The sense relations between predicates and those between
sentences are systematically connected by rules such as the basic rule of sense
inclusion. These sense relations are also systematically connected with such
sense properties of sentences as ANALYTICITY and CONTRADICTION.

Unit 10 Study Guide and Exercises

Directions   After you have read Unit 10 you should be able to tackle the following
questions to test your understanding of the main ideas raised in the unit.

   1 You should understand these terms and concepts from this unit:

synonymy/synonym	intension
paraphrase	symmetrical hyponymy
hyponymy/hyponym	entailment
superordinate term	transitive relation
Basic Rule of Sense Inclusion	co-hyponyms
sense relations	

2 Do you think it is easier to learn words as unique items, or as part of a system involving various kinds of sense relationships? That is, is it easier to learn words when we can relate them in systematic ways or when we learn them separately? Briefly explain.

3 What is meant by **synonymy**? Why is it difficult to define this term? Do most synonyms have identical or just similar meanings (or senses)? Do you think true synonymy exists? Try to support your answer with appropriate examples.

4 Identify in the following sentences the pairs of words in upper-case letters which appear to share the same (or nearly the same) sense. In some (or all) cases it may be difficult to decide, so be ready to explain the difficulty.
   a Fred always sleeps on the SOFA/COUCH
   b The neighbours have a BIG/LARGE family
   c The winning horse TROTTED/RAN to the finish line
   d This table is very SMOOTH/FLAT
   e That is a very HIGH/TALL building
   f That is a very FLAT/SLIPPERY road

5 Synonyms usually share some but not all senses. This becomes evident in certain of their uses. For each apparent synonym pair below supply sentences in which the two words can be used interchangeably without altering the sense of the sentence, and then give another sentence using one of the words in a different sense (where no interchange is possible with the same meaning).
   a small/little   e cheap/inexpensive
   b hard/difficult   f bright/well-lit
   c long/extended   g sad/dejected
   d lady/woman   h rob/steal
   i Do the same for the synonym pairs you identified in 4 above.

6 A special kind of synonymy falls under the heading of **euphemism**, whereby a culturally or socially disagreeable word is replaced by a more agreeable one with essentially (though not exactly) the same meaning. For each term below try to find several euphemisms which are less harsh, offensive, or explicit. For item (h) try to think of several additional examples.
   a war   f toilet
   b crazy   g poor
   c damn   h crippled
   d fired from a job i stupid
   e blind   h ....

7 Sometimes synonyms can have either positive or negative connotations, as shown by the first set below. Try to complete the other examples. A thesaurus may be helpful.

NEUTRAL TERM	POSITIVE	NEGATIVE
careful	scrupulous	keep a sharp eye on
save money	....	....
reserved	....	....
levelheaded	....	....
....	inquisitive	_____
....	....	lagging
laugh	....	....
talk	....	....
old	....	....
....	....	immature

8 What is a **paraphrase**? How are the notions of **synonymy** and **paraphrase** distinguished in semantics?

9 Supply as many paraphrases as you can for each of the following sentences. Remember that each paraphrase must have the same set of entailments as the original sentence.
   a I gave the book to my friend
   b Your child took out the garbage
   c It is likely that Fred will win the race
   d John is easy to please
   e The sales clerk received the money from me
   f Some students have a job

10 What is meant by **hyponymy**? When predicates are organized according to their hyponymic relationships with each other the resulting tree diagram is sometimes called a **taxonomy**.

11 Organize each of the following groups of words into a taxonomy in which the superordinate terms and their hyponyms are properly arranged with respect to each other. Be sure to identify which terms are superordinate and which are hyponyms (and which are co-hyponyms). Identify any problems you might have in organizing the data, and supply additional data if you can think of them. It may be helpful to sketch a tree diagram. Are you aware of any other disciplines in which such taxonomies are used?
   a hammer, screwdriver, wrench, awl, tool, pliers
   b carpenter, electrician, craftsman, plumber
   c mammal, human, animal, amphibian, reptile, frog, snake
   d shatter, crack, break, smash, fracture
   e man, woman, husband, bachelor, wife, human, widow

12 Explain what it means to say that hyponymy involves entailment.

13 For each sentence below give another sentence which the first one entails, and then give one which the first does NOT entail.

a John is a bachelor
b John is a widower
c Mary is divorced
d This is a tulip

14 Hyponymy and synonymy refer to relations between pairs of words, while entailment and paraphrase refer to relations between pairs of sentences. Supply the correct terms in the blanks.
Hyponymy is to .... as synonymy is to ....

15 What does the Basic Rule of Sense Inclusion have to say about the entailment relationship between the following two sentences?
a Mary bought a house
b Mary bought a building

16 Why does the Basic Rule of Sense Inclusion NOT work for the following pairs of sentences? How must it be amended to work here?
a Mary did not buy a house
b Mary did not buy a building

c Mary bought all the houses in town
d Mary bought all the buildings in town

17 Consider the following pair of sentences. Is there any entailment relation existing between them? Explain why or why not.
a Mary bought a big house
b Mary bought a big building