



## LEXICAL STORAGE AND LEXICAL ACCESS

The psychology of words and word meaning makes an important distinction between:

**Lexical storage:** how words are stored in our minds in relation to each other.

**Lexical access** (or **lexical retrieval**): how we reach a word when we need it.

This section introduces some basic concepts. Section B5 examines evidence of how words are stored; Section C5 examines models of how we manage to retrieve them.

### Storage assists access

Words are not stored in the mind independently. On the contrary, every content word appears to have close links to others. Let us consider why this is necessary.

Assume a speaker is seeking a word for a fruit. Using the meaning as a point of departure, the speaker might retrieve the whole set of fruit, which includes:

APPLE – PLUM – PEAR – GRAPE – BANANA – ORANGE – PEACH – CHERRY

The fruit is yellowish, which restricts the search to the first five. It is roundish and of medium size, which limits us to the first three.

So far, our speaker has only tried to access the word through meaning. But the word can also be found through its form. It is possible that, **in parallel** (i.e. at the same time as exploring the lexicon through meaning sets), the speaker has associated the sound /eə/ with the word that is being sought. This would provide a different a set of words:

BEAR – CARE – DARE – FARE – PEAR – RARE – SHARE – TEAR – WEAR etc.

There is only one word which fits both criteria – PEAR.

This is an extremely simplified version of what happens. But it illustrates the way in which form and meaning can interact in helping us to retrieve a word that we need.

Now consider the process in reverse – from the point of view of a listener who hears the word CARROT.

- in form, the initial sounds link in to the whole set of words beginning with /kæ/
- in meaning, the context might (or might not – a controversial issue) indicate that the current topic was vegetables and lead the listener to open up the set of vegetables.

The result might be a tie between CABBAGE and CARROT, which would be resolved when the speaker heard the next sound /r/.

The notion of words as linked by a network of forms and meanings is an important one when considering how an infant or a foreign-language learner acquires their vocabulary. Learning a new lexical item is not just a question of mastering the form of the item and associating it with a sense or range of senses. It is also a question of linking the item to the whole network of previously learnt words. If a child learns the word TERRIFIED, it has to

- a form a connection with HORRIFIED and TERRIER which are similar in form.
- b form a connection with AFRAID and SCARED which are similar (but distinct) in meaning.

### Weak links and strong links

Within the mental lexicon, some words are clearly more closely linked than others. Recent accounts of these links have been strongly influenced by a **connectionist** view of language processing (McClelland *et al.* 1986). Connectionism models itself upon the way in which the brain operates by transferring signals across multiple neural (nerve) connections. Simplifying greatly, it suggests that, when a connection is used a great deal, it gets proportionately stronger; when a connection is little used, it gets weaker. Thus, the link between the words FISH and CHIPS is a strong one because the two often occur together; similarly the link between AFRAID and SCARED is a strong one because the two often compete when we need a word to express fear. A link exists between FISH and RIVER or AFRAID and CALM but it is not of the same strength.

The notion of connection strength is useful because it accounts for

**frequency:** the words we use most are the ones that are easiest for us to retrieve. This is because the connections to them are more often used.

**collocation:** we retrieve certain words together because they are so closely connected: we talk about a *heavy smoker*, never a *\*large smoker* or a *\*compulsive smoker*.

### Spreading activation

Part of the evidence for associative links between words comes from a phenomenon called **spreading activation**. If you have just recently seen the word DOCTOR, you will recognise words such as *patient*, *hospital* or *medicine* more quickly as a result.

The idea is that activation (think of it as a kind of electrical impulse) runs along the connections which link the words in our minds. When we see or hear the word DOCTOR, it triggers off a reaction which 'lights up' words which have close connections to DOCTOR. This means that the words are more readily available to us in case we need them. Of course, activation does not last for long; it quite quickly **decays**.

Note that the activation effect is automatic. We cannot turn it on or off. It is not the same as a **context effect**. Consider what might happen if you read a text with the title CAMELS. Your reading would benefit from two distinct processes:

- ❑ **Spreading activation.** Seeing the word CAMEL would trigger automatic associations with closely connected words in your lexicon such as *hump*, *desert*, *sand* and help you to recognise those words more quickly if they occur.
- ❑ **World knowledge.** Knowing that the text is about camels might lead you to create certain expectations at a rather more conscious level: there may be something in the text about storing water in the hump, something about the two types of camel, something about survival in a hot climate.

Spreading activation is believed to be the explanation for an effect known as **priming**. In the example above, CAMEL is said to **prime** *hump*, *desert* and *sand*. A researcher might show a subject a sentence containing the word CAMEL and then test how quickly the subject responds to words that are or are not associated with it. This type of experiment often takes the form of a word/non-word task (known as a **lexical decision** task) where a button has to be pressed every time a group of letters on a screen is an actual English word.



**Experimenter:** You'll see/hear a sentence and afterwards you'll see/hear a word or a non-word. Press the button if you recognise the word.

[We saw a camel at the zoo . . . fosk – bank – lidge – hump]

The time taken to press the button is measured in milliseconds. This **Reaction Time** will be quicker to *hump* than to *bank*, because *hump* has been activated by prior exposure to CAMEL.

Priming can be used to discover important facts about spreading activation such as:

- How closely associated do words have to be for activation to occur?
- How long does the activation of associated words last?