LINGUISTICS

A new game for Kevin Bacon to play

MATHEMATICIANS have been playing word games. They've found that any word in the English language can be linked to any other in just a few steps, following the same "six degrees of separation" principle best known for connecting Hollywood actor Kevin Bacon with other film stars.

In the 1960s, a famous experiment run by social psychologist Stanley Milgram suggested that any two people in the US could be linked together by only six "friend of a friend" steps. Applied mathematician Ying-Cheng Lai at Arizona State University in Tempe wanted to known if this kind of "small world" property was a feature of lexicons as well.

Lai and his colleagues took the 30,000 words in an online thesaurus and created 900,000 different word pairs from them. They then tried to link the words in each pair via a chain of related words. They defined two words as being related if they expressed a similar concept – that is, if they were listed together in any thesaurus entry.

At first the researchers thought that the shortest path between two words with very different meanings, for example "thespian" and "ideogram", might turn out to be very large. But that wasn't the case, Lai says. "To our surprise, you only need about three or four steps on average to go from any word to another."

The key to this remarkable connectedness lies in words with multiple meanings. These act as short cuts, connecting remote concepts together and drastically reducing the number of steps needed to get from one word to another. A few word pairs just can't be linked very closely, however. It took eight steps to get from "octagonal" to "appendectomy" for example, via eighth, octave, tone, purity, sterility, birth control and vasectomy.

But overall, more than 99 per cent of the word pairs could be connected in four steps or less (*Physical Review E*, vol 65, p 065102). The researchers suggest that being able to connect unrelated words together so easily could be helpful for memory and creativity. Charles Choi ●