Your words are saying far more than you think. Uncovering the sense behind the sounds could reveal how humanity invented language, says David Robson

Language's missing link
Through the looking glass, Lewis Carroll's Alice stumbles upon an enormous egg-shaped figure celebrating his un-birthday. She tries to introduce herself:

"It's a stupid name enough!" Humpty Dumpty interrupted impatiently. "What does it mean?"

"Must a name mean something?" Alice asked doubtfully.

"Of course it must," Humpty Dumpty said with a short laugh. "My name means the shape I am -- and a good handsome shape it is, too. With a name like yours, you might be any shape, almost."

PURE whimsy, you might think. Nearly 100 years of linguistics research has been based on the assumption that words are just collections of sounds -- an agreed acoustic representation that has little to do with their actual meaning. There should be nothing in nonsense words such as "Humpty Dumpty" that would give away the character's egg-like figure, any more than someone with no knowledge of English could be expected to infer that the word "rose" represents a sweet-smelling flower.

Yet a spate of recent studies challenge this idea. They suggest that we seem instinctively to link certain sounds with particular sensory perceptions. Some words really do evoke Humpty's "handsome" rotundity. Others might bring to mind a spiky appearance, a bitter taste, or a sense of swift movement.

And when you know where to look, these patterns crop up surprisingly often, allowing a monoglot English speaker to understand more Swahili or Japanese than you might imagine (see "How's your Japanese?", page 32). These cross-sensory connections may even open a window onto the first words ever uttered by our ancestors, giving us a glimpse of the earliest language and how it emerged.

More than 2000 years before Carroll suggested words might have some inherent meaning, Plato recorded a dialogue between two of Socrates's friends, Cratylus and Hermogenes. Hermogenes argued that language is arbitrary and the words people use are purely a matter of convention. Cratylus, like Humpty Dumpty, believed words inherently reflect their meaning -- although he seems to have found his insights into language disillusioning: "I am -- and a good handsome shape it is, too. With a name like yours, you might be any shape, almost."

"An astonishing 95 per cent of people labelled the spiky object as 'kiki' and the curvy one as 'bouba'" have this condition, but Ramachandran suspected that cross-sensory connections are in fact a feature of the human brain, so that in practice we all experience synaesthesia at least to a limited extent. To explore this idea, he and Hubbard revisited Kohler's experiment to find out whether average people, and not just synaesthetes, might automatically link two different sensations.

Using similar shapes to those in the original experiment, but changing the names of the invented terms slightly, they found that an astonishing 95 per cent of people labelled the spiky object as "kiki" and the curvy one as "bouba". One possible explanation is that this might be down to the shapes of the lips as we form the vowels in these words; in "bouba" they are more curved than in "kiki".

The work turned out to be hugely influential, helping sound symbolism to finally get off the ground as numerous studies explored the kiki/bouba phenomenon. Chris Westbury at the University of Alberta in Edmonton, Canada, for instance, has...
shown that the association may be due to the consonants as well as the vowels: in "bouha" the "b" sounds are "continuants", meaning they are produced with a continuous flow of air. This creates a smoother sound, whereas the "k" sounds in "kiki" break up the airflow and make the word more jarring (Brain and Language, vol 93, p 10).

With the renaissance of the idea that the sound of a word could be linked to some kind of inherent meaning, the obvious next step was to investigate whether sound symbolism extends beyond this one intriguing example.

**Cross-sensory connections**

Building on the idea that certain words might elicit cross-sensory connections in our brain, a team at the University of Edinburgh, UK, decided to explore the links between sounds and tastes. Christine Cuskley, Simon Kirby and Julia Sinner dropped bitter, sweet, salty and sour drops of solution into their subjects' mouths. Then they asked them to manipulate a computer synthesiser to produce different kinds of vowel sounds that seemed to best match the taste on their tongues. The results were not random. Sweet tastes were associated with high vowel sounds, in which the tongue is placed nearer to the roof of the mouth, and back vowels, where the tongue is placed towards the throat rather than the lips. The "oo" in boot demonstrates both of these traits. Low, front vowel sounds, meanwhile—something like the "a" in "cat"—has these qualities—were associated with sour tastes (Perception, vol 39, p 553).

Others have been looking for evidence of sound symbolism in everyday speech. Although examples of onomatopoeia—words truly formed from a sound associated with what is named—are rare, it is possible that more subtle instances of sound symbolism have been lurking, almost literally, right under our noses. English words that begin with "sn" are often associated with our organ of olfaction: think "snout", "sniff", "snot", "snore" and "snorkel". Sceptics had argued that these "phonaesthemes" are purely coincidental, but research by Benjamin Bergen at the University of California, San Diego, suggests otherwise. He found that the brain processes meanings of pairs of phonaesthemes such as "snore" and "sniff” more quickly than other pairs related simply by their meaning (such as "cord" and "rope") or their sounds (such as "druid" and "drip"). That is exactly what you would expect if olfaction and the "sn" sound are somehow linked in the brain, says Bergen.

That's not all. At a recent workshop on sound symbolism in Atlanta, Georgia, he reported that "wh" words associated with words that describe the production of noises such as "whisper", "whine" or "whirl", and those beginning with "fl" that tend to signal movement in the air, such as "fly" or "flail", also enjoyed this fast track in the brain's processing. Bergen concludes that these may all be forms of sound symbolism.

Indeed, it now looks as if sound symbolism may be present in many languages. For example, Japanese, for example, contains a large grammatical group called "mimetic" words, which, by definition, are particularly evocative of sensual experiences. Gorogoro roughly translates as "large object rolling", while nurunuru is meant to evoke the feel of a slimy substance. "If you ask a speaker of Japanese, they will say they evoke an image of an expression," says Sotaro Kita at the University of Birmingham, UK. He is convinced that this group of words contain some sort of sound symbolism, having discovered that both Japanese and English-speaking children learn made-up mimetic verbs more quickly when they follow the sound-meaning associations found in Japanese than when they contravene them (Cognitive Science, vol 35, p 575).

Suspecting that sound symbolism might also help adults to understand a foreign tongue, Lynne Nygaard at Emory University in Atlanta, Georgia, recently presented English speakers with pairs of antonyms (such as fast/slow) recorded in 10 different languages—including Albanian, Dutch, Gujarati, Mandarin and Yoruba. When given the corresponding pair of English words, and asked to match the foreign words to them, subjects performed better than they would by chance—suggesting the words' sounds must give clues to their meaning.

What could these clues be? A subsequent analysis hinted at some answers. Words that indicate general movement tend to have more vowels, for instance, and they are more likely to have glottalic consonants (the "h" in "behind" for example). Sounds might also reflect the speed of movement: slow movement tends to be represented by sonorant sounds such as "loon" or "w"; whereas explosive obstruents produced from a blocked airway such as "ch" or "f", are suggestive of more rapid speeds. Nygaard presented her work at the Atlanta workshop.

Bringing all the evidence together, there seems to be a strong case for saying that sound symbolism does occur in human language. However, some big questions remain. How

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**HOW'S YOUR JAPANESE?**

If certain sounds really do evoke particular meanings then, given a foreign word and two alternative translations, people should be able to get the correct meaning more often than not. That is exactly what researchers found in one experiment testing Japanese words, including those below, on non-Japanese speakers. How well do you do?

<table>
<thead>
<tr>
<th>WORD</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akarui</td>
<td>(a) Bright (b) Dark</td>
</tr>
<tr>
<td>Nureta</td>
<td>(a) Dry (b) Wet</td>
</tr>
<tr>
<td>Onoi</td>
<td>(a) Light (b) Heavy</td>
</tr>
<tr>
<td>II</td>
<td>(a) Bad (b) Good</td>
</tr>
<tr>
<td>Neru</td>
<td>(a) Lie (b) Rise</td>
</tr>
<tr>
<td>Suzushii</td>
<td>(a) Warm (b) Cold</td>
</tr>
<tr>
<td>Osoi</td>
<td>(a) Slow (b) Fast</td>
</tr>
<tr>
<td>Hashiru</td>
<td>(a) Walk (b) Run</td>
</tr>
</tbody>
</table>

Answers:
(a) (b) (a) (b) (a) (b) (a) (b) (b) (a) (b)
common are words that elicit cross-sensory connections in modern languages? “Maybe they represent just small pockets of vocabulary,” says Morten Christiansen at Cornell University, in Ithaca, New York.

Then there’s the question of why we link certain sounds to certain shapes, flavours and styles of movement. The inherently nasal quality of the “sn” sound might explain why we sneeze and snore, but most attempts to explain many other examples are just stab in the dark. Investigations into the cross-sensory connections of full-blown synaesthesia may well shed light on this.

Finally, is sound symbolism universal, perhaps even innate? Tests showing that the patterns are recognised by young children, and by people across cultures, suggest that is a possibility, but more work needs to be done before it can be taken for granted.

Nevertheless, these questions have not stopped researchers exploring the potential implications of their findings. As Kita’s and Nygaard’s work suggests, sound symbolism could at the very least explain why some words stick in our mind better than others – a fact confirmed in a string of studies by Susan Parault, then at the University of Maryland in College Park, which showed that children across a range of ages are better able to learn unfamiliar words if they are sound-symbolic.

Advertisers and marketing executives may begin to see dollar signs in these insights. For example, Charles Spence at the University of Oxford, who has investigated the multisensory experience of chocolate, hopes to help confectioners alter their brand names to reflect the taste of the products. Others have looked at whether the names of cancer drugs might affect patients’ perceptions of them (Social Science and Medicine, vol 66, p 1863).

Most intriguingly, sound symbolism might provide the stepping stone. If the angular sounds of “kiki” seem to fit a distinctively jagged rock, for example, the word might have emerged as obvious shorthand. Sound symbolism “helped to get the first words off the ground”, says Hubbard.

**Bow-wow words**

Not everyone is convinced. Christiansen, for instance, accepts this revised bow-wow theory is plausible. “But we can’t prove it either way,” he says. Others are more positive. It’s very speculative, but it is a possibility, Vigliocco says. “Manual gestures seem like an obvious way [to imitate], but vocal imitation is possible as well, from imitating the shape of an object with the shape of the mouth, to imitating the size of an object by adjusting the length of the vocal tract.”

The beauty of the idea, says Cuskley, is that it helps to solve one of the most exacting problems facing any evolutionary theory of language: how did the ancestral genius who invented the first words get others to understand their meanings so that language could spread? Sound symbolism would have made these first words stick in the mind, and from these simple symbolic sounds our ancestors could have started to build a larger vocabulary. Eventually, the need to describe a greater number of ideas pushed humans to develop more arbitrary terms until they finally developed the complex language systems we use today.

The implication, according to Kita, is that the sound-symbolic relations we see in today’s languages may be remnants of those very first words – a kind of Rosetta stone that helps bridge the gulfs to our earliest languages. That is a profound claim, since most attempts to chronicle ancient languages fail at just a few thousand years BC. These cross-sensory connections, on the other hand, give us a glimpse of tens of thousands of years ago, at humanity’s dawn. “They are fossils from our ancestors’ language,” Kita says.

It is intriguing to think that if faced with the first humans ever to use language, we might have at least some common ground to share our thoughts. Now there’s an adventure worthy of Lewis Carroll’s Alice.