Scientists "see" ghosts

A 'ghost' in the Haunted Gallery at Hampton Court Palace

A 'ghost' in the Haunted Gallery at Hampton Court Palace

By Roger Highfield, Science Editor
7:01PM GMT 21 Feb 2008

The reason that apparitions, bogeymen and phantoms like to lurk in the shadows may have been revealed by scientists.

A team from University College London finds that when we gaze around in a poorly-lit context, it can fool our brains into seeing things that are not really there.

Although no one has done a systematic study of ghosts, neuroscientists are convinced they are "all in the mind" and, in the light of the new work, it does not seem so surprising that they seem most often glimpsed in "spooky" dimly-lit circumstances

In the journal PLoS Computational Biology, Prof Li Zhaoping and her colleagues say that the context surrounding what we see is all important - sometimes overriding the evidence gathered by our eyes and even causing us to imagine things.

They were surprised to find that a vague background context has more influence on what we see than one that is bright and well defined, and speculate that this might explain the power of some abstract art and why we can see vivid details in the vague brush strokes of impressionist paintings.

"The paintings are vague in details, but I speculate that, perhaps because of this vagueness viewers are free to use their vivid imaginations to fill-in the details," says Prof Zhaoping, who adopts her first name as her scientific pen name - Li is such a common name it can cause an identity crisis for Chinese scientists.

"Everything we see is an hallucination generated by the virtual reality machine inside our head," comments Prof Mike Morgan of The City University, London.

"Normally these hallucinations are vetoed by the information coming through our senses, so we can call perception 'controlled hallucination.'

"But when the input is ambiguous we can see all sorts of things, like the faces de Quincy saw in clouds and carpets. There are hundreds of faces hidden in the textured floors of the platforms at Euston Underground Station, if you look for them."

To reveal the haunting power of context, 18 observers were asked by the UCL team to concentrate on the centre of a black computer screen. Every time a buzzer sounded they pressed one of two buttons to record whether or not they had just seen a small, dim, grey 'target' rectangle in the middle of the screen. It did not appear every time, but when it did appear it was displayed for just 80 milliseconds (80 one thousandths of a second).

"People saw the target much more often if it appeared in the middle of a vertical line of similar looking, grey rectangles, compared to when it appeared in the middle of a pattern of bright, white rectangles. They even registered 'seeing' the target when it wasn't actually there," says Prof Zhaoping.

"This is because people are mentally better prepared to see something vague when the surrounding context is also vague. It made sense for them to see it - so that's what happened. When the target didn't match the expectations set by the surrounding context, they saw it much less often.

"Illusionists have been alive to this phenomenon for years,"continues Prof Zhaoping. "When you see them throw a ball into the air, followed by a second ball, and then a third ball which 'magically' disappears, you wonder how they did it.

"In truth, there's often no third ball - it's just our brain being deceived by the context, telling us that we really did see three balls launched into the air, one after the other."

"Contrary to what one might expect, it is a vague rather than a bright and clearly visible context that most strongly permits our beliefs to override the evidence and fill in the blanks."

This could also be why monsters tend to lurk in shadows. "In shadows many things are seen vaguely (rather than clearly), thus tending to trigger the filling-in," says Prof Zhaoping.

See our map of Europe's undiscovered holiday spots

Find out more about some of Europe's hidden gems and lesser-known destinations