How watching Pixar revealed the dark side of gloss

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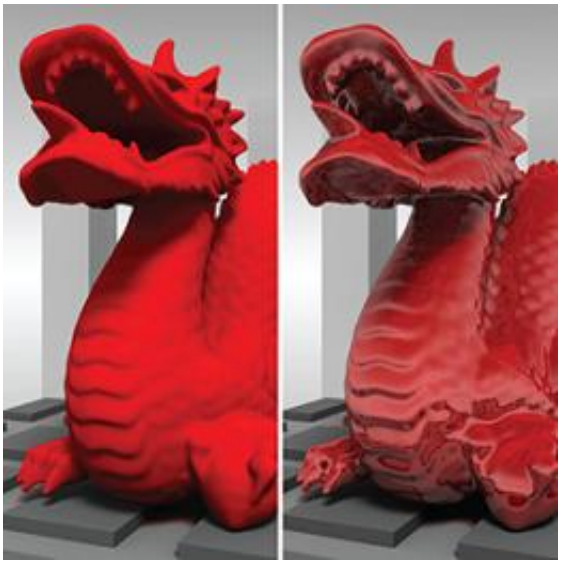

Two red dragons, one completely matte (left), and one glossy (right). The dragon on the right appears compellingly glossy especially in surface regions that generate lowlights, seen as locally dark surface regions that are not apparent on the matte counterpart. Credit: Juno Kim

(Medical Xpress)—A eureka moment while watching a movie for the umpteenth time with his children has led a University of Sydney researcher to achieve a new insight into visual perception, which could benefit traditional artists and graphic designers.

"I was watching the Pixar animation Cars with my kids for about the fiftieth time but this was the first time I noticed that the duco of one of

the cars was attractively glossy even though it only reflected images of the dark trees in the background," said Dr Juno Kim, from the University's School of Psychology and the lead author of the study, published in Nature Neuroscience this week.

The observation led Dr Kim and his colleagues to test the intuitive assumption that glossiness is the result of reflections of light off a surface that is smooth, shiny or wet.

The researchers added local dark or light areas to artificial two-dimensional surfaces, and asked study participants to report whether the surfaces looked glossy.

"We found that adding dark areas and bright areas to a matte surface could make the surface appear glossy. Importantly, even surfaces made up only of arrangements of dark regions created a compelling perception of glossiness," Dr Kim said.

Glossy surfaces can produce both bright highlights and dark 'lowlights' and the presence of either is enough for the human visual system to perceive the surface as being glossy.

The findings support earlier research led by Professor Bart Anderson, from the University's Surface Perception Laboratory, that the brain performs a complex geometric analysis and does not just do simple computations in order to perceive an object.

"In this case the brain works with the geometric relationships between locally dark or locally bright regions in the context of the surrounding shading," said Dr Kim.

The findings have implications for both computer graphics and for machine vision, (where machines perform repetitive human tasks with

visual feedback).

While modern artists and computer designers, such as Pixar, have previously used the technique without knowing how or why it worked, the new findings could provide better applications.

"Future graphic packages could create algorithms that take advantage of this new information to give designers new options in simulating the glossy appearance of any material," Dr Kim said.

More information: www.nature.com/neuro/journal/v … nt/full/nn.3221.html

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