

# Researchers find that the brain can assign value to an object in less than a tenth of a second

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Johns Hopkins neuroscientists have discovered how the brain can determine an object's value almost as soon as we see it.

The team found the [brain](#) can begin processing value just 80

milliseconds after seeing something. That's less than a tenth of a second—and means the brain is basically figuring out if something is quality or junk at the same time it recognizes what it is.

Having watched his wife shop, Ed Connor, the senior author of the research and director of the university's Zanvyl Krieger Mind/Brain Institute, can appreciate the speed of value judgments.

"She's flipping through the racks at Anthropologie at like two items per second and there's an instant no, no, no, maybe, yes—try this on," he says. "It's an example of how all through life, we see things and attach value to them very quickly. With this study, we've answered how at the brain level this can be so fast and even automatic."

The findings are published online today in *Current Biology*.

"At the same time we know it's a car, we know it's a cheap car, or a [sports car](#), or an old car," Connor said. "That has to rely on automatic and immediate value processing by the visual system."

Past research has shown that value representation is strongly associated with later responses in the [prefrontal cortex](#). The new findings show that value processing can begin in the visual [cortex](#), before any value signals appear in the prefrontal cortex. The visual cortex is well equipped to discriminate the fine details in appearance that underlie value judgments about natural objects, Connor said.

The researchers trained monkeys to recognize four different letters. Each letter varied, as if seen in slightly different fonts. The exact shape indicated how much of a liquid treat the monkey would get. The monkeys became experts at choosing the more valuable of two letters in order to get a larger reward. Neural response measurements during this task revealed the rapid emergence of value-related signals in the [visual](#)

[cortex](#).

As in the laboratory task, people become experts at perceiving fine variations that signify speed in a sports car, value in a luxury car, or high fashion in a dress or suit, Connor said. Knowing the value of cars and clothing may seem artificial, but for evolutionary purposes, Connor says being able to evaluate objects can be just as important as recognizing them.

For instance, if we meet a dog, we need to know right away if it's a friendly dog, or a dangerous one, he says. Or when we meet people, it's important to know if they're male or female, old or young, hostile or friendly.

"Recognizing objects isn't the whole story of vision," Connor says. "We need to instantly evaluate and understand things in the world to form fast, appropriate behavioral responses. Seconds count when competing for food or evading predators."

Provided by Johns Hopkins University

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