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Impulsive Behavior May Be Relict Of Hunter-gatherer Past

Drawing on experiments with blue jays, a team of University of Minnesota researchers has found what may be the evolutionary basis for impulsive behavior. Such behavior may have evolved because in the wild, snatching up small rewards like food morsels rather than waiting for something bigger and better to come along can lead to getting more rewards in the long run. The work may help explain why many modern-day humans find it so hard to turn down an immediate reward--for example, food, money, sex or euphoria--rather than investing and waiting for a bigger reward later. The work will be published in the Dec. 7 issue of the Proceedings of the Royal Society (London).

In experiments with blue jays, David Stephens, a professor of ecology, evolution and behavior in the university's College of Biological Sciences, found that birds presented with a choice of getting a small food reward immediately or waiting a short time for a bigger one could not be trained to wait, even after a thousand repetitions. Many researchers have explained such impulsiveness as the result of the bird "discounting" the value of a delayed reward--that is, instinctively realizing that a reward delayed may be a reward denied because conditions can change while the bird is waiting. But the birds' impulsiveness was simply too strong to explain that way, Stephens said.

"I think we were asking them the wrong question," he explained. "In nature, they don't often encounter a situation where they must give up a better, but delayed, food morsel when they grab a quick meal. So we designed an experiment that better modeled real life in the wild."

The new experiments were modeled on how animals encounter and exploit food clumps. The jays encountered one clump at a time and obtained some food from it. Then they had to decide whether to wait for a bit more from the same clump or leave and search for another clump. Not surprisingly, the birds still acted impulsively, preferring items they could get quickly. They considered only the size and wait time for their next reward--never a reward beyond that, even though it may have been bigger.

What did surprise Stephens was that the birds that went for the immediate reward were able to "earn" as much or more food in the long run as birds that were forced to wait for the larger reward or to follow a mixed strategy. The reason, he said, was that in the wild, animals aren't faced with an either-or choice of "small reward now or big reward later." What happens is that when they find a small bit of food, they don't wait; they just go back to foraging, and they may find lots of little rewards that add up to more than what they would get if they had to hang around waiting for bigger and better.

"Animals, I think, come with a hardwired rule that says, 'Don't look too far in the future,'" Stephens said. "Being impulsive works really well because after grabbing the food, they can forget it and go back to their original foraging behavior. That behavior can achieve high long-term gains even if it's impulsive."

The work may apply to humans, he said, because taking rewards without hesitation may have paid off for our foraging ancestors, as it does for blue jays and other foragers. Modern society forces us to make either-or decisions about delayed benefits such as education, investment and marriage; the impulsive rules that work well for foragers do more harm than good when applied in these situations.

"Impulsiveness is considered a big behavior problem for humans," said Stephens. "Some humans do better at binary decisions like 'a little now or a lot later' than others.

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When psychologists study kids who are good at waiting for a reward, they find those kids generallly do better in life. It looks as though this is a key to success in the modern world, so why is it so hard for us to accept delays? The answer may be because we evolved as foragers who encountered no penalties for taking resources impulsively.

"Also," Stephens added, "the National Institute on Drug Abuse funds a lot of studies of impulsiveness. It seems to play a part in addiction. I think anything we can do to understand impulsivity is a plus."

Stephens' co-authors were Benjamin Kerr, a postdoctoral associate, and Esteban Fernandez-Juricic, who is now an assistant professor at California State University at Long Beach. The study was funded by the National Science Foundation.

This story has been adapted from a news release issued by University Of Minnesota.