

Research says teens, young adults explore differently

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Credit: University of Arizona

The adolescent and college years are often regarded as periods of exploration—when teens and young adults begin to make decisions on their own for the first time.

Yet, strategies for exploration may change significantly during the transition from adolescence to young adulthood, according to a recently

published study in the *Journal of Experimental Psychology: General*.

According to the research, co-authored by University of Arizona psychologist Robert Wilson and his collaborators at Harvard University and Weill Cornell Medical College, young adults are more likely to engage in "directed exploration," or exploration driven by [information](#) seeking, than teenagers are. At the same time, teens seem to be more comfortable with uncertainty overall.

The findings add to Wilson's ongoing work on the explore-exploit dilemma in human decision-making.

Humans Use Two Strategies to Explore

Sometimes humans opt to explore. For example, we might, out of curiosity, choose a new menu item at our favorite restaurant. Other times, we like to exploit the information we already have, such as when we order our "usual," explains Wilson, the study's senior author and an assistant professor of psychology and cognitive science in the UA Department of Psychology.

But the dilemma is a bit more complex than that. The current study differentiates between two distinct types of exploration: directed and random. An example of "directed exploration" might be going to Google or Wikipedia to get an answer to a specific question, while an example of "random exploration" might be clicking on random articles in Wikipedia without an end goal in mind, Wilson said.

"There are two types of exploration, and people use both of them," Wilson said. "Directed exploration is really focused on finding information. Random exploration is much less goal-driven, but it's an equally good way of exploring the world."

In a study of 149 adolescents and young adults, ranging in age from 12 to 28, participants were asked to complete a computer-based "slot machine" task designed by Wilson to evaluate exploratory strategies. Tasked with achieving the highest score possible, participants were shown two on-screen "slot machines" with varying levels of information about each machine's previous outputs and the number of chances they would be given to play—either one or six. They then had to choose which machine to play.

When given just one chance to play, adolescents and [young adults](#) similarly exploited the high-reward option, or the machine with the best track record of outputs, based on the information given. However, when given six chances to play—and shown one machine in which only one previous output was known and one machine in which three previous outputs were known and all were in a similar numerical range—older participants were more likely than younger participants to play the machine with only one known output, in an effort to get more information about its performance. In other words, they were more likely to engage in directed exploration.

"Teenagers had much lower levels of directed exploration, so they were less strategically information seeking," Wilson said. "It seems there's an increase in directed exploration between the ages of 12 and 18, and then it sort of flattens off.

"Teenagers make up for this lack of strategic exploration with an overall bias toward more uncertain options. They're more willing to choose an uncertain option than the slightly older participants are."

This Doesn't Mean Bad Choices

Leah Somerville, Harvard associate professor of psychology, co-lead author of the study and director of Harvard's Affective Neuroscience &

Development Lab, said the findings contribute to researchers' understanding of adolescent decision-making.

"One of the lessons from this study is that there are strategies adults use to gather information that seem to be 'tuned' a little differently in adolescents," she said. "Adults consider the long-term consequences of gathering information—even when it means giving up a good option in the short term. Adolescents are less willing to give up those short-term rewards to gather information that might be useful in the future. The fact that adolescents are 'taken away' from future-oriented decisions when short-term rewards are on the line could be relevant to the real-world decisions that adolescents make."

It's important to note, Somerville said, that participants achieved generally the same results in the study task regardless of which exploration strategy they used, so one strategy should not necessarily be touted as better than the other.

"Often, adolescents are painted as having 'faulty' decision-making. These findings challenge that claim, instead suggesting that adolescents' decisions are 'tuned' to value different kinds of information," she said. "Whether this tuning helps or hurts them depends on the type of decision being made, but we should not assume that adolescents' decisions are worse by default."

As to why the two age groups have different exploration strategies, more research is needed, but one theory is that it has something to do with the way the brain physically develops during that phase of life, Wilson said.

"The idea of strategically deploying exploration in situations where you need it is a fairly sophisticated decision process, so one thought may be that this is related to the brain's prefrontal cortex, which we know develops through adolescence," Wilson said. "That's maybe the

neuroanatomy story, but we have no direct evidence for that in this paper."

More information: Leah H. Somerville et al, Charting the expansion of strategic exploratory behavior during adolescence., *Journal of Experimental Psychology: General* (2017). [DOI: 10.1037/xge0000250](https://doi.org/10.1037/xge0000250)

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