

Research sheds new light on self-destructive behavior

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It is more difficult to learn lessons from harmful behaviour such as excessive drinking when our story for why we are suffering is not correct. Credit: Shutterstock

Misunderstanding the link between our actions and consequences could be what makes giving up harmful habits so difficult, study shows.

People who persistently engage in [behavior](#) that causes them harm may be suffering not so much from an unwillingness to change, but a learning problem where they create logical, but ultimately wrong explanations for why they have suffered.

The findings, which were reported recently in the journal *Proceedings of the National Academy of Sciences (PNAS)* by psychologists at UNSW Sydney and Western Sydney University, could have important implications for tailoring therapy for people with self-destructive behaviors leading to addiction and other harmful consequences.

Good ship, bad ship

Psychologists from UNSW Sydney and Western Sydney University devised an experiment where young adult volunteers played a simple [video game](#) with an intergalactic space trade theme. Participants clicked on two [planets](#) to amass points which put them in the running to win a monetary prize.

Unbeknown to the participants, clicking either planet led to a similar amount of reward, but could also result in the emergence of different spaceships. Clicking on one planet would trigger a pirate ship that would steal large chunks of their winnings, whereas the ships triggered by the other planet were harmless.

The people who did best in the game—who the researchers deemed the "sensitives"—were those who made the link between choosing the "bad" planet and the pirate ship and adjusted their behavior to avoid clicking on this planet entirely.

But after a few rounds of the game, there was still a significant portion of people who had not yet connected the dots between choosing the bad planet and the emergence of the pirate ship. Once it was revealed to

them, mid-game, that clicking the bad planet led to punishing consequences, most people adjusted their behavior to avoid losing their loot.

But amazingly—and what fascinated the researchers—some people continued to choose the planet that delivered the pirate ship, despite being warned of the consequences.

"We already know from previous studies using the same video game that many people—who we call 'unawares'—fail to realize how their actions lead to negative outcomes," says study lead author Dr. Philip Jean-Richard-dit-Bressel.

"But in our recent experiment where we revealed to the 'unawares' how their choices are leading to negative outcomes, most quickly changed their behavior and started acting in ways that were beneficial to them. But there was still a subset of individuals that continued with their previous detrimental behavioral pattern, who we called 'compulsives.'"

What's going on here?

Study co-author Professor Gavan McNally, who is a behavioral neuroscientist at UNSW's School of Psychology cautions against viewing the experiment as a microcosm of real-life compulsive behavior, as "real life is a lot more stochastic and I don't believe people are that inflexible."

But while the experiment may not yet explain exactly why the compulsives continued to engage in self-defeating behavior—even after being shown where they were going wrong—Prof. McNally says the study highlights new ideas about what is going on at the cognitive level.

Up until now, Prof. McNally says, self-destructive behaviors that are

difficult to shift are commonly attributed to two explanations. One is that the individual simply values what they're pursuing above all else—such in the case of drug, alcohol or gambling addiction. Or the other explanation is that their compulsions are occurring outside their control or awareness.

"What we show is there is a cognitive pathway that emerges not from differences in value or awareness, but from failing to understand or appreciate correctly that their own actions are leading them to harm. Our 'compulsives' are indeed learning, it's just that they learn the wrong thing."

Infrequency of punishment

Part of the problem, the researchers say, is that when adverse consequences or punishment occur rarely, it's easier to continue to engage in behavior that carries a risk. This is by no means limited to people who have addictions, engage in reckless behavior or are driven compulsively. It can include all of us.

For example, think about driving and [speed limits](#). If we received a fine every time we went over the speed limit, we would be much more likely to change our behavior, using greater vigilance about speed limit zones and keeping a constant eye on how fast we were driving. Another example: if we were violently ill every time we drank alcohol, rather than once every 100 times, we would be much more likely to either severely curtail our intake or give it up altogether.

"When negative consequences to certain behaviors are infrequent, we have a large portion of people who won't change their behavior, even when you show them the link," says Prof. McNally.

In the video game example, the researchers experimented by having the

pirate ship emerge 10% of the time, 20% of the time and 40% of the time when that planet was selected. It turned out that at the 40% setting, about 40% of players started avoiding the punishing planet altogether, and at the 10% setting, this number reduced to 10%.

"If you are in that low frequency group, where it's harder to see the relationship between your behavior and that pirate ship appearing, that's where you tend to get individuals that will persist even after you've told them your action is leading to that negative outcome," Dr. Jean-Richard-dit-Bressel says.

But it's only a video game, why would they care?,

Dr. Jean-Richard-dit-Bressel says when interviewed, all students, whether they were sensitives, unawares or compulsives, said they cared about succeeding and actively tried to win more points than they lost.

"Those that were failing to avoid the pirate ship reported that they really disliked the point loss," he says.

"They're really good at saying, 'that's a bad thing, that's a good thing,' but they couldn't see how their actions that led to those outcomes were linked.

"It's not an issue of motivation, it's not an issue of impulsivity, or not having control over their own behavior. The problem really seems to be the ability to cognitively form an accurate model of your how your actions lead to certain outcomes that you want versus not want."

Lessons for life

The researchers are planning to progress the research further to find out why certain people may find it harder to learn from their mistakes, as

well as tailoring therapy to the individual.

"This year we will be seeing if this research can be used in treatment settings for alcohol problems to see what extent these differences in decision-making capture individual differences in treatment responses," Prof. McNally says.

"Does it allow better matching of individuals to treatments? The other side to that is, if you want to change people's behavior, what is the best way in which you present that information to them to change their behavior, especially when that information contradicts their experience?"

Dr. Jean-Richard-dit-Bressel hopes this research is the first step towards understanding what it is that brings a person to what he describes as an inflection point—recognizing that they need to change their behavior.

"When someone is dealing with, say a [substance use disorder](#), the inflection point can be when they start recognizing the detrimental side of their behavior and begin being more open to making beneficial changes, such as seeking treatment.

"We think the cognitive component of being aware of the link between behaviors and outcomes is often overlooked. So if we can find the best way to inform them of that relationship, they can actually make better decisions for themselves."

More information: Philip Jean-Richard-dit-Bressel et al, A cognitive pathway to punishment insensitivity, *Proceedings of the National Academy of Sciences* (2023). [DOI: 10.1073/pnas.2221634120](https://doi.org/10.1073/pnas.2221634120)

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