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The role of symbolic generalization in explaining the effect of the near-miss

What this research is about

Modern slot machines have features that entice people to continue gambling, which can lead to excessive gambling. One such feature is 'near-miss'. A near-miss involves getting two of the three matching images to win a prize, with the third image appearing just above or below the payline. Past research has shown that people rate their chances of winning as higher after near-misses. People also gamble at a faster rate and for longer period with near-misses.

An explanation for the near-miss effect is that near-miss looks close to a win on the slot machine display. Thus, people react to a near-miss as if it is a win. However, a near-miss is still not physically the same as a win. Another explanation is symbolic generalization. In symbolic generalization, people transfer their learned responses from one situation to another because the two are seen as being related. Two symbolic forms of relation are 'same' and 'opposite'.

If people have learned to see the images on a slot machine, such as cherry and bell, as having relation of sameness, they are likely to transfer their emotional responses associated with a win (e.g., cherry-cherry-cherry) to a near-miss (e.g., cherry-cherry-bell). On the other hand, people may not transfer their responses if they see the two images as having an opposite relation. In this study, the researchers examined the role of symbolic generalization in near-misses using a simulated slot machine task.

What the researchers did

The researchers recruited 91 students from a university in the UK. Participants first completed the South Oaks Gambling Screen (SOGS). According to the SOGS, most participants gambled recreationally without a gambling problem.

Next, participants completed two relational training and testing phases in front of a computer. For the first phase, they learned about the relations between images that shared a physical dimension (e.g., a tall tree, a medium tree, and a small tree). Thus, these images were not arbitrarily related. Participants received feedback about the relations as being same or opposite. They were then tested and had to make correct responses when choosing the third image for each set without feedback.

During the second phase, participants received training on images that were arbitrarily related. These images included six common images found on slot machines (cherry, plum, lemon, watermelon, bell, and the number 7) and a nonsense word (CUG). Similar to

What you need to know

Symbolic generalization refers to the transfer of learned responses from one situation to another because the two are seen as symbolically related. In this study, the researchers tested the role of symbolic generalization in near-misses using a simulated slot machine task. They trained 91 participants on the relations between seven images (e.g., cherry, bell, lemon) as being same or opposite. One image, cherry, always depicted win during training. As expected, participants then rated win outcomes with images that they had learned to be same as cherry to be closer to a win than win outcomes with images that they had learned to be opposite. They rated near-misses as closer to a win than losses.

the first phase, participants learned and received feedback about the relations between these images. They were then tested to ensure they could respond correctly about the relations between the images.

Participants then played a simulated slot machine task that also had two phases. The first phase trained participants on the payout of the slot machine. Outcomes of wins, near-misses, and losses consisted of images from the relational and testing phase. Wins always involved three images of cherry. Near-misses involved two images of cherry plus another image (e.g., cherry-cherry-bell). Losses involved one image of cherry plus two other images (e.g., cherry-bell-lemon). There were six blocks with 12 trials each. The researchers randomly assigned participants to receive either 33% near-misses or 50% near-misses during each block. After each block, participants rated how closely each outcome was to a win.

During the second phase of the slot machine task, participants saw outcomes of wins, losses, and near-misses that used different combinations of all the images. Each image was presented five times, with a total of 40 trials. Participants again rated how close each outcome was to a win.

What the researchers found

During the slot machine payout training, participants rated the win outcome (cherry-cherry-cherry) as closest to a win. They rated the near-miss outcomes (e.g., cherry-cherry-bell) as closer to a win than the loss outcomes (e.g., cherry-bell-lemon). This occurred regardless if participants got 33% or 50% near-misses.

During the second phase of the slot machine task, participants rated the win outcomes slightly differently depending on the relations they had previously learned. For example, if participants had learned that bell had relation of sameness as cherry and lemon had opposite relation, they rated the win outcome with three bells as slightly closer to a win than the win outcome with three lemons. They rated the near-miss outcomes with either bell or lemon as similarly close to a win. These results suggest that slot machine images can influence people's expectation about winning through symbolic generalization.

How you can use this research

This study can inform intervention providers and gambling regulators about the near-miss effect. It can also inform future research. For example, future research may want to examine the role of symbolic generalization in people with problem gambling and with more complex multi-reel slot machines.

About the researchers

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