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Illusion of control and sense of agency among undergraduate students

What this research is about

It is common for people to overestimate their level of control and skill over games of chance. Psychological mechanisms could contribute to the illusion. People often believe they have more control over an outcome when they make an action or choice (e.g., choose their own lottery numbers). Thus, illusion of control is related to a sense of agency, which is our experience of control over our environment. One challenge has been to measure illusion of control. Many previous studies have examined subjective ratings, where people judge their confidence in winning or how much control they think they have. These ratings are prone to demand characteristics of the studies or memory biases. Fewer studies have used behavioural measures. To fully show that people have illusory control, it is necessary to show that they are willing to pay a cost to gain control over a chance outcome. This study developed a novel experimental task to test for illusory control and examined how illusory control related to sense of agency.

What the researchers did

The researchers recruited 78 undergraduate students from a university in UK. They administered a novel, computerized card-guessing task. Here, 13 cards were dealt face down on a circular wheel with a white "win" segment and a red "loss" segment. Participants would be rewarded money if they revealed an Ace in the win segment. They would lose if the Ace was in the loss segment. In the "no control (baseline)" condition, participants could only press the "reveal cards" button. In the "free spin" condition, they could rotate the win and loss segments for free before pressing "reveal". In the "pay to spin" condition, they could choose to pay in order to rotate the win and loss segments. At the end, a questionnaire was administered to measure subjective illusory control (e.g., how much more control spinning gave them).

What you need to know

This study examined illusory control over a chance outcome among undergraduate students. Several tasks measured illusory control and sense of agency. Results revealed that confidence in winning was higher when participants could exert control (i.e., spinning a wheel before revealing the cards). This effect was stronger when they had to pay a cost to gain control. Thus, illusory control was highest when participants were willing to disadvantage themselves. On the tasks that assessed sense of agency, the majority overestimated their control over the tasks.

Two different tasks from the cognitive psychology literature assessed sense of agency. In the contingency judgement task, participants were presented with an unlit bulb and had 1.5 seconds to decide whether to try to light it up by pressing the space bar. At the end, they rated their degree of control over the illuminations. In two conditions, the light bulb illuminated 25% or 75% of the times and participants won money for each illumination. In two other conditions, it illuminated 25% or 75% of the times and they lost money each time it did not light up.

The intentional binding task had four conditions. In two conditions, participants pressed a key at any time they wanted to produce a tone that occurred 250 ms later. Participants guessed either the timing of their key press or the tone. In the baseline conditions, they guessed the timing of a key press in the absence of a tone or the timing of a tone without a key press.

What the researchers found

On the card guessing task, the frequency of paying to spin was quite high. Over half (64.1%) paid at least once, and 35.9% paid five or more times. Illusory control seemed to be trait that varied across participants. While many were willing to pay to gain control, about one third refused to pay at all. Illusion of control was higher under conditions of "pay to spin" and "free spin". Moreover, participants were more likely to spin when their confidence was higher. This effect was stronger in the "pay to spin" condition than "free spin" condition. In other words, the decision to exercise control was more closely linked to decision confidence when the control was costly.

On the contingency judgement task, participants overestimated their degree of control over the light bulb illuminations. They rated their control much higher when they won money than when they lost money, and in the 75% conditions compared to the 25% conditions. On the intentional binding task, participants reported to have pressed the key later than they actually did when it produced a tone. Likewise, they reported to have heard the tone earlier than it actually played Thus, there was an intentional binding effect. Participants had a compressed sense of time when they thought an action (key press) produced an outcome (tone).

Illusory control was related to an explicit sense of agency. That is, illusory control on the card guessing task related to overestimating one's agency over the contingency judgement task. But it was not related to an implicit sense of agency about action-outcome relationships (intentional binding).

How you can use this research

Gambling treatment providers could use this study to support interventions that focus on decreasing illusory control. They could advocate for removing game features that promote illusory control. This study also extends knowledge on how illusory control is best defined and studied. More research is needed on how illusory control affects problematic gamblers as opposed to healthy individuals.

About the researchers

Juliette Tobias-Webb, Eve H. Limbrick-Oldfield, and **Luke Clark** were affiliated with the Department of Psychology at the University of Cambridge in UK; LC and ELO are now based at the Centre for Gambling Research at the University of British Columbia in Canada. **Claire M. Gillan** is affiliated with the Departments of Psychology at the University of Cambridge and New York University. **James W. Moore** is affiliated with the Department of Psychology at the University of London. **Michael R. F. Aitken** is affiliated with the Department of Psychology at the University of Cambridge and IOPPN at King's College London. For more information about this study, please contact luke.clark@psych.ubc.ca.

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