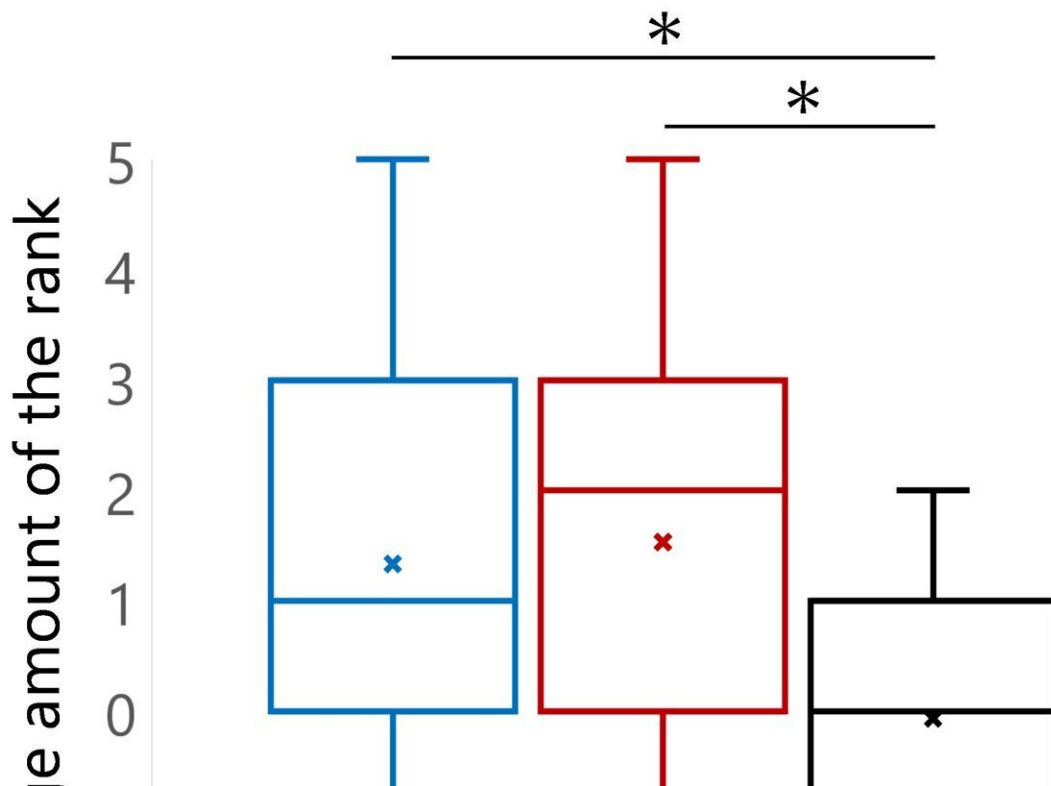


# Using a semi-autonomous robot to understand the psychological connections between machine and user

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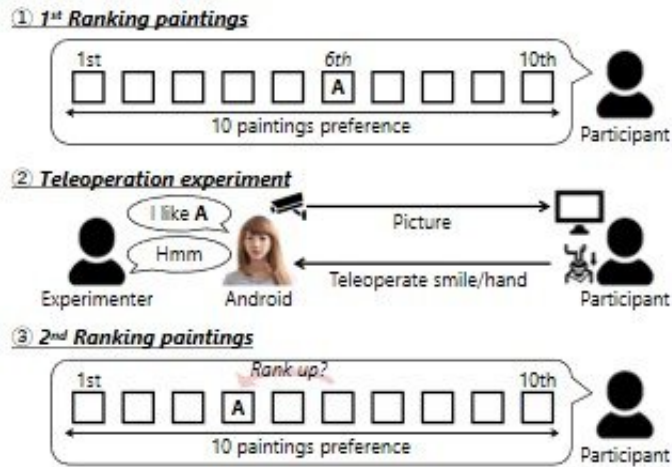


Changes in attitude by the participants in relation to the ranking of the paintings. The results of a Student's t-test (alpha level of 0.05) obtained after applying a Bonferroni correction (multiplying the p-value by 3) were used to determine if the magnitudes of the changes under the various conditions were different. We confirmed that the changes were significantly higher in SC than in WC, and higher in HC than in WC. (\* p Scientific Reports (2022). DOI:

Humans have long been known to sympathize with the machines or computer representations they operate. Whether driving a car or directing a video game avatar, people are more likely to identify with something that they feel in control of. However, how the autonomous behavior of the robots affects their operators is not known. Now, researchers from Japan have found that when a person controls only a part of the body of a semi-autonomous robot, they are influenced by the robot's expressed "attitudes."

Researchers at the Department of Systems Innovation at Osaka University tested the [psychological impact](#) of remotely operating certain semi-autonomous robots on humans. These "telepresence" robots are designed to transmit the [human voice](#) and mannerisms as a way of alleviating labor shortages and minimizing commuting costs. For example, a [human operator](#) may control the voice, while the [body movements](#) are handled automatically by a computer.

"Semi-autonomous robots have shown potential for practical applications in which a robot's autonomous actions and human teleoperation are jointly used to accomplish difficult tasks. A system that combines the 'intentions' of different agents, such as an algorithm and a human user, that are collectively used to operate a single robot is called collaborative control," first author Tomonori Kubota says.



Outline of the experiment: (1) The participants were asked to rank the 10 paintings. (2) They were assigned to 1 of the 3 experimental conditions (SC, HC, and WC). In all conditions, the android recommended the painting that was ranked 6th by the participants to a male confederate of the experimenters (who was assumed to be a fellow participant by the others). (3) Fifteen minutes after the experiment, the participants were asked to re-rank the same 10 paintings. If the rank of the painting recommended by the android was higher than that of the first painting, we considered that the attitude of participants had been influenced by the android, supporting our hypothesis. Credit: *Scientific Reports* (2022). DOI: 10.1038/s41598-022-13829-3

In the experiment, the team investigated whether the attitude of the teleoperator would align more with that expressed by the semi-autonomous robot when they controlled a part of the robot's body. Beforehand, experimental participants were asked to rank a set of 10 paintings. They were then assigned to one of three conditions for controlling a human-like robot. Either they operated the robot's hand movement, ability to smile, or did not control the robot at all. They were then shown the android speaking to another participant who was actually collaborating with the experimenters. The android recommended the painting that had been ranked sixth, and the experimenters recorded how much this influenced the robot operator's subsequent ranking of that

painting.

"This study reveals that when a person operates a part of the body of an android robot that autonomously interacts with a human, the person's attitudes come to closely align with the robot's [attitudes](#)," senior author Hiroshi Ishiguro says.

This research indicates that in future implementations of "human-robot collaborations," designers need to be mindful of the ways operators may be influenced by their role with subconscious changes in attitude.

The article, "Alignment of the attitude of teleoperators with that of a semi-autonomous [android](#)," was published in *Scientific Reports* .

**More information:** Tomonori Kubota et al, Alignment of the attitude of teleoperators with that of a semi-autonomous android, *Scientific Reports* (2022). [DOI: 10.1038/s41598-022-13829-3](https://doi.org/10.1038/s41598-022-13829-3)

Provided by Osaka University

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