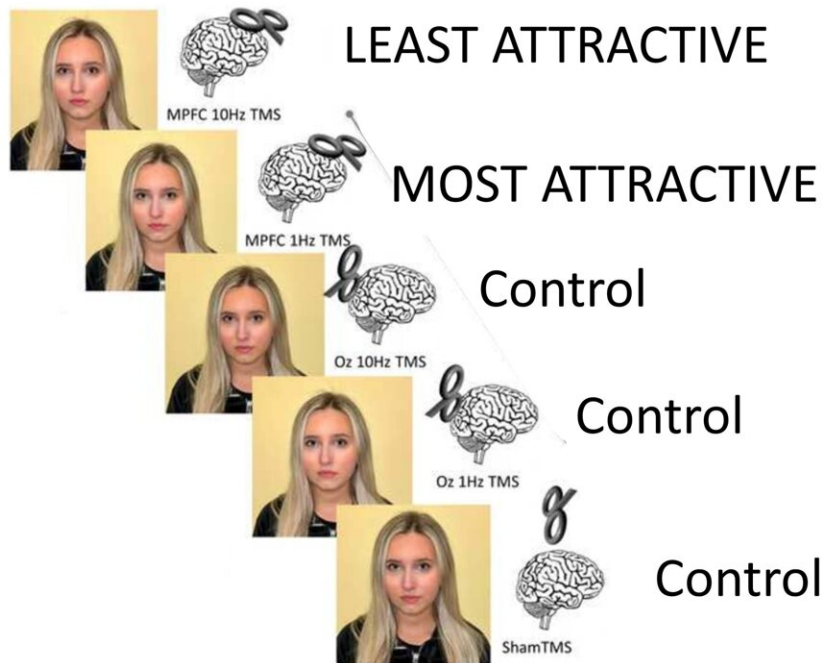


Stimulating the medial prefrontal cortex changes a person's perceived attractiveness, study suggests

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A mock participant after the five brain conditions. The first increased brain activity in the frontal lobe and on average, caused a decrease in attractiveness. The second, inhibited the frontal area and increased attractiveness. The next three were control conditions. Sham means no TMS was applied. Credit: Zorns et al.

Humans typically perceive others and themselves as more or less

physically attractive, yet the neural underpinnings of these attractiveness-related perceptions remain widely unexplored. While some past studies found that stimulating the brain, particularly the medial prefrontal cortex (MPFC), can change a person's physical appearance, they did not determine whether it altered how attractive they were perceived to be by others.

Researchers at Montclair State University recently tried to answer this research question, by conducting a two-phase experiment involving [human participants](#). Their findings, [published](#) in *Frontiers in Human Neuroscience*, suggest that modulating activity in the MPFC using brain [stimulation](#) techniques changes how attractive one is perceived to be by others.

"Sam Zorns, a student at Montclair came to me with the following thoughts," Dr. Julian Keenan, who supervised the study, told Medical Xpress. "She said, A person's physical attraction can be raised or lowered by how they feel or what they are thinking. We all know this, but what would happen if we stimulated the part of the brain that controls confidence and one's self-awareness? Would that change how attractive others would see them as?"

After reviewing previous literature focusing on human attraction, Dr. Keenan and Zorns realized that so far no one had explored the link between brain stimulation (i.e., transcranial magnetic stimulation) and perceived attractiveness. They thus set out to investigate it themselves.

"We came up with the idea for this study during Dr. Keenan's Social Neurobiology class, which I was attending as a student," Zorns said. "The first thing we said to each other was that we wanted to discover something that hasn't been totally touched on in research yet. As Dr. Keenan said, we already had a basis for physical attractiveness in the self, but wanted to see if we could influence perceived attraction in

others."

The recent study by Dr. Keenan, Zorns and their colleagues was aimed at answering two main research questions. The first was whether, after brain stimulation, a person would be perceived as more attractive. The second was whether they would themselves feel more attractive or confident in their appearance.

To do this, the researchers recruited a total of 440 participants, 10 of which took part in the first phase of their experiment and 430 of which in the second. In the first experimental phase, they stimulated the brain of 10 participants and then took a picture of them.

"We used five different conditions," Dr. Keenan explained. "We knew that the prefrontal cortex (the frontal part of the human brain) was the area of interest. We sped up activity there (excitation). We also slowed activity there (inhibition). We compared these two conditions with some controls."

Dr. Keenan, Zorns and their colleagues found that people did not feel more attractive or more confident after their brain was stimulated. In other words, after receiving brain stimulation, participants reported feeling exactly the same about themselves as they did before the experiment.

"In the first phase of the study after excitation and inhibition, the subjects would answer questions on a sliding scale pertaining to themselves in the sense of attractiveness and confidence," Zorns said.

"In the second phase of the study, instead of having the rating pool answer questions, which was something we considered, we decided to have those that were rating the subjects rank the photos on an attractiveness scale. This gave us a clearer response on how the subjects

were perceived."

During the second phase of the experiment, Dr. Keenan, Zorns and their collaborators asked 430 new individuals to rate the pictures they had taken of the first 10 initial candidates, following brain stimulation. Remarkably, they found that the inhibition of the frontal cortex made people more attractive, while exciting it made them less attractive. In other words, people whose frontal cortex was inhibited using brain stimulation were rated as more attractive by others than those whose frontal cortex had been excited (i.e., speeding up activity of neurons in the region).

"This is the first time that brain stimulation has been found to change attractiveness," Dr. Keenan said. "Furthermore, this is one of the first, if not the first study that has had a large sample of people rate on any measure of a person following brain stimulation. Third, people become more attractive without experiencing any conscious change themselves. The changes in one's appearance took place in an unconscious manner."

Overall, the findings gathered by this research team suggest that changes in brain activity in the prefrontal cortex influence how one is perceived, particularly in terms of their physical attractiveness. Yet these changes were found to have no effect on how attractive the individuals with this change in activity perceive themselves to be, suggesting that internal perceptions are not a good indicator of how others perceive us.

"This is a first for research which is such an honorary feeling and I'm so appreciative to have such a great mentor that helped facilitate this study," Zorns said.

"I can confidently say that myself and those who worked so hard on the study along with me are very thankful to have Dr. Keenan. Our results gave us so much insight into the level of unconsciousness that goes into

appearance and attractiveness that we weren't originally aware of."

This recent study could soon open new avenues for neuroscientific research, inspiring teams at other institutes to carry out similar experiments. Meanwhile, Dr. Keenan and Zorns hope to continue exploring the effect they observed, to unveil other changes following brain-stimulation that they may have missed.

"We now have to find out if there are any conscious changes," Dr. Keenan said. "We may have asked the wrong questions. That is, did the participants that had their brains stimulated feel any change? As far as we know, they didn't. However, we probably didn't ask all the questions we should have."

In their next studies, the researchers could change the questions posed to participants, to determine whether this will lead to different answers and results. They are particularly interested in ascertaining whether people change their conscious attractiveness-related perceptions following brain stimulation.

"In my opinion, one of the most difficult parts of the research was asking the right questions because sometimes, you just don't know what the exact right questions are; it's trial and error," Zorns added.

More information: Attraction is altered via modulation of the medial prefrontal cortex without explicit knowledge. *Frontiers in Human Neuroscience*(2024). [DOI: 10.3389/fnhum.2024.1333733](https://doi.org/10.3389/fnhum.2024.1333733). [www.frontiersin.org/journals/h... 024.1333733/abstract](https://www.frontiersin.org/journals/human-neuroscience/articles/10.3389/fnhum.2024.1333733/abstract)

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