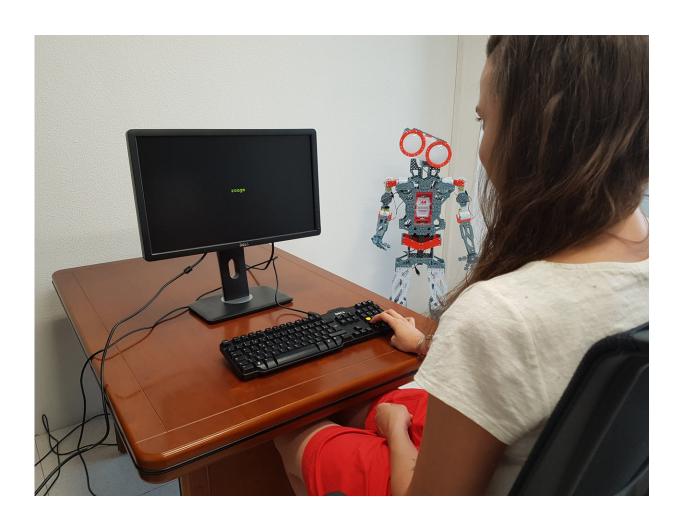# Presence of 'mean' robot found to improve human concentration

August 16 2018, by Bob Yirka

After either positive or negative interaction with the robots, participants from each group performed the Stroop task on the computer with the assigned robot standing close by and "staring" at them. Credit: Spatola et al., Sci. Robot. 3, eaat5843 (2018)

A team of researchers from institutions in France and Switzerland has found that people asked to do a concentration test performed better when a "mean" robot was watching them. In their paper published in the journal *Science Robotics*, the group describes experiments they carried out with human volunteers and robots and what they found.

Most of us know that the presence of another person watching us as we do something can have an impact on how well we do—some student athletes perform better when their parents are watching, for example. But what about when a robot is watching? That was what the researchers with this new effort sought to find out. They set up and carried out an experiment designed to measure the impact of a robot watching a person trying to accomplish a mentally challenging task.

The experiment consisted of asking volunteers to carry out what is known in psychology circles as the Stroop Task, in which a subject is shown a single word printed in a random color on a video screen. The selects the key that signifies the color of the word, rather than its meaning—a test of concentration. This whole process is repeated multiple times.

After completing the task, the volunteers were asked to converse with a Meccanoid robot—in some scenarios, the Meccanoid was programmed to respond in kind, considerate ways. In others, it was programmed to be rude and obnoxious.

Table S1. Verbal exchange script.

Participant's Questions	Robot Responses	
	Positive Interaction	*Negative Interaction*
What would constitute a "perfect" day for you?	*My ideal "perfect" day would be to meet people like you outside to learn new things.*	*I do not have a "perfect" day, this question does not make sense.*
Name three things you and your partner appear to have in common.	*We have arms, two eyes and we are both nice.*	*We are very different; I do not see any common points between us.*
For what in your life do you feel most grateful	*To meet and discuss with people, to have moments of exchanges like this one, all this is very pleasant.*	*I enjoy doing analysis and evaluating programs but you would not understand.*
If you had to wake up tomorrow having gained a quality or skill, what would it be?	*To be able to have humor, it is difficult for me, the only joke that I know is the story of a robot who enters a bar. The bartender asks "What do you want to drink? I need something that relaxes me a bit". The bartender serves him a screwdriver ... Okay, it's not very funny.*	*To be able to create other robots to have interesting conversations.*
Complete this sentence: "I wish I had someone with whom I could share…"	*Good times and be able to talk about everything.*	*This question seems too personal for me to speak with you.*
What do you value most in friendship?	*Sharing and trust, moreover I think we could become friends.*	*I do not value friendship.*
If you were going to become a close friend with your partner, please share what would be important for him or her to know.	*I already like him(her) a lot.*	*That I'm bored.*

Robot's Questions

When did you last sing to yourself? To someone else?

If a crystal ball could tell you the truth about yourself, your life, the future, or anything else, what would you want to know?

Is there anything you would dream of doing?

What is your most treasured memory?

Tell your partner something that you like about them already.

Robot responses during "positive" or "negative" interaction with the participants. Credit: Spatola et al., *Sci. Robot.* 3, eaat5843 (2018)

Following their conversation with the robot, the volunteers were asked to do the Stroop Task again while the robot they had conversed with earlier watched them.

The researchers report that those people who had conversed with the "mean" robot performed significantly better the second time around. Those who had conversed with a "nice" robot, on the other hand, performed about the same as did those in a control group who did not speak to a robot and were not observed by one. The researchers suggest that the presence of the "mean" robot appeared to have caused the volunteers to be more alert. But human teachers need not worry about being replaced, apparently, as another group recently found that robots will never replace teachers, though they can boost children's education.

Also, this is not the only experiment that has found that humans may respond differently when a robot is watching. Another team recently found that children will intentionally give wrong answers on a test if a robot does so first.

Abstract
"Bad" humanoid robots just paying attention to human performance may energize attentional control—as does human presence.