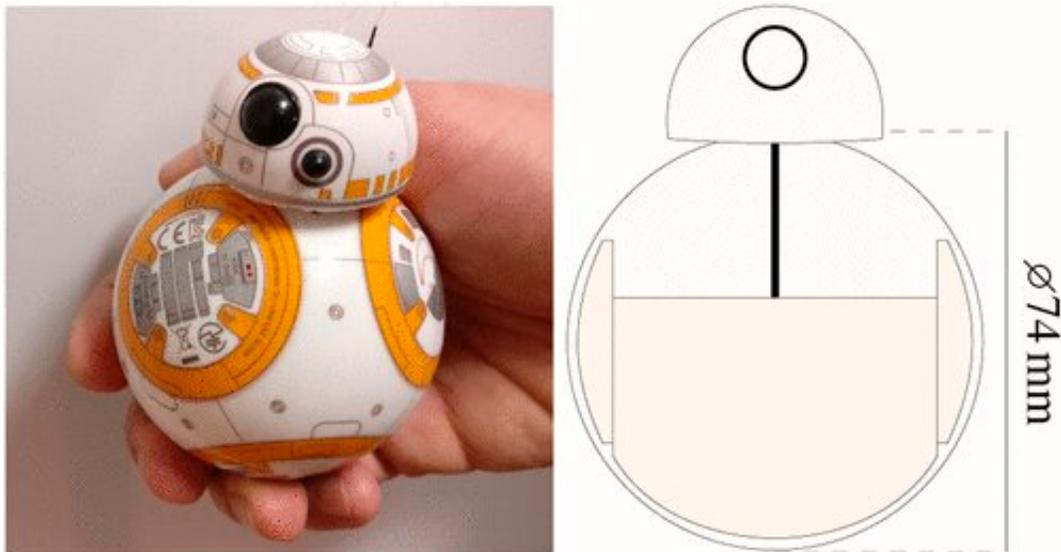


# Potential for social connection between humans and robots

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Left: The used robot platform BB8 from Sphero. Right: A 2-D cross-sectional view of the robot. A two-wheel vehicle (darker shape), kept in position by a heavy weight, moves the sphere when driving. The speed of each servo motor can be set individually, allowing the robot to move straight, to turn and to spin. A magnet attached to the vehicle keeps the head on top of the sphere facing towards the movement direction. Credit: *Adaptive Behavior* (2022). DOI: 10.1177/10597123211066153

New research from the University of Hertfordshire reveals how humans could develop more natural, social interactions with robots in the future.

The new [human-robot interaction](#) research, published in *Adaptive*

*Behavior*, is the first ever to evaluate people's perception and interaction with an intrinsically motivated [robot](#) that has been designed to appear sociable and companionable.

"Intrinsic motivations" are computational modes that try to replicate what motivates humans or other organisms at a primal level, for example the drive of a baby to explore its own limbs and how they work.

Scientists hope that the findings of this latest study will influence the way engineers design robots in the future—the results could be key to developing robots that people might one day accept in their daily lives and in their homes.

The study used a BB-8 style robot, produced by Sphero as Star Wars merchandise. To make the robot appear more sociable, scientists programmed the robot with algorithms to simulate curious and playful adaptation to its own experience. They set the robot to have either simple reactions, or to adapt their behavior based on interaction with a [human](#) partner. Researchers then measured participants' responses as they interacted with the robot, in particular noting that the adaptive robot was perceived as having more 'warmth.' In a nutshell, the curious and adaptive robot was seen as more social and friendly.

Dr. Marcus Scheunemmn, Visiting Research Fellow at the University of Hertfordshire and Senior Robotics Engineer at BotsAndUs, commented: "Traditionally robots have been preprogrammed and do repetitive tasks. However, it is very unlikely that we will be able to program all tasks for all the ever-changing homes and environments out there. Therefore it is important that robots can explore new things and learn to adapt to new experiences—this is the way forward for them to cope with human-made, fast-changing environments.

"The really cool thing is that we did not program the robot's behavior

explicitly. We just gave it the rules to be curious and let it create behaviors to explore its environment. We used this robot in a genuine, physical human-robot interaction experiment, something that hasn't been done before."

Dr. Christopher Salge, research fellow at the University of Hertfordshire, added: "Understanding the way people instinctively react to robots will help us consider how they could be assimilated more into day-to-day life in future. We might think of robots as cold and mechanical—and that's how they've traditionally been shown in popular culture. But if you feel a robot is sociable, or even empathetic, you will intuitively have a different response to it. This could help build trust and acceptance, for example of driverless cars, healthcare aids and domestic help."

Professor Daniel Polani explained: "Humans are very sensitive to behaviors and emotions. We even form emotional relationships with objects and brands. And we're not the only animal to have this 'cuteness detection'—but robots don't have it, of course. We can endow robots with these properties through careful design choices."

In future, the research team aims to explore how robots can memorize these behaviors and interactions for future decision-making, as robots move beyond simple pre-programmed tasks to creating autonomous, meaningful behavior.

"Human Perception of Intrinsically Motivated Autonomy in Human-Robot Interaction" is now published in *Adaptive Behavior*.

**More information:** Marcus M Scheunemann et al, Human perception of intrinsically motivated autonomy in human-robot interaction, *Adaptive Behavior* (2022). [DOI: 10.1177/10597123211066153](https://doi.org/10.1177/10597123211066153)

Provided by University of Hertfordshire

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