

People with prosthetic arms less affected by common illusion

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Most people wrongly judge smaller objects to be heavier than larger ones if they weigh the same. Credit: Lauren Jennings

People with prosthetic arms or hands do not experience the "size-weight illusion" as strongly as other people, new research shows.

The size-weight [illusion](#), which affects about 98 per cent of people, causes them to experience smaller objects as feeling heavier than larger objects of the same weight.

The study – led by the University of Exeter and the University of Strathclyde – compared the perception of people using their anatomical hands with that of amputees using [prosthetic](#) limbs.

The researchers were surprised to find that the size-weight illusion was twice as strong in non-amputees lifting with their [hand](#) as it was in the

prosthetic users.

"This unexpected finding suggests that using a prosthesis might fundamentally affect the way people perceive the world," said Dr. Gavin Buckingham of the Department of Sport and Health Sciences at the University of Exeter.

"People using a prosthetic hand perceive real weight differences just like everybody else, but the effect of the size-weight illusion is halved.

"The reasons for this are a little mysterious. It might be to do with the lack of sensory receptors in a prosthetic hand, or might depend on how the prosthetic hand is attached to the stump."

In a second experiment, the researchers tested how the illusion affected non-amputees who used a prosthetic hand simulator to lift objects.

The results were similar to those for amputees with [prosthetic limbs](#) – the effect of the size-weight illusion was halved.

Sarah Day, of the National Centre for Prosthetics and Orthotics in the Department of Biomedical Engineering at the University of Strathclyde, added: "Many amputees prefer not to use [prosthetic arms](#) or hands, but the reasons for this are not well understood. Research like this might help us better understand why."

The research was carried out by academics at the University of Exeter, Liverpool Hope University, Manchester Metropolitan University, Heriot-Watt University and the University of Strathclyde.

The paper, published in the journal *Psychonomic Bulletin and Review*, is titled "The impact of using an upper-limb prosthesis on the perception of real and illusory weight differences."

More information: Gavin Buckingham et al. The impact of using an upper-limb prosthesis on the perception of real and illusory weight differences, *Psychonomic Bulletin & Review* (2018). [DOI: 10.3758/s13423-017-1425-2](https://doi.org/10.3758/s13423-017-1425-2)

Provided by University of Exeter

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