The alien awakened by a rubber hand

What happens if you administer a tactile illusion to a brain-damaged patient whose hand is out of their control? A team of researchers has done just that, figuring that illusions could offer new insights into complex neuropsychological disorders.

The patient in question was a 69-year-old lady whose left-sided stroke had left her with alien hand syndrome. Most of the time her right hand was held in a clenched position that she couldn't open. Occasionally, accompanied by a mild electric sensation, it moved involuntarily, jerking, or even slapping her in the face.

Michael Schaefer and his colleagues at Otto-von-Guericke University Magdeburg tested the lady on two sensorimotor illusions – the traditional rubber hand illusion and the lesser-known somatic rubber hand illusion. The first involved the patient placing one of her arms on the table-top, with the other underneath. A rubber arm was placed alongside her real arm on the table. The researcher then stroked the patient's hidden arm and the rubber arm in synchrony. When the illusion works it creates the sensation of feeling in the rubber arm, as if it's a part of the person's body. In fact the patient experienced no feeling in the rubber arm at all, regardless of whether it was her healthy arm or alien arm that was being stroked under the table. The rubber hand illusion doesn't work for everyone so this null finding is not particularly surprising.

In *Neurocase: The Neural Basis of Cognition*

Things got more interesting when the researchers tested their patient with the somatic rubber hand illusion. This procedure involved the rubber arm being placed between the patient's two real arms on a table-top. This time, the patient was blindfolded and the researcher (wearing plastic surgical gloves) picked up one of the patient's hands and used it to tap the rubber hand. At the same time, and in synchrony, the researcher tapped the patient's other hand. This procedure creates the strong illusion for the participant that they are touching their own hand rather than the rubber hand – a feeling that the patient said she experienced.

But something surprising also happened when the researchers tried out this illusion. Within moments, the patient's alien hand leapt up off the table and was grabbed by her healthy hand. She said she felt an electric sensation in her alien hand prior to it rousing. The illusory experience seemed to have awakened her alien hand. This effect occurred every time the procedure was repeated. But crucially it only happened when it was the patient's healthy hand that was used to tap the rubber hand, whilst the patient's alien hand was simultaneously tapped by the researcher (and not when the illusion was done the other way around). The awakening effect also disappeared when the procedure was repeated with the patient's blindfold removed, which is known to destroy the illusion.

All this suggests that it wasn't touching the alien hand *per se* that roused it, but rather it was the experience of the body illusion. Schaefer and his colleagues think that their patient has a disconnect between the anterior supplementary motor area (SMA) at the front of her brain (involved in inhibitory control) and other brain regions involved in movement. They reckon this impaired motor integration somehow interacted with the illusory feelings of body ownership triggered by the rubber hand trick. Perhaps, they said, the illusion further weakened the SMA's already compromised control of the alien hand.

'Although our results should be confirmed by further studies, we believe that the examination of experimental-induced illusions in patients with disorders of self-embodiment is promising and might help us to develop treatments for these diseases in the future.'

I Some experts prefer the term anarchic hand syndrome for this patient's condition, reserving the term alien hand syndrome for a distinct but related condition in which the patient no longer believes the hand is theirs. For consistency we use the terminology adopted by the authors of this paper. For more, see tinyurl.com/anarchichand.

How to reverse the bystander effect

In the July issue of the *Journal of Social and Experimental Psychology*

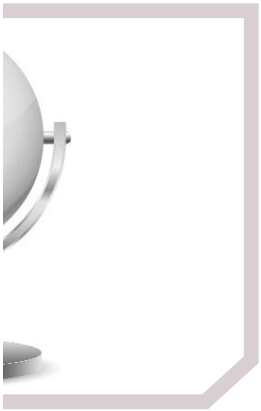
You see a shopper trip over in a busy street. Someone else can help. That's what you tell your conscience. This is the bystander effect, and it's been demonstrated in numerous studies over many years.

But life is complicated and psychologists have begun looking at the circumstances that can nullify or even reverse the effect. For a new paper, Marco van Bommel and his team tested the idea that the presence of others could in fact increase our proclivity for helping if we're nudged into a self-aware mindset and thereby reminded of our social reputation.

Two experiments were conducted using an online chat room for people with extreme emotional problems. Eighty-six students were logged in and shown five messages posted by troubled forum users – for example, one was written by a person who wanted to commit suicide. The participants were told they could write a reply if they wanted, but it was entirely up to them.

In the baseline condition, each participant could see his or her name in the top left-hand side of the screen alongside other users' names. A counter also told them if the forum was quiet, with just one other person logged-in, or if it was busy, with 30 others online.

This basic arrangement replicated the classic bystander effect – participants were less



likely to post replies when there were more people logged into the forum. However, when the researchers cued self-awareness by highlighting the participant's name in red on the screen, the bystander effect was reversed – they now posted more replies when the forum was busy compared with when it was quiet.

A second study built on these findings, but this time self-awareness was cued by the presence, or not, of a webcam on the computer. For those in the webcam condition, their attention was drawn to the device by having them check that its LED indicator light was on, although they were told that the camera wouldn't be used until a later task. In the absence of a webcam, the bystander effect was again replicated – participants on a busy forum, compared to a quiet forum, posted fewer replies to users in need. By contrast, participants cued to be self-aware by the presence of a webcam actually wrote more replies when the forum was busy, compared with when it was quiet.

'The bystander effect can be reversed by means of cues that raise public self-awareness in social settings,' the researchers said. Defending the study's relevance in a world where our social activities are increasingly taking place online, they also pointed to implications for the debate around the proliferation of security cameras in public places. 'While certain forms of self-awareness may not always be welcomed by people, the present findings do underscore their power to promote helping one another,' the researchers said.

The new science of 'Phew!'

In the May issue of *Psychological Science*

There's a childish prank I never tire of. As soon as we've left the house and the front-door has slammed shut, I pat down all my pockets and say nervously to my companion 'Er, you've got the keys, right?'. Then, just when their dismay at the prospect of being locked out has peaked, I say 'Only joking!' and watch with pleasure as relief washes over them.

I say 'relief', but what exactly is the emotion my companion experienced? As Kate Sweeny and Kathleen Vohs write in a new article, 'Although relief is readily identified and frequently experienced, it is not understood well from the perspective of psychological science.'

Now Sweeny and Vohs have attempted to make a start at mapping out this uncharted emotional territory. They began with a pilot study asking 91 people to provide a personal example of relief. Roughly half the group described a 'near-miss' kind of relief – rather like fearing that you've locked yourself out and then realising that you haven't. The other half described a kind of 'task-completion' relief, in which a negative experience had come to an end. A second pilot study with dozens of American and Dutch participants established similarly that half their relief experiences in the preceding week were of the 'near-miss' category and half were of the 'task completion' kind.

Next, in a study in which 114 more participants reflected on recent relief experiences, the researchers found that near-miss relief was associated with having more thoughts about how much worse things could have been and feeling more socially isolated (regardless of whether they were on their own or not). Sweeny and Vohs said this is consistent with past research showing how excessive rumination can be harmful to close relationships. Experience of task-completion relief, by contrast, was associated with more thoughts about how things could have been even better.

Lastly the researchers had a go at inducing relief. They invited 79 participants to a lab and told them they'd have to sing a song into an audio recorder. Half the participants were then told the recorder was broken, thus prompting them to experience near-miss relief. The other half of the participants did the singing, which it was presumed would be followed by the experience of task-completion relief. Quizzed afterwards, it was again found that near-miss relief, more than task-completion relief, was associated with feelings of social isolation and thoughts about how things could have been worse. The negative counterfactual thinking mediated the social isolation – that is, the more thoughts about how bad things could have been, the more socially isolated people felt.

What does all this tell us about what relief is for? 'Experiencing near-miss relief could increase the likelihood that people will act to avert an unfavourable fate in the future,' Sweeny and Vohs said. 'In contrast, task-completion relief allows people to focus on the positive emotional experience with minimal distraction from downward counterfactual thoughts. This process might reinforce satisfaction in the completion of a job well done... and therefore increase the likelihood that people will repeat the unpleasant experience.'

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