

How punishment can help boost memory

A well-established finding in psychology is that successfully retrieving information from memory serves to consolidate the storage of that information. Each time your brain's filing clerk tracks down the right information, the more likely he is to find it another time. Psychologists call this the testing effect – practising retrieval of information is far more effective than simply re-studying that same material.

Can this benefit of testing be enhanced? Yes it can. A new study has provided the first ever demonstration of how to enhance the memory consolidation that occurs after correctly answering a test question. Bridgid Finn and Henry Roediger's important and somewhat surprising new finding is that following a correct answer with an aversive stimulus serves to enhance the consolidation of that memory. It's like punishing the filing clerk after each correct retrieval makes them even more accurate in the future.

Forty undergrads studied multiple lists of 10 word-pairs, each featuring a Swahili word and its English translation. After each list of 10, they were tested. Presented with the Swahili, they had to answer with the English. Here's the important bit. If they answered correctly, one of three things happened immediately: a blank screen appeared; a neutral picture appeared (e.g. a fork); or a negative, aversive picture appeared (e.g. a dead cat).

After this pattern of study period and test had been followed for 10 lists of 10 word-pairs, the participants were then given a jumbo test of all 100 Swahili words. Here's the key result: for those items answered correctly in the earlier mini-tests, it was those that were followed by a nasty picture that were most likely to be accurately recalled in the final jumbo test. Earlier correct answers that had been followed by a neutral pic or blank screen were not so well remembered in the final, jumbo test (and performance was equivalent across the blank/neutral conditions).

'These data are the first to show that arousal following successful retrieval of information enhances later recall of that information,' the researchers said.

A follow-up study was similar to the first but this time correct answers in the initial mini-tests were followed by neutral or aversive pictures that appeared two seconds later, as opposed to appearing immediately as they did in the first study. This was to see if there was a narrow window beyond which a negative stimulus wouldn't any longer enhance the consolidating effect of correct retrieval. The results were just the same as for the first study, so even two seconds later, a nasty picture is still able to enhance the memory consolidating effect of a correct retrieval. Future studies are needed to test just how long after a correct retrieval this process is still effective, and to see if positive images exert a similar benefit.

Finally, the researchers looked to see whether the presentation of a negative pic has its memory-enhancing effect after items are merely studied, as opposed to recalled. A similar protocol with Swahili-English word pairs was followed as before, but this time, instead of mini-tests after each set of 10 word pairs, the participants were simply given the pairs to study again, with each pair followed by either a blank screen, neutral picture or nasty picture. This time, there was no benefit of the negative pics. In fact, there was a trend for pairs to be recalled less often if they'd been followed by a nasty pic in the earlier study phase.

Why should negative images boost the consolidating effects of answering a test item correctly? Finn and Roediger aren't sure but think it has to do with links between the amygdala, which is involved in fear learning, and the hippocampus – a brain area involved in long-term memory storage. This is a rather vague account and doesn't explain why aversive stimuli only enhance memory after correct retrieval, not further study. By way of further context, a 2006 study showed the presentation of aversive images after to-be-learned stimuli was beneficial during the initial study of that material.



In the June issue of *Psychological Science*



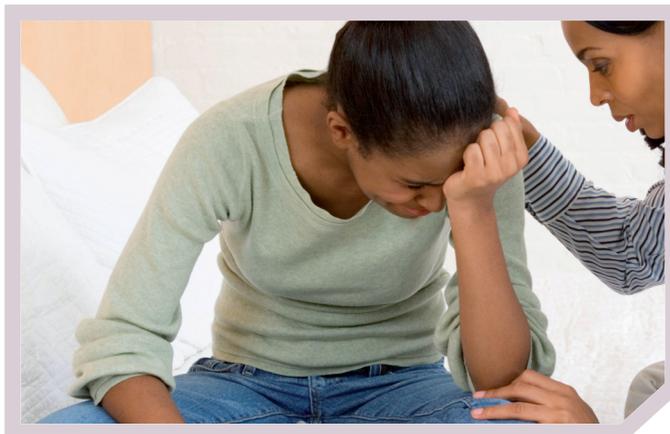
Laughing at oneself

In the June issue of *Emotion*

To be capable of laughing at oneself is usually considered a mark of good character and the foundation of a robust sense of humour. Yet this is a behaviour that's barely been touched on by psychologists. Opinions have been expressed – for example, La Fave and his colleagues thought that laughing at oneself was never genuine and couldn't be a truly happy event. But for largely practical reasons, experiments on the topic are non-existent. Now Ursula Beermann (University of California, Berkeley) and Willibald Ruch have shown one way to do it.

Sixty-seven undergrads rated their own ability to laugh at themselves and they nominated one or two peers to provide third-party ratings of the same. Sneakily, whilst the participants filled out these and other questionnaires at a computer, a screen camera took pictures of them. A little later the participants were asked to rate distorted pictures of the faces of unfamiliar men and women. To their surprise, included in the selection were the sneaky photos taken earlier of themselves. These photos of the participants had also been distorted to be, for example, stretched wide as if looking in a spoon (the Mac 'Photobooth' software was used to create these effects).

The participants were filmed while they rated the photos so the researchers could later analyse the footage to see whether the participants laughed at the distorted images of themselves. Ekman's Facial



Does crying really make you feel better?

In the August issue of *Journal of Research in Personality*

Action Coding system, which focuses on the flexing of specific facial muscles, was used to decode the participants' facial expressions, and in particular to look for signs of genuine 'Duchenne smiles', which are symmetrical and involve creasing of the muscles around the eyes. Signs of laughter were also noted.

The findings seemed to validate the new methodological approach. Although 80 per cent of participants flashed a genuine smile at least once on seeing their own distorted image, it was those who claimed to be able to laugh at themselves, and whose peers agreed with this verdict, who showed more frequent and intense smiling and laughter in response to the distorted self-images, and fewer signs of fake smiles or negative emotion. On the other hand, there was no correlation between participants' ability to laugh at themselves (based on self- and peer-report) and the amount of laughter triggered by distorted images of other people's faces. This suggests that proclivity for laughing at oneself really is a distinct trait, separate from a general readiness to laugh.

Finally, those participants who laughed more at themselves tended to have more cheerful, less serious dispositions and to be in a better mood on the day of testing.

'[T]he current study succeeded in providing the first empirical evidence on the phenomenon of laughing at oneself,' the researchers said.

A popular idea is that crying is cathartic – that the tears of sadness wash away life's woes like detritus carried off in the tide. This has been supported by retrospective surveys that ask people how they felt after previous bouts of crying. Lab studies, by contrast, which involve participants watching weepy movies, have found crying to have no such benefit. Both approaches, however, are seriously flawed. Findings from the retrospective approach are prone to memory distortion and people's answers are likely influenced by the popular cathartic idea. Lab studies, meanwhile, suffer from a lack of realism.

A superior method is to have participants complete a daily crying diary for an extended period of time, to be completed each night – soon enough to reduce memory distortions, but not too intrusive to interfere with the behaviour under observation. Believe it or not, just one diary study of crying has been conducted before. Now Lauren Bylsma and

her colleagues have performed the second, involving 97 female undergrads who completed a crying diary, including questions about daily mood and crying context, for between 40 and 73 days. In all, 1004 crying episodes were documented, and all participants cried at least once. Most bouts of crying were triggered by conflict; the next most common reason was loss, followed by personal failing.

Bylsma's headline finding is that crying mostly had little positive benefit, at least not on overall daily mood. Not only did crying episodes tend to be preceded by two days of lower daily mood, they were also associated with lower daily mood on the day of crying and lower daily mood on two successive days afterwards. For mood in the specific moments after crying, the results were more encouraging. Most often mood was reported as unchanged (60.8 per cent), but 30 per cent of sessions were associated with a positive mood change, while 8.8 per cent led to a deterioration in mood.

Other findings included: more intense (but not longer) crying episodes were associated with more positive mood outcomes, as were crying episodes that followed a feeling of inadequacy and that triggered a positive change in the situation. Also, crying in the company of one other person was associated more often with positive mood change than was crying alone or in the company of multiple people. Conflict tears tended not to be associated with a positive mood change, undermining the idea that tears can defuse social tensions.

The study has its limitations – for example, the mood scale only had a three-point range, and it's a shame that men weren't included too. But the researchers emphasise that theirs was 'the first extended examination of the relationship between crying and mood using detailed contextual information from multiple crying episodes and, as such, represents an important step towards understanding this striking human behaviour.'



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