# Can LAUGHING GAS erase bad memories? Inhaling nitrous oxide stops thoughts of traumatic events 'sticking' in the brain

* **Researchers asked volunteers to watch scenes of graphic violence**
* **They then recorded their memories for a week after in daily diaries**
* **Number of bad memories dropped over time for those given nitrous oxide**
* **Meanwhile, the decline was more gradual for those given only air**

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Giving people 'laughing gas' after a traumatic or harrowing event could stop them being haunted by any potential distressing memories.

In tests, people who inhaled nitrous oxide after watching graphic scenes of extreme violence reported fewer troubling memories in the days after the film.

While people who only breathed normal air had a much more gradual decline in the number of bad memories, or 'intrusions.'

The research may help to reduce effects of post traumatic syndrome disorder - experienced by people caught up in awful events such as soldiers or civilians in wars or emergency services workers.

To test the effects of nitrous oxide, the researchers from University College London asked 50 healthy volunteers to watch two scenes of graphic violence in a French film described by one critic as 'so violent and cruel that most people will find it unwatchable'.

The film clips were chosen to create a milder form of the sorts of intrusive memories that follow from people suffering trauma in real-life and a trained psychologist and medical doctor were on hand during the screening.

The 2002 film, Irreversible, features a violent rape scene and a man's face being battered with a fire extinguisher.

People who inhaled a mixture of 50 per cent nitrous oxide and oxygen afterwards experienced a much faster decline in distressing memories than those who breathed normal air.

The number of distressing memories reported by volunteers went down exponentially over the days following the film for those given nitrous oxide, while the decline was more gradual for those given air.

In the week that followed, volunteers completed a daily diary to record any distressing intrusive memories they experienced, the paper in Psychological Medicine reported.

Dr Ravi Das, of the UCL Psychology department said: 'The day after they saw the film, the number of intrusions experienced by the group who received nitrous oxide fell by over a half.

'By contrast, the decline in intrusions was much slower in the group who received air, where there was not a significant drop in intrusions until the fourth day.

'We think that this is because nitrous oxide disrupts a process that helps permanent memories to form.'

He added: 'On any given day your brain will be exposed to a huge amount of information, some important, but most trivial.

'If information is "important" enough to remember, for instance because it produces a strong emotional response, it is "tagged" for storage.

'The brain requires N-Methyl D-Aspartate (NMDA) receptors to tag information during the day, which is then filed for long-term storage while we sleep.

'We know that nitrous oxide blocks NMDA receptors, so could interfere with tagging.

'This might explain why the nitrous oxide group seemed to have weaker memories of the film the day after they watched it.

The research also found that people who felt more 'dissociated' after watching the film tended to experience more intrusive memories.

Dissociation is a measure of how detached someone feels from a situation and from themselves, and is assessed by questionnaire.

Signs of dissociation include a distorted experience of time, a feeling that things are unreal and dream-like, and a feeling of disconnection from one's body.

Co-author Dr Sunjeev Kamboj said: 'Nitrous oxide is routinely used as a painkiller by paramedics and in A&E departments because it is safe and easy to administer.

'Many people who end up in an ambulance will have undergone some form of psychological trauma, and our study suggests that the nitrous oxide is likely to be having some effect on how their brain processes it.

'However, whether it helps to prevent symptoms of PTSD or makes them more likely may depend on how dissociated patients feel before they receive it.

Further research is now needed to determine whether dissociation similarly affects the response of trauma victims who receive nitrous oxide or other painkillers such as ketamine.

The researchers note that intrusive memories differ from flashbacks.

While intrusive memories are recollections of an event, during flashbacks PTSD sufferers re-experience a traumatic event in full as though it were happening and may be unable to distinguish it from the present reality.