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People Are More Suggestible Under Laughing Gas

(Jan. 10, 2009) — The pain-relieving effects of nitrous oxide – laughing gas – may be enhanced by suggestion or hypnosis, according to a new study by UCL (University College London). The study's findings – that people are more suggestible under the gas – mean that dental patients may benefit from being coached to relax while undergoing sedation.



Nitrous oxide (laughing gas) is commonly used by dentists to sedate their patients before treatment, but some dentists believe their patients also become more suggestible while under the influence of the gas. A number of dentists have been trained in hypnosis and find that their patients respond well to being spoken to in a quiet, hypnotic manner – the new findings suggest that these effects could be further enhanced with laughing gas.

The UCL study set out to establish whether laughing gas does indeed boost imaginative suggestibility – a trait closely related to hypnotic suggestibility - and imagery vividness. Thirty participants took part in two sessions where they were given a mask from which they breathed in air or 25 per cent nitrous oxide. The volunteers were not told which type of gas they were being given, and the mask was scented to disguise the sweet smell of the laughing gas.

During each session, participants were given a series of mental imagery tests and were asked to rate their response according to a scale of 1-7, where 1 was 'as clear and vivid as the real thing' and 7 was 'no image present at all'. For example, participants were asked to close their eyes and imagine tasting oranges or smelling roast beef, feeling linen or hearing the honk of a car horn.

Volunteers were also put through a series of 'imaginative suggestibility' tests based on suggestions given to them while under the gas. The suggestions were worded to invite the participant to experience hallucinated sensations. For example, they were told to imagine a sour taste in their mouth, and were told that after a while they would actually begin to experience a sour taste in their mouth, and that this would become stronger and stronger. Or they were told that a voice would come out of a (non-existent) speaker in the corner of the room, and that the voice would ask them a number of simple questions about themselves. If the participant responded well to the suggestion, he/she would answer some of the questions that the hallucinated voice had asked.

The study found that the nitrous oxide boosted imaginative suggestibility by approximately 10 per cent. This effect was unrelated to participants' expectations regarding the effects of the drug.

Dr Matthew Whalley, Honorary Research Fellow at UCL, says: "Nitrous oxide is one of the most widely used yet least well understood anaesthetic gases and until recently, relatively little was known about how it worked inside the body. Recent research has shown that nitrous oxide, like ketamine, acts as an antagonist at glutamatergic N-methyl-D-aspartate (NMDA) receptors which are found throughout the brain. A brain-wide excitation of these receptors might be responsible for the laughing gas-induced increase in imagery vividness found in the study. Alternatively, the gas may have caused volunteers to partly withdraw from their reality of actively taking part in the

tests, so that they felt less in control of their actions and felt that the suggested effects were happening by themselves.

“Many dentists use laughing gas to relieve discomfort in their patients, but our study suggests that combining the gas with instructions and suggestions to help them to relax and become absorbed in imagery, for example, might enhance the pain-relieving effect. Our findings are preliminary, however, so it would be helpful to do a larger scale study to confirm our results and explore the best ways in which to use and combine nitrous oxide and suggestion.

“Our study fixed the concentration of nitrous oxide at a relatively low 25 per cent, so it would be good to explore whether there is a dose-response relationship between drug administration and suggestibility. We already know that hypnosis enhances the effects of suggestion, so it would be helpful for clinicians to know whether combining laughing gas with hypnosis would increase suggestibility and enhance the analgesic (pain-killing) effects.

“A growing number of health professionals are trained in hypnosis but it is nothing to be alarmed about – people often think that hypnosis is about the hypnotist ‘taking control’ of the hypnotised person, but in reality the person undergoing hypnosis is an active participant and has to want to participate in order to experience a benefit. There is good evidence that although people can respond to suggestions under hypnosis, they can also choose to refuse any suggestion, and cannot be made to do things that they do not want to do.”

Emeritus Professor David Oakley, UCL Psychology, says: “It is estimated that between 250 and 500 dentists who have been trained in hypnosis in the UK are currently using hypnosis and suggestion to help their patients to deal with anxiety, discomfort and pain. This study provides further evidence that combining hypnotic suggestion with established procedures can be an effective way of making the experience of dentistry a more positive one for patients.”