

Carbon dioxide triggers inborn distress

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PLoS ONE publishes a study showing that inhalation of carbon dioxide (CO₂) triggers emotional distress and a panic response in healthy individuals. The findings of the study posit panic as an inborn survival-oriented response. The results may be relevant for a better understanding and the further prevention of emotional disorders.

It has been known for years that small amounts of carbon dioxide provoke a panic reaction in certain anxiety-prone individuals. This led to the “False Suffocation Alarm theory” which posits that panic attacks and anxiety may derive from the dysfunction of a biological “CO₂ sensor”, evolutionarily designed to alert the organism in case of impending death by suffocation. To test whether such a CO₂ sensing alarm system does exist, and whether CO₂ effectively controls emotional states, the research team of the Academic Anxiety Center at the University of Maastricht, the Netherlands (prof. dr. E. Griez and coworkers) conducted a study in healthy volunteers breathing increasing amounts of CO₂.

Sixty-four subjects performed four double inhalations of increasing doses of CO₂, from 0% to 35%, and were assessed with self-report questionnaires. The procedure induced a strictly dose-dependent negative emotion, the higher the CO₂ concentration, and the stronger the panic. Interestingly, older subjects exhibited a weaker reaction, suggesting that the underlying protective brain alarm may be blunted in the elderly.

These findings have potentially important implications. First, beyond a

particular threshold, increased CO₂ has an impact on our mental state, yielding negative psychotropic properties. This knowledge may be relevant in the prevention of emotional disorders. It is for instance well known that persons with impaired respiratory functions, as asthma and obstructive pulmonary disorders, are at risk for anxiety and depression. Second, in the future, scientists may use CO₂ inhalation in healthy volunteers as a valid experimental model, amongst other in psychopharmacological research.

Finally the above results posit panic as an inborn response, expressing the struggle for life in case of impending death, for instance when suffocating. The idea that such a negative emotion naturally proceeds from the disruption of a bodily function, underscores once again the close link between physical condition and mental states.

Source: Public Library of Science

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