

Pain and the evasive pursuit of pleasure

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COMMENTARY

Pain and the evasive pursuit of pleasure

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In this issue, you will find a paper by Gandhi et al. entitled 'Pain increases motivational drive to obtain reward, but does not affect associated hedonic responses: A behavioral study in healthy volunteers'. The authors present experimental data on the link between acute pain, motivational drive and hedonic responses to reward in humans.

Organisms are motivated to pursue pleasure and to avoid pain, an observation already made by the Greek philosopher Epicurus in his writings on hedonism (Creede, 1992). Pleasure and pain have mutually inhibitory effects on each other, and their neural mechanisms are largely overlapping (Leknes and Tracey, 2008). When pain is present, motivation to pursue pleasure will be reduced. Questionnaire studies in which chronic pain patients rate their motivational drive seem to support this view, indicating decreased motivational drive (e.g., Karoly and Ruehlman, 1996). A recent study in rodents, however, questions whether the experience of pain itself leads to impaired motivational drive (Low and Fitzgerald, 2012). Behavioural results indicated that acutely injured rats were actually more motivated to seek rewarding food pellets, compared with non-injured control rats. Nevertheless, despite their higher motivation to stay near the food pellets, these rats did not consume more pellets than the control rats. One possible explanation for this finding is a mismatch between increased motivational drive and (non-increased) consummatory pleasure, although other explanation such as suppression of novelty-induced suppression of feeding may also play a role (Low and Fitzgerald, 2012). Corresponding studies in humans were lacking until now.

In an innovative and well-controlled experiment, Gandhi and colleagues (this issue) translated the animal study into an experimental design for humans (Gandhi et al., 2013). Healthy human volunteers performed a monetary reward task twice, once while receiving painful heat and once while receiving non-painful warm stimulation. To obtain the reward, participants had to react as quickly as possible to a cue representing low, medium or high monetary reward, within individually adjusted time frames. Reaction

times served as an indicator of motivational drive (the faster, the more motivated). After each trial, participants rated their hedonic responses, i.e., how much they liked (or disliked) winning (or not winning) the amount in question. Analogue to Low and Fitzgerald's (2012) rodent study, the results indicate that participants were more motivated to obtain high monetary reward when in acute pain, compared with the non-painful condition. Faster reaction times, however, were not accompanied by increased hedonic responses; winning a high amount of money was liked equally much in both conditions. Gandhi and colleagues interpret these findings as a mismatch between motivational drive and hedonic impact.

Gandhi and colleagues' findings suggest intriguing interactions and changing temporal patterns between pain and motivation: Chronic pain patients may initially work harder to compensate for a pain-induced negative emotional shift in their lives. After a couple of unsuccessful attempts at actively countering the consequences of pain with increased pursuit of pleasure, chronic pain patients may lose their motivation to pursue pleasant activities. If confirmed in future research, this finding has implications for improving treatment of chronic pain patients: In a first, more acute stage, it may be useful to work on patients' relationship to pain (e.g., using mindfulness or acceptance-based approaches; Kabat-Zinn, 2003), and to prevent that overcompensation efforts result in disappointment.

Conclusions and implications, however, rely heavily on the assumption that the observed contrast between motivational drive and hedonic responding is, in fact, a real contrast, and not just the result of limited introspective access to subtle changes in hedonic pleasure. While motivational drive was assessed using a sensitive behavioural measure, hedonic responses to winning a certain amount were self-rated. Participants may have responded habitually, such that ratings reflect a stable judgment of how much they like winning a certain amount of money ('An extra \$4 are always nice'), rather than a state-like fluctuating measure of pleasure. Results should therefore be inter-

preted with caution, and further studies using alternative measures of hedonic responding are necessary.

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Conflicts of interest

None declared.

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