

## Laughter as a Form of Exercise

Is laughter a kind of exercise? That offbeat question is at the heart of a new study of laughing and pain that emphasizes how unexpectedly entwined our bodies and emotions can be.

For the study, which was published in Proceedings of the Royal Society B, researchers at Oxford University recruited a large group of undergraduate men and women.

They then set out to make their volunteers laugh.

Most of us probably think of laughter, if we think of it at all, as a response to something funny, as, in effect, an emotion.

But laughter is fundamentally a physical action. "Laughter involves the repeated, forceful exhalation of breath from the lungs," says Robin Dunbar, a professor of evolutionary psychology at Oxford, who led the study. "The muscles of the diaphragm have to work very hard." We've all heard the phrase "laugh until it hurts," he points out. That pain isn't metaphoric; prolonged laughing can be painful and exhausting.

Rather like a difficult workout.

But does laughter elicit a physiological response similar to that of exercise and, if so, what might that reveal about the nature of exertion?

To find out, Dr. Dunbar and his colleagues had their volunteers watch, both alone and as part of a group, a series of short videos that were either comic or dryly factual documentaries.

But first, the volunteers submitted to a test of their pain threshold, as determined by how long they could tolerate a tightening blood pressure cuff or a frozen cooling sleeve.

The decision to introduce pain into this otherwise fun-loving study stems from one of the more well-established effects of strenuous exercise: that it causes the body to release endorphins, or natural opiates. Endorphins are known "to play a crucial role in the management of pain," the study authors write, and, like other opiates, to induce a feeling of euphoric calm and well-being (they are believed to play a role in "runner's high").

It's difficult to study endorphin production directly, however, since much of the action takes place within the working brain and requires a lumbar puncture to monitor, Dr. Dunbar says. That is not a procedure volunteers willingly undergo, particularly in a study about laughing. Instead, he and his colleagues turned to pain thresholds, an indirect but generally accepted marker of endorphin production. If someone's pain threshold rises, he or she is presumed to be awash in the natural analgesics.

And in Dr. Dunbar's experiments, pain thresholds did go up after people watched the funny videos, but not after they viewed the factual documentaries.



The only difference between the two experiences was that in one, people laughed, a physical reaction that the scientists quantified with audio monitors. They could hear their volunteers' belly-laughing. Their abdominal muscles were contracting. Their endorphin levels were increasing in response, and both their pain thresholds and their general sense of amiable enjoyment were on the rise.

In other words, it was the physical act of laughing, the contracting of muscles and resulting biochemical reactions that prompted, at least in part, the pleasure of watching the comedy. Or, as Dr. Dunbar and his colleagues write, "the sense of heightened affect in this context probably derives from the way laughter triggers endorphin uptake."

The physical act of laughing contributed to the emotional response of finding something to be funny.

Why the interplay of endorphins and laughing should be of interest to those of us who exercise may not be immediately obvious. But as Dr. Dunbar points out, what happens during one type of physical exertion probably happens in others. Laughter is an intensely infectious activity. In this study, people laughed more readily and lustily when they watched the comic videos as a group than when they watched them individually, and their pain thresholds, concomitantly, rose higher after group viewing.

Something similar may happen when people exercise together, Dr. Dunbar says. In an experiment from 2009, he and his colleagues studied a group of elite Oxford rowers, asking them to work out either on isolated rowing machines, separated from one another in a gym, or on a machine that simulated full, synchronized crew rowing. In that case, the rowers were exerting themselves in synchrony, as a united group.

After they exercised together, the rowers' pain thresholds, and presumably their endorphin levels, were significantly higher than they had been at the start, but also higher than when they rowed alone.

"We don't know why synchrony has this effect, but it seems very strong," Dr. Dunbar says.

So if you typically run or bike alone, perhaps consider finding a partner. Your endorphin response might rise and, at least theoretically, render that unpleasant final hill a bit less daunting. Or if you prefer exercising alone, perhaps occasionally entertain yourself with a good joke.

But don't expect forced laughter to lend you an edge, Dr. Dunbar says. "Polite titters do not involve the repeated, uninhibited series of exhalations" that are needed to "drive the endorphin effect," he says. With laughter, as with exercise, it seems, there really is no gain without some element of pain.

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