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Pete Bee

How safe is your blast of caffeine?

Energy drinks are a £1billion-a-year industry in the UK and hugely popular among the young. But some experts caution that the caffeine content is a potential health risk and can bring on symptoms of a heart attack.  
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Energy drinks have become the elixir of a generation that considers itself in need of more of a jolt than can be obtained from a mere cup of coffee. Around 330 million litres of products such as Red Bull, the UK's bestseller, are consumed every year in Britain and the super-caffeinated drinks market is worth £1billion annually.

As they flood our shelves, though, some experts are concerned that they are potentially so harmful that they should carry health warnings. With some containing seven times as much caffeine as a strong cup of black coffee and 14 times that in a can of cola, there is a risk of harmful addiction, it has been claimed. Professor Roland Griffiths, of The Johns Hopkins University, Maryland, said in a study last week that there was a danger of some people becoming physically dependent on energy drinks and experiencing side-effects ranging from panic attacks and nausea to chest pains and racing pulses.

Drinks claiming to provide a jolt that will improve everything from work performance and concentration to reaction speed and stimulated metabolism are nothing new. As long ago as 1886 when the Atlanta-based pharmacist John Pemberton invented Coca-Cola - a product that originally allegedly contained a line of cocaine in each bottle and was marketed as "one of the most delightful, cheering and invigorating of fountain drinks" - consumers have swallowed the concept that they can sup their way to vitality. Coca-Cola ditched the cocaine in 1904, but its drink is still regarded by many as an adequate pick-me-up.

Other manufacturers are turning to an increasingly exotic list of ingredients from vitamins, fruit juices and teas to plant-based stimulants such as guaraná, herbs such as ginkgo and ginseng and the essential amino-acid taurine to compete for the ultimate boost.

But, for all of these drinks, the supposedly energising formulations amount to little without the boost provided in each by a large dose of caffeine.

A can of cola contains around 35mg of caffeine, a cup of instant coffee around 65mg. But Roland Griffiths analysed 28 energy drinks and found that Red Bull had 80mg of caffeine. Relentless, made by Coca-Cola, had 160mg and Cocaine, a controversial energy drink from the US that is about to be launched here, contains 280mg. One drink sold in the US, called Whoop Ass, was found to provide 505mg of caffeine a can.

"You can easily imagine people consuming a couple of these drinks and running smack into caffeine intoxication," Griffiths says. "People can end up not only feeling lousy, but in hospital thinking they are having a heart attack."

Previous studies have shown how the short-term effects of too much caffeine can cause sleeplessness, headaches, anxiety, heart palpitations, vomiting and severe chest pains that can lead some people to believe they are experiencing a heart attack. But recommendations about how much is safe to consume remain sketchy.

According to UK law, any drink containing more than 150mg of caffeine a litre has to state its content on the label and the Food Standards Agency advises pregnant women not to exceed 300mg of caffeine a day. Beyond that there is little to go on. However, in previous studies Griffiths has shown that even 100mg of caffeine a day - the amount found in a large cup of filtered coffee and only a third of the estimated total daily intake in the UK (280mg) - can lead to a physical dependence from which it is difficult to do without.

"There are no recommendations concerning upper limits for children or healthy adults in the UK," says Dr Elisabeth Weichselbaum, a nutrition scientist at the British Nutrition Foundation. "That is not to say there is no potential for harm. Parents should watch out for negative side-effects of caffeine in their children and should advise them not to drink high-caffeine drinks too often."

But policing consumption of products that are considered trendy and are the drinks of choice for a subculture that has grown used to being energised is increasingly difficult. Because they are served cold and are so widely marketed, these caffeinated beverages are hugely appealing to the youth market and are more likely to be taken in larger amounts than hot coffee drinks, which are generally sipped. Younger people are now ingesting much larger amounts of caffeine from an earlier age than adults, who have built up a caffeine tolerance from drinking tea or coffee over a long period.

Bob Tait, of Drugs Education UK, expressed his concern earlier this month about the number of schoolchildren who seem to be displaying signs of caffeine dependence because of the volume of energy products that they are consuming. "Children will drink them on the walk to school, at break and at lunchtime," he says. "If you have a child who is worked up on an energy drink, they will be agitated during lesson time."

Others have suggested that the caffeine in energy drinks means that the regular use of such products should be considered an accurate predictor of bad behaviour in young people. Reporting in The Journal of American College Health, Kathleen Miller, a sociologist and addiction researcher at the University of Buffalo, showed a link between caffeinated drinks and risky or aggressive behaviour patterns, including substance abuse, violence and unprotected sex. She says that her findings did not mean that caffeinated drinks cause bad behaviour, but that their regular consumption might be a warning sign for parents that "kids who are heavily into drinking them are more likely to be the ones who are inclined toward taking risks".

A growing number of researchers are looking not just at the effects of caffeine, but at the consequences of high doses

contained in energy products. Scott Willoughby, of the Cardiovascular Research Centre in Adelaide, Australia, recently showed how the sugar-free version of Red Bull can cause the blood to thicken, raising the risk of heart attacks and strokes.

In his study, Willoughby assessed the cardiovascular systems of 30 young adults one hour before and one hour after they had drunk a 250ml can of sugar-free Red Bull. He describes the results as "remarkable". Sixty minutes after drinking the Red Bull, the subjects displayed the kind of cardiovascular abnormalities that might be expected in a patient with heart disease, including an increased stickiness of blood.

"If you add in other risk factors for cardiovascular disease - stress or high blood pressure - this could be potentially deadly," Willoughby says. "The can comes with a warning of its own. But if you have any predisposition to cardiovascular disease, I'd think twice about drinking it."

Weichselbaum says that more work is needed before the long-term risks of a high caffeine intake is confirmed. Although people can become dependent on it, she says that "there is no conclusive scientific evidence that it's associated with any long-term health hazards such as an increased risk of heart disease, high blood pressure or cancer".

Griffiths says that caffeine has no nutritional benefit and suggests weaning yourself off energy and other caffeinated drinks if you can. What you won't miss, he says, is the false energy boost on which you might believe you have become reliant. Ironically, drinking too many energy drinks is not a solution to listlessness, but more likely to be a cause.

"If you wake up feeling groggy, you are probably suffering from caffeine withdrawal symptoms," Griffiths says. "Cut out caffeine and you won't get those weary feelings anywhere near so often." Caffeine, he says, exaggerates the perception of stress and the body's response to it. It is something we can all live without.

#### Case history: Why I needed medical help

Simon Andler, 38, from Woking, Surrey, is a chartered surveyor whose energy drink habit caused a health scare that made him seek medical advice.

"I had always been a person who relied on a cup of black coffee to wake me up in the morning, but until three years ago I didn't really drink more than that during a typical day. Sometimes I would drink a Diet Coke. But when I joined a gym, because I'd put on a few pounds, I discovered energy drinks and, without knowing it at the time, my caffeine intake must have increased about tenfold. There was a drinks machine dispensing healthy looking cans in the foyer of my gym and I assumed that they were what you were supposed to drink when getting fit. I usually took Lucozade Solstice, Isostar and Red Bull, all of which I now know contain caffeine.

"Within a month or so I was drinking morning coffee and four or five of these drinks a day. Although I was getting fitter and losing weight, I began to experience a racing pulse in the day that was so severe I often had to sit down for ten minutes until it passed. Sometimes my hands would also tremble. I was concerned enough to visit my doctor who referred me for tests. I was assured nothing was wrong. It never crossed my mind that it could be caffeine because, aside from Red Bull, I didn't think the other drinks contained any.

"Only when my fitness routine was halted for six weeks after I broke my wrist skiing did the palpitations stop. I had halted the drinks because I wasn't at the gym. I realised that they must be to blame. I was astounded when I did some research and found just how much caffeine I'd been drinking - the equivalent of about ten cups of coffee a day. I have now given up completely."