

SIMULATION STIMULATION

Research at the University of NSW casts doubt on the performance-enhancing properties of caffeine. Peter Markmann reports.

A strong cup of coffee at the crack of dawn wakes you up to face the day. Another after that stressful meeting settles your nerves. A few cups before approach helps you concentrate on landing that Jumbo you're piloting in from the other side of the world.

Or does it really make any difference? Researchers at the University of New South Wales have been trying to find out.

Honours student Tom Caska, under the supervision of aviation safety lecturer Dr Brett Molesworth, wanted to test the folklore that a few cups of coffee improves airmanship.

The team tested the effect of caffeine on pilot concentration, reaction time and alertness in 30 volunteers drawn from the UNSW pilot training course and other flying schools at Bankstown airport.

The subjects were split into three groups of ten. Before testing, they answered questions that enabled the researchers to control for demographic

variation. The questions related to flying experience, licences, usual caffeine intake (if any), and amount of sleep in the previous 24 hours.

The subjects were required to lay off coffee, tea and chocolate for six hours before the testing.

In the first phase of each test, they performed a simulated instrument landing system approach into Sydney Airport in a virtual Cessna 172. This was done on a Cirrus II flight console running X-Plane software. The console captured the subjects' movements in relation to displacement from the glideslope – left and right, up and down. These data reflected response times, skill and alertness.

Directly after the exercise, members of each group were given one of three set doses of pharmaceutical-grade caffeine powder – 0 mg (placebo), 1 mg, and 3 mg per kilo of body weight; an 80 kg subject in the second group would get an 80 mg dose, while a person of the same weight in the third group would get 240 mg. A regular cup of coffee contains between 30 and 120 mg of caffeine, depending on the origin and quality of the bean.

The caffeine was given in water with lemon juice to mask its taste or absence. Thirty minutes later – the time it takes for the drug to kick in – the subjects were asked to perform the same task

again on the simulator.

Their performance had consistently improved on the second attempt. As the degree of improvement was statistically indistinguishable among the three groups, the researchers attributed it to learning. They concluded that caffeine, at least in the amounts given, did not enhance performance. Caffeine withdrawal symptoms may have adversely affected some of the subjects, but this was not obvious.

The team will conduct further tests this year on a larger sample.

A higher dosage range may yield a different result. A 1991 Canadian study of runners and cyclists showed that caffeine boosted endurance levels by up to 50 per cent.



Flavour of the month or out of favour

The verdict on the health effects of coffee is mixed. The stimulant, occurring naturally in various plants and beans, seems to have filtered into Europe from North Africa and the Middle East more than 300 years ago. The earliest usage dates to prehistoric times.

Up to 90 per cent of Westerners drink coffee daily. The drug, or, according to Molesworth, perhaps just the ritual, engenders feelings of wakefulness, clarity and wellbeing first thing in the morning.

Coffee has been variously maligned

and hailed by the medical profession. It is addictive and “too much” – however that’s defined – causes anxiety, insomnia and increased heart rate.

On the plus side, coffee contains antioxidants, boosts the metabolism and now appears to have some major health benefits when consumed moderately.

A 2001 Harvard School of Public Health study discovered that moderate caffeine consumption lowered the danger for men of developing Parkinson’s disease. Men who drank four or five cups a day

had half the risk of those who drank little or none. The result for women was less conclusive.

In 2004, the HSPH found that regular consumption of coffee also reduced the risk of type 2 diabetes. Exactly why is unclear; caffeine itself is known to increase blood sugar levels, and the presence in coffee of antioxidants such as chlorogenic acid and magnesium may be beneficial. The results were positive, to a lesser extent, even for decaffeinated coffee.