

Does caffeine cause dehydration?

12 April 2017, by Ben Desbrow



Studies have found caffeinated drinks retain about as much fluid as water or sports drinks. Credit: Kyle Meck/Unsplash

For a long time [people have been told](#) that caffeine is a diuretic. For some, this translates into advice to avoid or remove caffeinated beverages from the diet of people at risk of dehydration, or during periods of extreme summer heat.

While possibly well meaning, this advice is wrong.

By definition, a [diuretic](#) is a product that increases the body's production of urine. Hence water, or any drink consumed in large volumes, is a diuretic. Importantly, urinating more does not inevitably lead to dehydration (excessive loss of body water).

Drinking simultaneously provides the body with fluid for absorption (avoiding dehydration) and initiates urine production. Depending on the urine losses that occur following drinking, a beverage might be more accurately described as a "poor [_re_hydrator](#)" if large fluid losses result.

Caffeine is a weak diuretic, and tolerance to this effect is acquired rapidly (in four to five days) with regular caffeine intake. What's somewhat concerning is that this has been known [for almost 100 years!](#)

In 1928, a study involving three people showed

that when participants consumed no caffeine for more than two months, a dose as little as half a milligram per kilogram of body mass (roughly the amount in half a cup of coffee) caused a "noticeable" increase in urine loss.

But regular caffeine intake (for four to five days) created a tolerance to the diuretic effect, so that over a milligram per kilogram of body mass (one cup of coffee) was needed before an effect was detected. This suggested that regularly consuming caffeinated drinks wouldn't lead to chronic dehydration.

While the study had obvious sample size limitations, an investigation employing contemporary research methods and analysis [confirmed these findings](#) more than a decade ago.

This study involved 59 healthy individuals being monitored for 11 days. The investigation was designed to determine if drinking caffeine resulted in fluid loss or [dehydration](#).

Initially, each participant's caffeine intake was stabilised for six days at 3mg per kilogram of [body mass](#) (approximately two to three cups of coffee per day). Following this period, caffeine intake was manipulated for five days at a dose of either zero, low (one cup) or moderate (two cups) levels.

The researchers monitored myriad hydration measures such as urine production and colour. Almost every hydration measure we currently use for monitoring fluid balance was not influenced by regular caffeine intake.

In hydration science, the effect of any beverage on fluid in the body is judged by the balance between how much the [body](#) retains of any volume consumed. Recently, the creation of the "[beverage hydration index](#)" has been established to describe the fluid retention capacity of different beverages by standardising values compared to still water.

Again, the beverage hydration index shows

commonly consumed caffeinated beverages such as coffee, tea and cola have similar fluid retention capacity to water or commercial sports drinks.

One strength of the beverage hydration index is that it recognises all beverages make a contribution to total fluid intake (ranking some as more effective than others). By advising people not to consume drinks they enjoy (just because they contain caffeine), individuals may not automatically replace drinks, leading to a reduction in total fluid intake.

The evidence linking [poor hydration status to poor health](#) (particularly in vulnerable groups) is well established. Dehydration can produce disruptions in [mood, brain and heart function](#) and has also been found to be an [indicator for worse prognoses](#) in older patients admitted to hospital.

So while some caffeinated beverages such as cola and energy drinks have their own health implications such as high levels of sugar, in terms of optimising [fluid](#) balance, there's no need to worry about [caffeine](#).

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