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Acute cognitive, mood and cardiovascular effects of green and black tea

Andrew Scholey, Alicia Burns, Matt Pase and Andrew Pipingas
Swinburne University, Melbourne, Australia

Abstract

Tea is often described as having “refreshing” properties. Indeed, components of both green and black tea have been shown to acutely improve aspects of cognition and mood and to affect cardiovascular function. There is, however, surprising little research directly comparing these effects between different types of tea. This study therefore examined acute cognitive, mood, and cardiovascular effects of green tea and black tea.

A double blind, randomised, placebo-controlled, balanced, three-way cross-over study was conducted. Fourteen healthy young adults ($M = 23.8$, $SD = 3$ years) consumed placebo (water), green tea and black tea in balanced order at least 24 h apart. The drinks were prepared according to standardised procedures and consumed under double-blind conditions (in opaque containers with lemon cordial added for taste-masking). Mood and cognition were measured at baseline then 90 min post-treatment, cardiovascular function was assessed post-dose only. Mood was evaluated using a series of visual analogue scales, cognitive performance was assessed using a suite of standardised tests from the Computerised Mental Performance Assessment System (COMPASS), gauging performance on aspects of attention, memory and executive function. Peripheral and central systolic and diastolic pressure, augmentation pressure, augmentation index, and blood flow velocity were measured via Sphygmocor pulse wave analysis and Doppler ultrasound, respectively. There were a number of significant effects associated with the active treatments. Compared with placebo, black tea and green tea was associated with significantly improved digit vigilance accuracy ($p < .01$), while green tea was associated with higher alertness ($p < .05$). Regarding cardiovascular outcomes, black tea and green tea significantly increased central diastolic pressure, and peripheral diastolic pressure in comparison to placebo ($P < .01$). Black tea also significantly increased central systolic pressure compared to green tea and placebo ($p < .05$). Analysis of treatment guessing suggested that the masking procedure was highly effective. In conclusion, the present study shows that green tea improves alertness. Since black tea contains higher levels of caffeine, this effect is likely underpinned by non-caffeine mechanisms or caffeine/non-caffeine compound interactions. Improved vigilance is consistent with caffeine effects which may be modulated by cardiovascular effects. Interestingly the cardiovascular effects are opposite to those reported for chronic tea interventions. These results suggest that acute cognitive and cardiovascular components of tea merit further investigation both in the presence and absence of caffeine.

Conflict of Interest

There is no conflict of interest regarding this study. Scholey has received research grants, consultancy payments, travel funding and speakers fees from the nutrition industry.