The Effects of Theobromine, Theophylline, Paraxanthine, and Glucose on the Adenosine Circadian Cycle

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The purpose was to determine whether a stimulant containing caffeine and sugar had a greater effect on reaction time rather than just caffeine or sugar alone. To test this, I did a baseline test to determine the participant's reaction time. I gave them a stimulant containing caffeine and sugar. After waiting thirty minutes for the caffeine and sugar to metabolize, I tested their reaction time again to determine the change. I repeated this process the next two days except I changed the independent variable. The second day, the participants were given a stimulant containing an equivalent amount of sugar and the tests were repeated in the same manner. The third day, the participants consumed a stimulant containing an amount of caffeine that was equivalent to that of the first round of testing and the tests were repeated. This showed that the stimulant containing caffeine and sugar made the reaction time 17.4 percent quicker, sugar alone made the reaction time 9.2 percent quicker, and caffeine alone made the reaction time 15.5 percent quicker. I have concluded this is because caffeine affects the adenosine circadian cycle while glucose fuels the cycle. Theobromine, Theophylline, and Paraxanthine, the three chemical into which caffeine is metabolized, block adenosine diphosphate from reaching the adenosine receptors in the brain. This gives a false sense of alertness. Glucose is primarily used as a form of energy. The participants already had consumed sugars the day of testing. This is why sugar didn’t have a larger effect on reaction time.

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