Attentional effects in real life settings upon tea consumption as measured by wearable (HOT-1000) functional near infrared spectroscopy device

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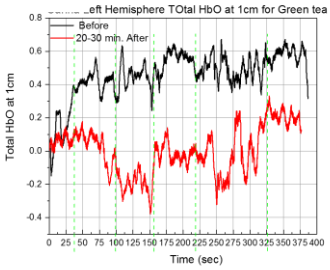
Recently, both black and green ta are getting attention because of their positive health effects. The main origin for these effects stems from two compounds found in the tea, caffine and L-theanine. Caffine is related to attention, energy, motivation, self-confidence, alertness and concentration. On the other hand, theanine is related to relaxation. Therefore drinking tea is supposed to make one alert at the same time give some relaxation too. Up to now there have been a few reports that use functional MRI or EEG to investigate the neural activity[1,2]. We propose the use of using wearable devices in monitoring neural activity through optical signals and focuses on addressing changes in attention with consumption of green, lemon and milk teas.

To collect light related signal changes under neural activation, HOT-1000 (NeU systems) was used. It has no wire or optical fiber and almost cause no discomfort to the subject. The device uses 810 nm light and uses two detectors to detect changes in the reflected light intensities. The signals can be accessed by an Android device. The data can be collected as a CSV file and can be processed using a PC. The study was conducted upon the approval of ethical board.

A total of 6 subjects participated in the study and they took three sessions. During the first session, explanation followed by water and green tea was done. For comparison, neural activation data with milk tea and lemon tea was also acquired. Figure below shows the protocol of the task used in the experiment. Subjects were given tea 30 min prior to performing the tasks and their total HbO was compared for before and after consumption of tea. Figure below shows the results for a female subject with green tea. As can be seen there is an overall decrease in the Total HbO (red line) indicating lesser effort with increased attention from green tea consumption during tasks. More analysis is needed to arrive at a definitive conclusion.

Time	1min	-	1min	1min.	-	1min
Task	Rest	multiplication 12*1～12*12 2*1～2*9	rest	word-chain game	multiplication 3*1～3*9	Rest



[1]Okello, et a. (n.d.), https://doi.org/10.1179/1476830515Y.0000000008

[2]Borgwardt, et al., (2012) *European Journal of Clinical Nutrition*, *66*(10), 1187–1192. https://doi.org/10.1038/ejcn.2012.105