

# **The effect of green tea on stress and attention**

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## **Abstract**

Stress and attention are the main issues concerning the mental health of youths. Teens suffer from stress, which affects their attention at school and in their daily lives. Sometimes, this leads to severe stress requiring the individual to take medication to control it. However, there is another option. The infusion of tea may increase attention and reduce stress in young adults. High school participants from ages fourteen to eighteen will answer a 35- item questionnaire separated into three sections. The first section asks general questions about age, amount of beverage consumed, and type of beverage. The second section is the Mindful Attention Awareness Scale (MAAS), and the third is the Perceived Stress Questionnaire (PSQ). Data analysis showed MAAS did not have a significant correlation with tea consumption. However, PSQ showed a p value of less than one ( $p < 1$ ). This means, the higher the amount of tea a high school student drank, resulted in less stress. The conclusion indicates that tea helps relax the body, leading to less stress. Tea is composed partly of L-theanine, an amino acid that triggers a calming effect. Yet, tea preparation becomes a limitation. There are multiple ways to prepare tea. The method used can affect its effects on the body. Future research should focus on administering traditional tea to high school students to overcome limitations and bias.

## **Introduction**

Bad mental health among teens is notorious. Teens cannot focus on school or daily tasks due to daily stress. If extreme, some may need medication. Having access to drugs is also limited for adolescents. Some don't have the insurance to cover it or have uneducated parents that believe mental health is not real. However, there is another option. Tea, a popular drink, may help with relaxation (Gibson 2007). Tea is composed of L-theanine, an amino acid unique to tea. "During rest, theanine increases brain activity which is associated with relaxation." (Einother 2013) Then,

"during attention switching tasks, background activity increases"(Einother 2013). Leading to better performance and attention in school.

Past studies have approached severe illnesses or diseases. Coimbra, for example, studied oxidative stress caused by an imbalance of antioxidants in the body. Coimbra used green tea infusion to reduce oxidative stress. Participants consumed it for 4 weeks and prepared it at a temperature of 70-80 Celsius every day. Results showed a significant decrease in MBH, suggesting reduced oxidative stress in the cell (Coimbra, 2006). This study used green tea leaves and a structured preparation method. However, when left open for participants to decide, preparation becomes a limitation. Research done in 2014 studied the drinking habits of university students. This study concluded that drinking tea daily relaxes the student's body, resulting in low stress. However, the study did not control preparation. Resulting in high sugar consumption (Chen Tseng, 2014)

L-theanine, an amino acid found in green tea, has also suggested great results of preventing and decreasing symptoms of diseases. As previously stated, preparation becomes a limitation due to the different ingredients an individual adds to their tea. Therefore, in Chen's study, some students got great results for drinking pure tea, but others did not. By only adding milk and sugar, l-theanine's health effect decreases. (Chen Tseng, 2014) Yet, when controlled, the benefits are more notorious.

Research suggests tea has the ability to decrease anxiety, stress and increase attention. A study done in 2019 shows that green tea consumption increases the production of dopamine and serotonin, decreasing anxiety and stress. These results are caused by l-theanine, an amino acid unique to tea. (Lopes, 2019) Another study done in 2012 suggests that people who consume tea feel less tired and reported performing better at work (Bryan J, 2012). It also improves alertness and reduces fatigue. (Einother, 2013)

Tea relaxes the body and reduces stress, but it also makes people productive. A study done in 2011 shows that 200 mg of l-theanine intake may help normal people with high anxiety propensity to pay attention to daily activities. (Higashiyama, 2019). Showing that quantity affects the outcome.

Although stress has increased in teenagers and lowered their daily performance. Studies suggest that l-theanine may reverse it (Lopes, 2019). This amino acid found in green tea increases attention to daily tasks (Bryan J, 2012). So, if teens consume tea, their attention and performance will increase. However, preparation must be controlled to avoid limitations (Chen Tseng, 2014). The consumption starts through “oral administration of l-theanine is first absorbed into the blood from the intestinal tract, and then a little amount of l-theanine, in blood flows into the brain through the blood-brain barrier. This increases the level of dopamine in the brain and reduces the serotonin level to generate a neuroprotective effect via neurotransmission which results in faster response” (Kakuda, 2002) By drinking tea, stress levels may decrease, and attention will rise.

## **Statement of Purpose**

This leads me to my hypothesis that the consumption of tea by high school students will make a difference when measuring stress and attention with the MAAS and PSQ Questionnaire

## **Materials and Methods**

A 35-item questionnaire was used to collect data. The questionnaire was separated into three sections, with the second and third being the Mindful Attention Awareness Scales (MAAS) and the Perceived Stress Questionnaire. (PSQ)

The questioner starts by addressing age which ranged from 14 to 18. Then, participants were asked about their beverage of choice between coffee or tea. They also had to indicate the type of tea or coffee. Such as americano or oolong tea. One of the limitations of the study was the preparation,

which differs for each individual. However, to control some aspects of it, the questionnaire asked about the addition of sugar, milk, cream, and/or whip cream.

Quantity was also asked. Participants had to indicate how many cups of coffee or tea they consumed per day. Lastly, to collect data on attention, participants were asked about their performance at school and had to answer the MAAS questions. Then, PSQ was used to measure stress.

Due to the participation of underage students, the permission of a guardian was needed. Participants were kept anonymous and protected. The White Plains Public high school approved for students to participate by getting IRB approval.

#### *Mindful Attention Awareness Scale (MAAS)*

The MAAS questionnaire helps assess an individual's frequency of mindful states over time (Warren, 2003.) The questions are focused on addressing the presence and absence of attention in the present. (Warren, 2003.) For this study, I used the Ohio State University MAAS questioner. It had fifteen questions ranging from almost always to almost never. The questions were selected to be appropriate for teens to avoid discomfort and boredom. To complete this part of the questioner, participants spend approximately 10 minutes. They were not required to give a written response but to select the answer that best fits. This questionnaire was used to find the correlation between the consumption of tea and attention.

#### *Perceived Stress Scale (PSQ)*

To test stress PSQ questions were added. Questions ranged from never to very often. With ten-item questions, participants only spent 8 minutes. The PSQ questions are designed to assess the extent to which participants find their lives unpredictable and/or uncontrollable during the previous month (Meng, 2020) The PSQ questioner has shown valid results on testing adolescents mental

well-being and complaints of burn-out and fatigue (Osteras, 2018) The questionnaire used in this study has been selected to be suitable for teen participants.

## Results

### *Participants*

Eleven students who attend White Plains High School filled out the anonymous questionnaire. The questionnaire showed an average time completion of 30 minutes. Ages ranged from 14 to 18. 82% reported drinking tea daily. Of the 82%, 50% said to be drinking two cups per day and 25% one cup a day. Students also reported to consider themselves good students with grades in the A and B range.

### *MAAS (Attention)*

Of the 11 participants, 46% reported having moderate attention, 45% minimal attention, and 9% high. As shown in figure one, drinking tea has no significant correlation with attention.

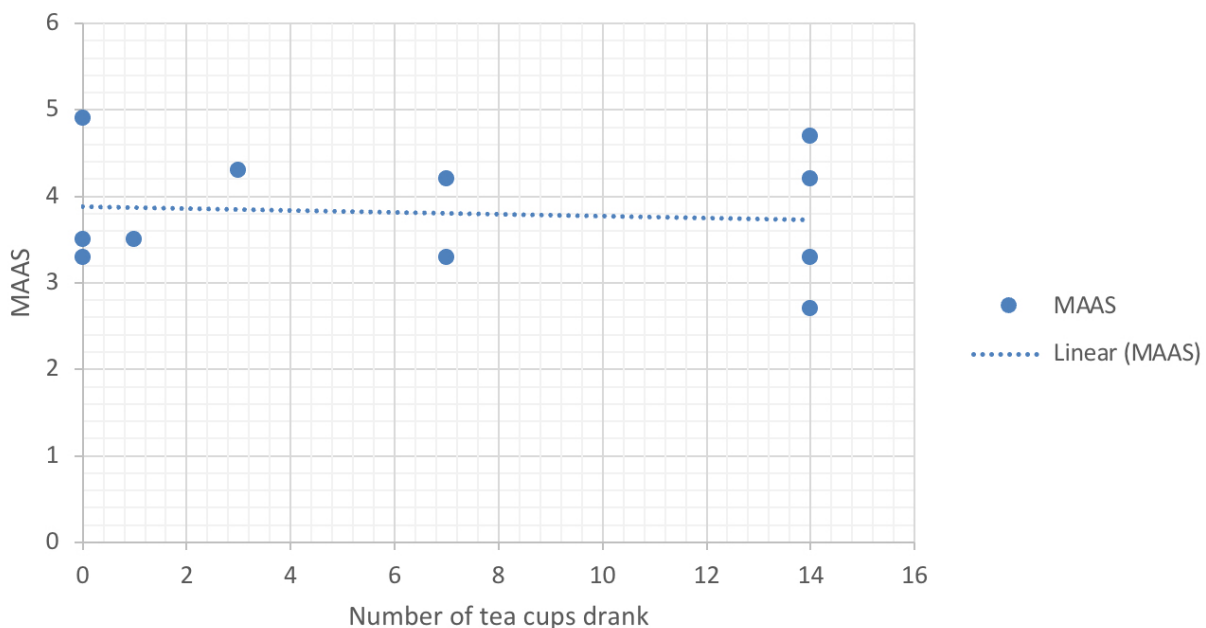
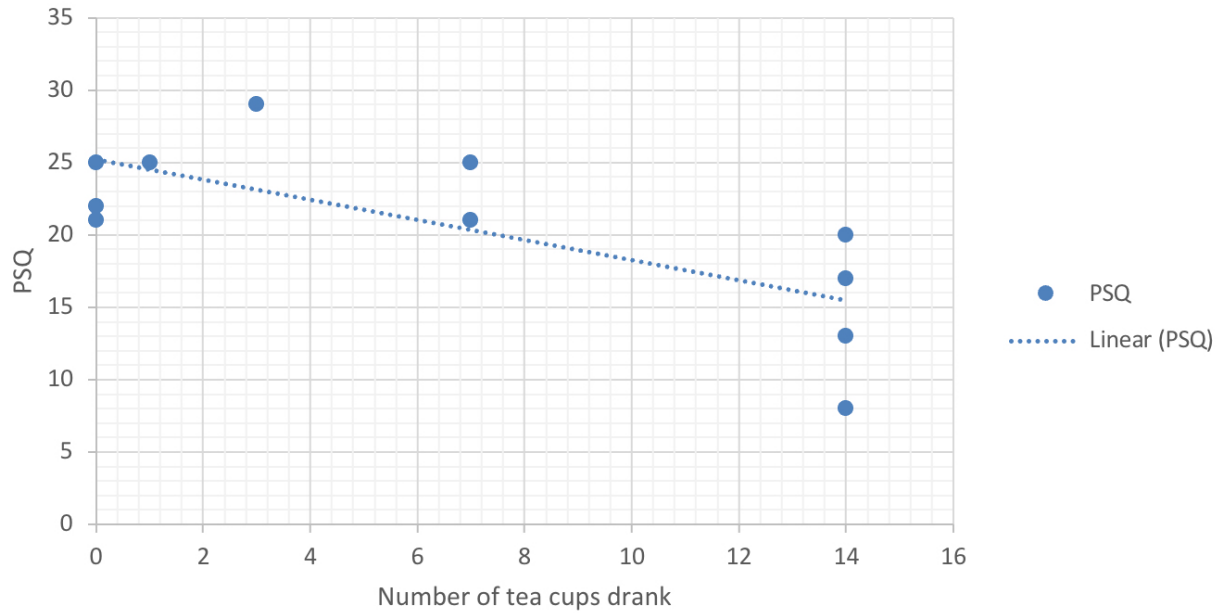


Fig 1. Correlation between MAAS questionnaire and tea.

*PSQ (stress)*



73%

Fig 2. Correlation between PSQ questionnaire and tea.

stress

of participants  
reported moderate  
levels. 18%

showed minimal levels and 9% reported high-stress levels. Results shown in figure two show a negative correlation between tea consumption and stress ( $p < 0.001$ ). Suggesting that drinking tea on a daily basis could help lower stress on a high school student

## Discussion

According to the American Psychological Association, 78% of Americans adults say their stress level increases leaving them overwhelmed. This also affects their physical and mental health. However, this isn't new information, everyone experiences stress, including teenagers. Teens make up 20% of the U.S population. (U.S Census Bureau, 2019) Adolescents, as well as adults, are faced with stress by trying to manage their personal life with school. This then leads to mental problems which evolve through time by also decreasing their mental awareness. On top of that, society does not seem to accept the importance of mental health, making the distressing complicated.

Tea is one of the most popular drinks in America. They are made from fruits and herbs. Tea can also be designed to fit a person's desired taste by adding sweeteners and milk. Such popular drinks, however, can also make an impact in someone's life, specifically for teens.

L-theanine is an amino acid unique to tea. This amino acid makes tea a great candidate for decreasing stress. L-theanine has shown to have a direct effect on the brain, after being examined in electroencephalograph (EEG) (Juneja, 1999) The test showed that l-theanine relaxes the mind without causing drowsiness. Yet it all depends on the amount drunk per cup and per day.

This past study shows how drinking high amounts of tea has an effect in stress levels. A high percentage of student participants reported drinking two or one cup per day. This affected their results on the PSQ section of the questionnaire. Their stress level was lowered, which also shows l-theanine's effect on the brain.

## **Limitations of the Study**

A change in the research plan was a limitation. Due to the safety of everyone, the study had to be switched from testing traditional green tea on high school students to researching individual daily tea consumption by using an online questionnaire. Although having the questionnaire online made the process quicker, it also presented many limitations. Participants were not able to ask if they had trouble or were unsure about the questions.

## **Conclusion & Applications**

Stress being a main problem among teenagers may be controlled by the consumption of tea. Yet, to show favorable effects, consumption must be regulated. Future research should concentrate on administering traditional tea to high school students. This way bias and limitations on preparation and consistency can be discarded.

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