

Effects of Coffee Consumption on the Psychological Wellbeing of Undergraduate Students during Online Learning

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Abstract

This study evaluates undergraduate students' coffee consumption levels and investigates how it affects their psychological well-being during online learning. Caffeine is a psychostimulant that boosts body energy levels, and coffee is its primary medium in beverages, so it is popular among students due to their need for help studying, especially during online classes. However, caffeine also has adverse effects. The researchers gathered data from a sample of 100 college students through a digital survey that aimed to know their level of coffee consumption and general mental health status using the GHQ-12 questionnaire. The GHQ-12 generates social dysfunction, anxiety and depression, and loss of confidence. The data obtained from the respondents were analyzed using descriptive and inferential statistics, and measurements of this study have determined that age and social dysfunction are associated with coffee consumption. It was concluded that age is directly proportional to coffee consumption, and students with high social dysfunction tend to consume a high amount of coffee. The researchers recommend that educational institutions must hold seminars for their students to discuss this awareness and encourage dosage limits of coffee to students.

Keywords

Coffee consumption, mental health, online class, psychological wellbeing, online learning

1. Introduction

Coffee is one of the most commonly consumed beverages in the world and a major source of caffeine. Caffeine is a widely known psychostimulant that mainly boosts energy levels of the human body, increasing alertness (The Nutrition Source, 2020). The increase in caffeine use is evident worldwide due to its positive effects on the cardiovascular system and central nervous system of the body. The caffeine compound has inotropic and chronotropic effects. It stimulates locomotor activity, which activates an improvement in physical performance and cognitive functions such as concentration and memory enhancement (Cappelletti et al., 2015). Coffee beans, tea leaves, cocoa beans, and kola nuts naturally consist of caffeine in their system. Additionally, caffeine can also be extracted and added to other types of foods and beverages. With these, dietary products such as coffee, tea, yerba mate, cola-type sodas, and energy drinks are primary sources of the stimulant compound commonly ingested by consumers (Zucconi et al., 2013).

According to the study by Verster & Koenig (2018), adults from the age of 18 to 35 years old have a 98.6% caffeine intake, and around 55.8% of it comes from coffee. Thus, the regular source of caffeine among adults is the consumption of coffee. Students and workers fall under this age category, so it is natural for them to have a higher intake of coffee than the other age groups. With its benefits of heightening brain activity and sustaining the flow of nutrients, it helps them achieve an improved mood and boosts their focus. Hence, drinking coffee is considered a benefactor to worker efficiency (Frisch, 2015).

Caffeine consumption has short-term effects such as improved mood, alertness, energy and helps to remain awake. When consumed in moderation, it appears to have no significant health implications (Nawrot et al., 2003). Caffeine consumption can help a person's mental health at risk of depression. Students have a higher risk of depression due to stress or tiredness. It can lessen a person's anxiety level and elevate their mood. (Haskell et al., 2005). Coffee can highly help a student, especially in studying. It can help the student to be more focused and energetic, which is important if a student is studying or attending an online class.

Caffeine intake results in a physiological change in the human body depending on an individual. These physiological changes include increased breathing and heart rate and improved mental and physical aspects of the human body to help students deal with activities (Better Health, 2020). A low caffeine intake of less than 400 mg or 4 cups of coffee daily can enhance mood, improve exercise performance, and protect against heart diseases and diabetes (Healthline, 2020). A small amount of caffeine can help boost work efficiency and thus help students and adults from work and school-related activities.

Caffeine is predominantly found in coffee. However, caffeine can also be found in energy drinks and tea, consumed by most adults and students nowadays. According to the study by Mahoney et al. (2019), out of the 1248 college students surveyed, 79% of the college students consume caffeine, mainly coffee and tea, to feel awake, and 27% of the college students consume caffeine to increase physical energy. Thus, it states that students consume caffeine to have physical and mental energy to keep up with modern-day activities such as online assessments and work-related activities. Because caffeine increases mental awareness and stimulates the nervous system, it helps the students stay energized and complete requirements essential to online learning.

Students' mood and focus were highly affected by online learning due to stress. With the current set-up of learning, which is online, students' stress levels have doubled since the start of the online learning set-up. (Lawless & Allan, 2004) Even if the course is delivered through an online learning system, stress is the second leading cause of students missing or failing to attend class. Stress can lead to different factors such as mental blocks, lack of concentration, competitiveness, academic problems, and psychological well-being. Students drink coffee to stay awake or boost their mood to attend online classes and do school activities. College students commonly consume caffeinated beverages to cope with stressful academic settings (Lazarus, 1993).

Coffee is one of the major sources of caffeine. Caffeine boosts the human body's energy. Considering these, the main objective of this study is to evaluate undergraduate students' psychological well-being when they consume coffee during their online learning by obtaining factors of information this study requires, such as the demographics and the 12-item general health questionnaire (GHQ-12). The secondary objective of this research is to determine the mental disorder that the students project based on their GHQ-12 scores and correlate this to their age, year level, and coffee consumption. Lastly, this study aims to provide recommendations to the students regarding changes to be made in their coffee consumption in accordance with the results of their psychological well-being.

2. Review of Related Literature

Adults and College students are almost similar in terms of the amount of requirement or work they need to accomplish throughout the day. College students need the energy to perform their best in every activity and provision they receive in their respective universities. And for that reason, college students consume a lot of caffeine beverages, especially coffee, to finish the day. According to the study by Jahrami et al. (2020), 98% of the college students in Bahrain consume a regular daily intake of caffeine, and coffee is the primary source of ingested caffeine; hence coffee is a standard beverage when it comes to college students. Caffeine influences cognitive performance as well as alertness and wakefulness perceptions. (Cappeletti et al., 2015). In addition, the study stated that the Institute of Medicine Food and Nutrition Board Committee on Military Nutrition Research reported that the ingestion of caffeine at a dose of 150 mg enhances cognitive performance for at least 10 hours; thus, it states that consuming coffee and caffeine beverages can help college student in their classes mentally and can be a benefit for mental health. According to the study by Meissner (2019), there is no significant correlation between caffeine intake and the respondents' anxiety level, proving that caffeine intake does not cause anxiety in users. Furthermore, caffeine has no significant relationship to the decrease of attention of college students even after control and well-rested sleep duration (Arieputri et al., 2018).

Consuming caffeinated beverages and products can help workers and students complete daily activities. According to Olsen (2013), college students are now dependent on beverages containing caffeine, such as coffee and energy drink,

to perform their very best in their hectic lives, including attending classes and internships. In addition, the study also stated that the majority of the college students from UNH consume caffeinated beverages, mostly coffee, because college students lack sleep the night before their class and for studying purposes. In another study by Calderone (2015), College students increase caffeine consumption under adverse circumstances such as increased sense of stress, insufficient sleep, and studying for exams. On the other hand, coffee can also be used as a relaxation and stress relief source in a workplace environment. According to the study by Fernandes et al. (2021), more than a third of the survey respondents claimed to consume coffee as a moment to take a breather, relax the body, think of fresh ideas, and communicate with colleagues in a workplace environment.

Numerous reasons why college students and adults consume coffee and caffeinated beverages regularly. According to the study by Choi (2020), students' motivation for consuming caffeinated beverages, mostly coffee, was due to alertness, taste, mood, socialization, health benefits, and habit. As coffee and caffeinated beverages increase alertness, college students consume coffee to help them concentrate and focus during classes. Caffeine affects concentration, moods, and arousal in college students. It can increase alertness, sustain attention, and reduce reaction time which are all essential in a learning environment. (Brice and Smith, 2020). Coffee and Caffeine products are helpful in cognitive performance, which is necessary for the academics of college students. Still, there is no significant relationship between academic performance and caffeine intake in college students (Khan et al., 2015); thus, caffeine intake does not enhance a student's academic performance but sharpens cognitive performance, which can benefit the learning environment.

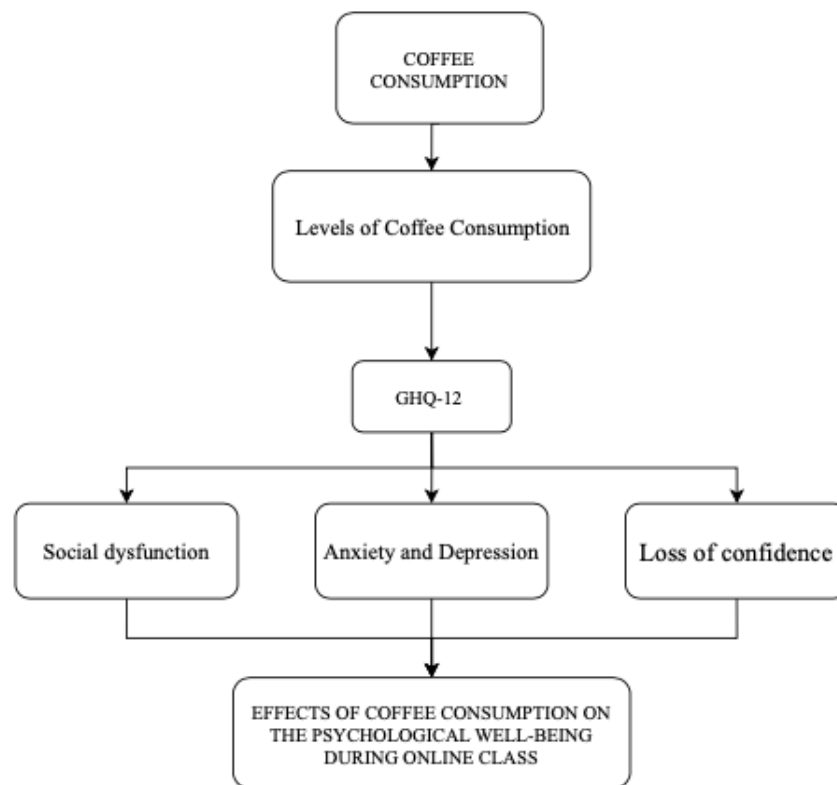


Figure 1. Conceptual Framework

3. Methods

3.1. Conceptual Framework

Figure 1 shows the conceptual framework that was used in the study to determine the effects of coffee consumption on psychological well-being during online classes. The study used the GHQ-12 questionnaire to determine the possible outcome of the different levels of coffee consumption on mental health, namely social dysfunction, anxiety and depression, and loss of confidence. Taking coffee and other caffeinated products can have a psychological effect on humans, which can cause a bi-phase. Low intake produces stimulation, which is often perceived as desirable. In

contrast, high intake can cause a negative impact of caffeinism that can lead to a change of mood, affecting social relationships (Daly and Fredholm, 1998). Excessive caffeine intake can cause symptoms such as psychiatric conditions, including sleep and anxiety disorders, increasing hostility, anxiety, and psychotic symptoms. (Winstone et al., 2018). Many studies have stated that caffeine increases feelings of optimism and self-confidence while it eliminates boredom and fatigue (Times Now Digital, 2018). These three factors or mental disorders were essential in determining the effects of coffee consumption on psychological well-being during online classes.

3.2. Respondents of the Study

The researchers made survey forms to be distributed to 100 undergraduate students in different schools. The survey form contains information that will be needed for the research study. It includes a demographic profile, the respondents' amount of coffee consumption, and the general health questionnaire (GHQ-12). The general health questionnaire (GHQ) contains 12 items of questions, and it is used to measure the respondents' psychological well-being or mental health. The respondents are mainly just coffee drinkers.

3.3. Ergonomic Tools

Goldberg's 12-item General Health Questionnaire (GHQ-12) is utilized as the primary ergonomic tool for this study. The GHQ-12 contains questionnaires that aim to evaluate the general psychological status of a person and determine the possible presence of social dysfunction, anxiety and depression, and loss of confidence. In this study, the researchers associated the questions with online learning to assess undergraduate students' psychological well-being during the online learning set-up.

3.4. Statistical Treatment of Data

Descriptive statistics is the statistical method applied in this study to measure the demographic profile and determine the results of the GHQ-12 questionnaire. The researchers also utilized Inferential statistics, specifically Correlation – Pairwise Pearson Test, to assess the association between variables, mental fatigue, and coffee consumption.

4. Results and Discussion

4.1. Demographic Profile

Table 1 shows the summary of the demographics profile. Among the 100 respondents, 56% are males, and 44% are females. The age group of most respondents is 21–22 years old, with an average of 62%. The remaining age groups are 18-20 years old, 23–24 years old, and over 25 years old, with 29%, 8%, and 1%, respectively. For the year level of all the undergraduate students that have participated, 57% are in their 2nd year, which is the highest percentage measured. Moreover, 23% are first-year students, 16% are 3rd, 3% are 4th, and 1% are in their 5th year. For the level of coffee consumption, 34% drink 1-2 cups per day, 33% drink 2 to 6 cups per week, 30% drink less than 2 cups per week, and only 3% have a high amount of consumable dosage daily with more than 2 cups per day. Regarding the time the respondents usually drink their coffee, 46% said they drink it any time of the day. In comparison, 32%, 6%, and 15% of them answered that they consume their coffee in the Morning, Afternoon, and Evening respectively. Lastly, the respondents were also asked if they drink coffee mainly to have energy for school, and 54% of them responded Yes while 46% said No.

Table 1. Demographic Profile

Items	Mean	Std. Dev.	Range
Able to concentrate	1.67	0.570	2
Lost much sleep over worry	2.10	0.859	3
Playing a useful part	1.75	0.716	3
Capable of making decisions	1.84	0.598	3
Under stress	2.16	0.884	3
Could not overcome difficulties	1.69	0.72	3
Able to enjoy day-to-day activities	1.79	0.729	3
Able to face problems	1.93	0.671	3
Feeling unhappy and depressed	1.71	0.82	3
Losing confidence	1.65	0.833	3
Thinking of self as worthless	1.71	0.808	3
Feeling reasonably happy	1.85	0.687	3

4.2. Results of Mental Health Measurement

The psychological well-being of the respondents was measured using the GHQ-12 questionnaire (Table 2). The undergraduate students were asked to rate their mental health using the 4-point Likert scale, and based on the results, the GHQ scores (Table 3) were measured by getting the mean or average values of their responses to each item.

Table 2. Result of Mental Health Measurement (GHQ-12 Questionnaire)

Items	Mean	Std. Dev.	Range
Able to concentrate	1.67	0.570	2
Lost much sleep over worry	2.10	0.859	3
Playing a useful part	1.75	0.716	3
Capable of making decisions	1.84	0.598	3
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Losing confidence	1.65	0.833	3
Thinking of self as worthless	1.71	0.808	3
Feeling reasonably happy	1.85	0.687	3

Table 3. Mental Disorders determined based on the GHQ-12 Scores

Items	Mean	Std. Dev.	Range	%
Social dysfunction	9.29	2.236	10.16	51.10
Anxiety and Depression	6.38	1.856	9.75	35.09
Loss of confidence	2.51	1.14	4.5	13.81

The 12-item questionnaire has three possible outcomes of mental disorder, namely, social dysfunction, which includes six categories such as being able to concentrate, playing a helpful part, capable of making decisions, able to enjoy day-to-day activities, able to face problems, feeling reasonably happy. In contrast, per calculations, 51.10% of the students show signs of mental fatigue. Another possible outcome is anxiety and depression, which include losing much sleep over worry, under stress, not overcoming difficulties, and feeling unhappy and depressed; according to the

results, 35.09% of the students show signs of this. Lastly, loss of confidence is also one of the three possible psychological morbidities that can be measured, and it was determined that only 13.81% of the students show signs of this. Loss of confidence includes losing confidence and thinking of oneself as worthless. An overview of the results can be seen in Table 2 and Table 3 above.

4.3. Correlation Analysis Results

Age, year level, consumption, social dysfunction, anxiety & depression, and loss of confidence are the variables used to correlate these independent variables. Shown in Table 4 are the computed correlation values. Through correlation analysis, it will determine if the independent variable is significant with a P-value < 0.05,

Table 4. Correlation Result

	Age	Year level	Consumption	Social Dysfunction	Anxiety & Depression
Year level	0.578				
Consumption	0.244	0.191			
Social Dysfunction	0.057	-0.055	0.318		
Anxiety & Depression	0.004	-0.107	-0.063	0.288	
Loss of Confidence	-0.107	-0.12	0.106	0.348	0.518

Table 5. Pairwise Pearson Correlations

Sample 1	Sample 2	N	Correlation	95% CI for p	P-value	Remarks
Year level	Age	100	0.578	(0.431, 0.696)	<0.001	Significant
Consumption	Age	100	0.244	(0.050, 0.420)	0.015	Significant
Social Dysfunction	Age	100	0.057	(-0.141, 0.251)	0.571	Not significant
Anxiety & Depression	Age	100	0.004	(-0.193, 0.200)	0.971	Not significant
Loss of Confidence	Age	100	-0.107	(-0.297, 0.092)	0.291	Not significant
Consumption	Year level	100	0.191	(-0.006, 0.373)	0.057	Not significant
Social Dysfunction	Year level	100	-0.055	(-0.248, 0.143)	0.59	Not significant
Anxiety & Depression	Year level	100	-0.107	(-0.297, 0.092)	0.291	Not significant
Loss of Confidence	Year level	100	-0.12	(-0.309, 0.079)	0.236	Not significant
Social Dysfunction	Consumption	100	0.318	(0.130, 0.484)	0.001	Significant
Anxiety & Depression	Consumption	100	-0.063	(-0.256, 0.135)	0.536	Not significant
Loss of Confidence	Consumption	100	0.106	(-0.092, 0.297)	0.292	Not significant
Anxiety & Depression	Social Dysfunction	100	0.288	(0.097, 0.458)	0.004	Significant
Loss of Confidence	Social Dysfunction	100	0.348	(0.163, 0.509)	<0.001	Significant
Loss of Confidence	Anxiety & Depression	100	0.518	(0.358, 0.648)	<0.001	Significant

Shown in table 5 are the calculated values for the confidence interval, correlation values, and P-values. Although some variables were determined to have a significant relationship with one another, namely year level and age having a p-value of 0, anxiety & depression and social dysfunction with a p-value of 0.004, loss of confidence is also correlated with social dysfunction and anxiety & depression with a p-value of 0, only Age and Social dysfunction correlates with

coffee consumption. The data shows that consumption with a p-value of 0.015 is significant with age. It only indicates that coffee consumption increases if a person is aging; the more a person ages, the higher the coffee intake they consume on a daily basis.

Social dysfunction is a social problem that causes hardship in interaction with different people who surround a certain person with this social problem. Social dysfunction is correlated with coffee consumption with a p-value of 0.001, which shows that they are significant to one another, meaning that students with social dysfunction tend to consume a higher amount of coffee. It causes anxiety and depression, losing confidence. Students having anxiety and depression correlate with losing their confidence because the data shows it has a p-value of 0. Stress, anxiety, and depression are related to caffeine consumption (Richards, G., & Smith, A. 2015). As a result, it can be proven that excessive consumption of coffee has a negative effect or increases the probability of mental health problems, specifically social dysfunction.

5. Conclusion

In this study, the researchers collected data through a questionnaire given to 100 undergraduate college students who consume and drink coffee. The researcher used a 4-point Likert scale to rate the respondents' mental health and measured the results by Goldberg's 12-item General Health Questionnaire, which helps assess an individual's physiological status and determine the presence of social dysfunction, anxiety, depression, and loss of confidence. The result of the demographic shows that most of the respondents gathered were males aged from 21-to 22 years old, currently in their second year of college. Most respondents consumed 1 to 2 cups of coffee daily and preferred to drink coffee any time of the day. And lastly, most of the respondents consume coffee for school purposes based on the survey given.

In the Mental Health Measurement or the GHQ-12 Questionnaire, the respondents were given 12 items to evaluate the presence of a mental disorder. These 12 items are namely: worrying, ability to concentrate, losing much sleep over worry, playing a useful part, capable to make decisions, under stress, not being able to overcome difficulties, able to enjoy day-to-day activities, being able to face problems, feel unhappy and depressed, losing confidence, thinking of self as worthless, and feeling reasonably happy. The results show that 51.10% of the respondents showed signs of social dysfunction, 35.09% showed signs of anxiety and depression, and 13.81% showed signs of loss of confidence.

Based on the correlation analysis results, coffee consumption and the respondents' age showed a significant relationship, thus proving that consumption of coffee also increases with age. Furthermore, another factor that led to a significant relationship is the consumption of coffee and the presence of social dysfunction in the respondents, thus stating that an increase in consumption of coffee can also increase social dysfunction in the consumer. Other comparisons of factors such as consumption of coffee with anxiety and depression and coffee with loss of confidence have no significant differences. Therefore, it can be proven that a high amount of coffee indicates an adverse effect or risk of mental health disorders, specifically social dysfunction. Social dysfunction is one of the symptoms of neuropsychiatric disorders and has been repeatedly associated with severe health outcomes such as possible suicidal risk and poor communication with people (Porcelli, 2020).

6. Recommendation

The results of the statistical analysis and the study's outcome proved that a high amount of coffee consumed by undergraduate students appears to have a negative effect on their mental health status. Thus, the researchers have concluded to provide recommendations and probable solutions to this problem. For educational institutions, the researchers suggest that they uphold their policies to support and care for students' welfare by initiating mental health awareness programs within their respective communities. Such programs must include online webinars or discussion programs about how overconsumption of coffee can expose students to risks of mental health disorders, specifically Social dysfunction, which has been proven in this study. This initiative will help students be encouraged to improve their mental health during online learning so they can perform better without being negatively affected by the coffee they consume.

For the students, self-awareness is encouraged by the researchers. Knowing their amount of coffee intake and its noticeable effects on the system of their bodies would help them evaluate their well-being. However, the researchers mainly suggest that those students who drink such a high amount of coffee, more than 2 cups per day, must reduce their consumption due to the determined risks according to the study. The researchers also suggest alternative brain-

boosting beverages to expand the students' options and aid them during their online classes, such as green tea, kombucha, etc.

For future researchers, since the study determined only a single correlation that directly associates coffee consumption with the mental health status of college students, it indicates that coffee consumption alone cannot predict the students' overall psychological well-being but only a part of it. In addition, coffee consumption is this study's only primary dependent variable. Thus, the researchers recommend considering more factors that could affect the psychological well-being of undergraduate students during online learning, such as the quantity of sleep, frequency of eating meals per day, duration of breaks, and academic workload.

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