



A Study on Caffeine Expectancy and Stress among College Coffee Consumers

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ABSTRACT

With Starbucks and Tim Horton in trend globally, so is the increasing caffeine usage among college students. Students have started consuming caffeine as their energy catalyst, believing that it would help them study for an exam overnight or help them win a sports event. Expectancies for caffeine reveal the various expectations people have, concerning its consumption, based on which they may alter its daily dosage. Caffeine consumption also has an association with the perceived stress. The aim of the current research was to study the effects of outcome expectancies of caffeine consumption including energy/work enhancement, social/mood enhancement/physical performance enhancement, anxiety/negative physical effects, etc. and to determine the relationship of caffeine with perceived stress among college students. Standardized scales were used to measure the caffeine expectancies and perceived stress. A total sample of 62 undergraduate and postgraduate students within the age limit of 18-25 years participated in the study. The result found out that the various outcome expectancies for caffeine consumption are positively correlated to each other. It also revealed that there is a significant positive correlation between perceived stress and caffeine expectancies including withdrawal/dependence and sleep disturbance. It is suggested that the students must keep a check on their daily caffeine consumption so that they do not consume too much that might gradually lead to caffeinism.

Key Words: Caffeine Consumption, Expectancy, Stress, College Students

Introduction

It should be noted that the frequency and quantity of caffeine consumption has a relationship with its expectancy effects. Beliefs of students that a cup of coffee shall help them concentrate better during examinations or an energy drink before a match shall improve their physical performance increases their drive for caffeine. But the question arises whether the expectancy effects associated with caffeine consumption actually make a difference.

A study by Harrell and Juliano (2009) examined the relationship between caffeine expectancies and subjective performance tasks in order to assess performance, mood, caffeine withdrawal and negative somatic effects using a 2*2 factorial design on 60 abstinent coffee drinkers. The sample was made to drink decaffeinated coffee with either 280mg or 0mg of added caffeine and was told that they had been administered caffeine regardless of actual caffeine content. The dose was crossed with varying instructions that the coffee would either enhance or impair their performance. Their performance was assessed based on a Rapid Visual Information Processing task (RVIP) (Yeomans et al., 2002) and a finger tapping task (Heatherly et al., 2005). It was found that the caffeine condition produced enhancement on both the performance tasks. However, interplay between dose and expectancy was found only relative to the visual information processing task. Subjects who expected impairment and did not receive caffeine actually improved performance in contrast to the ones who expected enhancement. Thus suggesting that caffeine intake has varying effects based on diverse expectancies of the people.

Caffeine Consumption Expectancy

“Caffeine (1, 3, 7-trimethylxanthine) is the most commonly consumed central nervous system stimulant in the world by humans. It is an alkaloid found naturally in more than 60 different plant species including coffee, tea and cacao beans (chocolate and cocoa)” (Heckman et al., 2010). According to Fulgoni et al. (2015) “caffeine is a stimulant that acts on the central nervous system and may also help to improve memory and alertness.” Moreover, Bandura (1986, 2001) stated that “outcome expectancies are the believed consequences of a person’s perspective behavior and relevant for behavior and actions of all kinds ranging from health and wellbeing related actions (Schwarzer & Luszczynska, 2016) to self-directed career and organizational behavior” (Lent, 2013).

Expectancy can therefore be referred to as a perceived expectation that the particular behavior would cause a certain effect. In comparison to drugs like alcohol, cocaine, tobacco, marijuana, etc. a little is known about the subjective beliefs of people consuming the world's most actively used mind altering drug- caffeine. There is no doubt that drug expectancies may directly influence drug experience (i.e., the placebo effect) (Kirsch, 1999). Similarly, manipulating drug expectancies influence both subjective and behavioral drug effects (Brandon et al., 1999; Fillmore & Vogell-Sprott, 1992; Fucito & Juliano, 2007; Harrell & Juliano, 2009). Hence, caffeine consumption may also have an association with the subjective anticipatory beliefs people possess.

Expectations for self-reported mood enhancement, energy enhancement and better physical performance acts as a driving force for college students contributing to their increased caffeine intake. According to McIlvian et al. (2011) beliefs of students about caffeine, prompt their use of caffeine as a study aid. However, once the person becomes addicted to caffeine, so much so that he can barely imagine a day without it; regular caffeine consumption starts to take a toll on his physical and mental health and might also lead to withdrawal eventually.

Some of the earliest experiments focusing on caffeine expectancies were conducted by Fillmore and Vogell-Sprott (1992) which involved the manipulation of expected effects of caffeine in a computerised rotor task. The experiment consisted of two studies comprising a total sample of 56 participants. The sample was randomly divided into four groups in each study. Among four, three groups anticipated administration of caffeine. However, they were actually given only a minute amount of caffeine in their decaffeinated coffee, thus these groups acted as placebos. The fourth, or the control group, neither expected nor received caffeine. The research assistants attempted to manipulate the expectancies of caffeine on motor performance in two out of the three placebo groups based on the two conditions that the caffeine consumption would respectively enhance and impair their performance. The results revealed that the participants' performance was positively related to what they were being told. Those who were in the enhancement condition performed better than the placebo group that was not subject to researcher's statements. Similarly, those who were in the impairment condition demonstrated diminishing performance as compared to the third placebo group. Thus, the research attempts to demonstrate that caffeine consumption expectancies and its manipulation affects performance even under placebo conditions.

In the further manipulation of drug expectancies that examined alcohol as well as caffeine it was also found out that the subjects who were led to believe that caffeine impairs their performance performed more poorly in psychomotor tasks in contrast with subjects that were led to expect enhancement. Hence, it can be concluded that expectancies could play a role in the subjective variability in caffeine reactivity (Fillmore et al., 1994).

32 undergraduates participated in the single blind experiment conducted by the means of 2*2*2 mixed factorial design which aimed to examine the effects of caffeine consumption based on the self-reports obtained before the experiment about whether they expected caffeine to stimulate them or not and were subsequently divided into two groups: E+ and E- respectively. The within subject factors included messages (told caffeine v/s told placebo) and beverage type (given caffeine v/s given placebo). Following the ingestion of either caffeinated or decaffeinated coffee, on four experiments in all; subjects in both the groups were assessed on signal detection, memory scanning and free recall tasks. It was observed that the subjects showed a mismatch between the message and the drink given on two sessions. Performance under caffeine was better than placebo in E+ group only for signal detection but this group did not benefit more than the other in either message condition. However, in the memory scanning task, no correlation was found between either of the drinks or between both the groups. Neither did caffeine and messages have an impact on performance on the delayed free recall task. Thus, stating that the messages and caffeine are not entirely related to the expectancies of the people (Oei & Hartley, 2005).

Stress

According to Lazarus (1966) "stress arises when individuals perceive that they cannot adequately cope with the demands being made on them or with threats to their wellbeing." In addition to this, stress occurs when pressure exceeds your perceived ability to cope" (Palmer, 1999). Stress is a state of mild or extreme mental pressure when the individuals are almost unable to cope up with the complexities of life. When the prefix, "perceived" is added to "stress" it specifically denotes the individual's beliefs rather than concrete facts that may or may not be true.

College students are often burdened up with the various issues going on in their life: may it be the difficulties that arise while adjusting to the new college environment, peer pressure, family problems, academic stress, the want for financial independence etc. In order to soothe their anxieties, they usually start consuming mild stimulants which, according to them, helps them relax and focus on their goal. As per the research, the most widely consumed stimulant is caffeine in the form of coffee. The relationship of caffeine consumption and stress is inseparable. It has been observed that college students sometimes rely upon caffeine in order to calm their anxiety or to enhance their mood, thereby, leading to lower stress levels while at other times; they curse coffee for their increased anxiety or stress levels.

A cross sectional study conducted by (AlAteeq et al., 2021) which aimed to examine the relationship between caffeine intoxication and stress on a sample of 547 female university students at PNU, Saudi Arabia revealed a positive correlation between caffeine consumption and perceived stress ($p < 0.045$). Caffeine intoxication and stress was examined using a self-administered questionnaire equally distributed between health and non-health college students using the DSM-5 criteria and Arabic version of PSS-10 respectively. Data was analyzed using SPSS and the mean total caffeine consumption per day was 424.69 ± 385.31 mg, with coffee being the major source. The mean of the high caffeine consumption group (>250 mg/day) was 628.28 ± 381.6 mg/day in contrast to the low caffeine consumption group (<250 mg/day) which was 126.6 ± 68.01 mg/day. It was also found that the students who experienced caffeine intoxication symptoms than asymptomatic students (75% versus 57.1%; $p < 0.005$) consumed comparatively higher levels of caffeine. Finally, it was evident that the students, who had high levels of caffeine consumption, had significantly higher scores for perceived stress in comparison to the others (21.40 ± 6.38 and 20.27 ± 6.31). The results of the study emphasizes on the need for educating the college students about caffeine intoxication and organization of stress management programs by the universities.

Purpose

The purpose is to study the relationship between caffeine expectancy and perceived stress among college students who consume coffee.

Hypothesis

There will be a positive significant relation between coffee expectancy and its subdimensions with perceived stress.

Method

Sample

A total of 62 college students participated from across Ludhiana and Chandigarh in the study of which 45 were females and 17 were males. The age of the subjects ranges from 18 to 25 years.

Measures

- **Caffeine Expectancy Questionnaire (CaffEQ)** as given by Huntley and Juliano (2012), consists of 47 questions, each rated on a 6 point scale ranging from 'very unlikely' to 'very likely.' It is used as an instrument for the assessment of possible effects that caffeine might have on the subjects. This questionnaire measures the effect of following expectancies: Withdrawal/ dependence, Energy/work enhancement, Appetite Suppression, Social/ Mood enhancement, Physical performance enhancement, Anxiety/ negative physical effects and Sleep disturbance.
- **Perceived Stress Scale (PSS)** was developed by Cohen et al. (1983). It is a classic 10 item stress assessment instrument, each with a 5 level response scale ranging from 'never' to 'very often.'

Procedure

The participants were informed about the purpose of the research and the questionnaires were filled through Google forms, each participant was thanked for their cooperation. Standardized Psychological Tests were administered to the participants.

Analysis of data results

The responses of the participants were analyzed to see the outcome expectancies of caffeine consumption and caffeine's effect on perceived stress levels among college students. Mean and standard deviation and correlations between withdrawal/dependence, energy/work enhancement, appetite suppression, social/mood enhancement, physical performance enhancement, anxiety/negative physical effects, sleep disturbance and perceived stress.

Results

Table 1 shows the mean and standard deviation scores of 62 young adults with variables Caffeine Expectancy and its sub dimensions and Perceived Stress.

	Caffeine expectancy	Withdrawal/dependence	Energy/work enhancement	Appetite suppression	Social/mood enhancement	Physical performance enhancement	Anxiety/negative physical effects	Sleep disturbance	Perceived stress
N	62	62	62	62	62	62	62	62	62
Mean	134	29.9	29.0	13.2	21.2	9.21	19.4	11.5	21.1
Standard deviation	45.7	14.1	10.1	5.80	8.77	4.61	8.05	5.36	7.07

Table 2 shows the correlation matrix of withdrawal/dependence, energy/work enhancement, appetite suppression, social/mood enhancement, physical performance enhancement, anxiety/negative physical effects, sleep disturbance and perceived stress.

	Caffeine expectancy	Withdrawal/dependence	Energy/work enhancement	Appetite suppression	Social/mood enhancement	Physical performance enhancement	Anxiety/negative physical effects	Sleep disturbance	Perceived stress
Caffeine expectancy	—								
Withdrawal/dependence	0.893 *	—							
Energy/work enhancement	0.794 *	0.608 ***	—						
Appetite suppression	0.768 *	0.690 ***	0.456 *	—					
Social/mood enhancement	0.775 *	0.665 ***	0.755 *	0.420 *	—				
Physical performance enhancement	0.725 *	0.609 ***	0.645 *	0.398 *	0.573 *	—			
Anxiety/negative physical effects	0.652 *	0.546 ***	0.233	0.629 *	0.222	0.345 *	—		
Sleep disturbance	0.740 *	0.510 ***	0.551 *	0.632 *	0.498 *	0.434 *	0.618 *	—	
Perceived stress	0.257 *	0.274 *	0.091	0.247	0.136	0.065	0.191	0.321 *	—

Note. * p < .05, ** p < .01, *** p < .001

Discussion of Results

The results of the study revealed that the average cups of coffee consumed by the sample in a day are 2.39. Also, there is a significant positive correlation between perceived stress and caffeine expectancy ($r=0.257, p<.05$). Also, all the dimensions of the caffeine expectancy including: - Withdrawal/dependence ($r=0.893, p<.001$), Energy/work enhancement ($r=0.794, p<.001$), Appetite suppression ($r=0.768, p<.001$), Social/mood enhancement ($r=0.775, p<.001$), Physical performance enhancement ($r=0.725, p<.001$), Anxiety/negative physical effects ($r=0.652, p<.001$) and Sleep disturbance ($r=0.740, p<.001$) were significantly positively related with caffeine expectancy. The study has also found that Perceived stress had no significant relation with Energy/work enhancement, Appetite suppression, Social/mood enhancement, Physical performance enhancement and Anxiety/negative physical effects. However, Perceived stress has a significant positive correlation with Withdrawal/dependence ($r=0.274, p<.05$) and Sleep disturbance ($r=0.321, p<.05$).

Similarly, in a descriptive cross sectional study conducted in Lahore, on a sample of 670 university students using CaffEQ, the participants reported that they consume caffeine because it makes them feel more alert (83.4%), they experience caffeine withdrawal without caffeine (83%) and caffeine makes them feel more energetic (80.6%). It was also reported that their perceptions for not consuming caffeine was irregular heartbeat (81.7%), irritability (76.8%), and sleep disturbance. (Zahra, Maqsood, Latif, Athar, Shaikh & Hassan, 2020).

Conclusion

The research study comprehends the effects of outcome expectancies for caffeine consumption along various dimensions – withdrawal/dependence, energy/work enhancement, appetite suppression, social/mood enhancement, physical/performance enhancement, anxiety/negative physical effects, sleep disturbance and also examines the relationship between caffeine intake and perceived stress among 62 college students (18-25 years). All the dimensions of caffeine expectancy were found to be positively related to each other. A significant positive correlation was found between perceived stress and caffeine expectancy. Thus, denoting that as the expectancies for caffeine increases, so is the stress level, as perceived by college students. It is suggested that college students should be made conscious of their daily dose of caffeine consumption so that it does not negatively impact their health and wellbeing.

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