

# Energy Drink Use and Sleep Quality in University Students

Kathy Sexton-Radek, Amy Bedolla, Katherine Kaja, Aisha Arshad, Kayla Bella Mitria

Psychology Department, Elmhurst University, Elmhurst, USA  
Email: [kathysr@elmhurst.edu](mailto:kathysr@elmhurst.edu)

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## Abstract

Energy drinks are commonly used by young people. Young adult university students typically use the Energy drinks for the caffeine and other ingredients that are advertised to increase attention and thus aid in the process and completion of academic activities. The widespread use extends to ED added to alcohol and with substance to prolong their effects. While the research on the mechanism of ED is imprecise, some marketings of ED include ingredients that are caffeine, Vitamin B, green tea and undisclosed herbals. Demographics and energy drink use variables from a dataset of a larger study of sleep quality in young adult university students is presented. With the documented effects of energy drinks on functioning, the current study was designed to identify energy drink use in a sample of young adult university students. Baseline data of one week of sleep logging rendered and average sleep efficiency score (total time asleep divided by total time in bedtimes 100 where 85% is considered an acceptable level). The mean sleep efficiency value was inversely correlated with energy drink use. A regression analysis of each substance used to predict sleep quality was statistically insignificant.

## Keywords

Sleep, Sleep Quality, Sleep Health, Young Adult Health, Student Health

## 1. Introduction

A report indicated that caffeine is the most widely used psychoactive substance in the world [1]. The popularity of energy drinks (ED) is linked to this common knowledge. In a google search, some 7000 plus names of products associated to the title “energy drink” was found. In a population of University students where high stress for academic performance is central, the use of energy drinks is prevalent. Estimates of University student use of EDs is some 68% on student surveys

[2] [3].

The enticement to ED stems from the perceived energy, alertness, and increased stamina for attention—promises that would aid all cognitive actions for academic assignments and study [1] [4]. The mental alertness and physical stamina factors are added components motivating ED use in University student populations. These components have crossed over to recreational use of EDs for intensified and sustained recreational activity by mixing with alcohol or as an adjuvant to cannabis use [5]. Use and excessive use of EDs within the University student population is known. Perceived energy and alertness, popularity, perhaps convenience of use prompt this continued upward trend. A trend that is regarded as a public health concern [6] [7]. The health decrements are of concern, and, particular to this study, the poor sleep quality [8] [9].

Marketed EDs while listing ingredients provide a vague specification of ingredients linked to the promised energizing effect. What is clearly labeled are components such as salt, a general term of “amino acids”, sometimes vitamin B, varying amounts of caffeine, glucose, various mixtures of herbal extracts such as green tea and proprietary blends of unknown substances [6]. The salt content is often high, which stimulates thirst and in turn, continued and increased use of the product. The amount of caffeine, the recognized component for energy varies from product to product of some 40 to 120 mg [5].

Health effects of ED use included documented anxiety/panic attacks, elevated heart rate, elevated blood pressure, abdominal cramping, dysentery, tremors and increased reports of depression and anxiety symptoms [2]. ED has been found to be inversely correlated to reduced total sleep time, number of wakeups during a sleep interval (*i.e.*, fragmented sleep) and extended time to fall asleep [3] [4]. Academic health, the degree of student success in academic endeavors, has been found to be compromised with reduced overall grade point average among University students using EDs regularly [10] [11].

Experimental evidence has found a small, temporary increase in attention from ED use (Bastista *et al.*, 2025). Thus, the perception of ED use exceeds the actual changes that occur in attention and focus. In addition to the health decrements of use, usage patterns are unknown. This disturbing finding of knowledge of increased use and repeated ED use has not been studied. A parallel to the half life effects of caffeine use from traditional sources of coffee/tea/soda use is often referred to. A cup of strong, steep coffee, some 80 mg of caffeine intake has a half life of 4 to 6 hours. Repeated caffeine intake in this manner, leads to pharmacologically active caffeine from the first cup of coffee effects to be extended with the second, the third and onward number of cups. This additive effect of caffeine is a possible, untested mechanism of repeated, continued ED consumption.

With the uncertainty of the mechanism of ED use, other important factors that are altered such as tolerance for stress remain a complicated problem to solve. The role of increased academic stress, the perception of academic stress and elevated energy drink use has been found [1] [11]-[13]. These findings were confirmed by

other research in this area [3] [11]. The current study focusses on energy drink use and sleep quality follows the important coupling found in survey self-report survey studies [8].

## 2. Method

### 2.1. Participants

227 participants from a larger study of sleep quality and environmental factors responses to general health questions and one week of sleep logging are used in this study. This IRB approved study entailed the completion of a brief questionnaire about general health with question of sleep schedule, amount of incidence of colds/flu, use of OTC substances of any type, alcohol and nicotine use, pain and/or injury. The participants were from a small liberal arts university in the Midwest that received course credit for participation. The demographic information is represented in **Table 1** and **Table 2**.

**Table 1.** Demographic and substance use  $n = 227$ .

Demographic Information/Substance Use	Details
Age range	18 - 30 years
Work at least 20 hours per week	68%
Substance use	89% Yes / 11% No

### 2.2. Measure/Instrument and Procedure

All participants were requested to complete a standard sleeping log of bedtime, wake time, number of wakeups, estimated time to fall asleep, time in bed and napping daily for one week. The sleep log data was used to compute poor sleep quality, on average with a sleep efficiency score of 75% or below—this data set represents the 224 participants filtered from the sleep efficiency variable to be poor sleepers. Each participants' response about ED use was noted for this study.

**Table 2.** Substance type by use.

Substance Type	Use?	Daily?	2 - 3X/day?	Once in awhile
Recreational Cannabis	42%	21%	7%	50%
Alcohol	86%	44%	9%	63%
Caffeine-Coffee, Soda, Tea	91%	93%	89%	14%
Herbs (Kavakava, Gingko Palava, Ginseng)	17%	1%	0%	3%
Tobacco/Chewing Tobacco	38%	78%	29%	3%
Energy Drinks	78%	61%	11%	18%

## 3. Results

There were no incomplete data points. The participant age ranges were between 18 - 30 years old. The mean age of the sample was 20.38 years ( $SD = 3.7$ ) with 86 males and 138 female participants. The sample was predominantly Caucasian

(76.8%), with 9.1% Hispanic, 7.2% African American, 4/1% Asian and 2.8% other. Six health related questions asking about substance use were examined. **Table 2** depicts the type and reported substance use. Some 89% reported using substances. Of those that reported substance use, caffeine followed by alcohol was the most common. The third most common substance reported was Energy Drinks. In a substantial drop in frequency percent, recreational cannabis and tobacco, at 42% and 38% use, respectively, are used. The daily pattern of substance use denotes caffeine, tobacco and energy drinks as the most common. Energy drink use (defined daily energy drink use) was associated with poor sleep efficiency,  $r = -0.52^*$ .

#### 4. Discussion

The popularity of Energy drinks has been consistent. Young Adult University populations represent the most common use of energy drinks. Our findings of 78% of our sample using energy drinks with 61% of that group indicating daily use and 11% twice a day use as significant. Bastista *et al.*, (2025) metaanalyses findings with Litmap propose the measurement of energy drink patterns as necessary to fully understanding the problem. A systematic approach such as this conceptualized with corresponding mathematical analysis of academic performance and mental health outcomes from energy drink use are essential to addressing the research question of the effects of energy drinks. Protano *et al.*, (2022) approach to the analysis of University study energy drink consumption will establish the patterning of use and thereby assist in the identification of intervention points for health care treatment. Given the empirical experimental evidence that energy drinks alter perception but not reaction time, sustained visual motor focus, vigilance responses to pattern cues tasks that share feature of academic learning and work tasks.

#### 5. Conclusion and Recommendations

We reported a dataset from a larger study of sleep quality of poor sleepers' self-reported ED use. We conclude from the analysis of the data set that Eds are popular, and they exceed in popularity to other substance use. University students use EDs to increase their attention to academic work and, in some instances, a belief to extend the effects of alcohol or substances. The public reporting of the vagueness of labels of the ingredients in EDs and the health effects seems to go unabated.

We recommend further research on the varied ingredients of EDs and the establishment of a mechanism for the pharmacological effect. Additionally, we believe further information is needed to increase public health awareness among young adult university students in terms of the ill health effects of EDs. We believe the common use pattern, as exemplified in our data set analysis, underscores the need to heighten awareness about EDs and poor health effects. And finally, we think messaging about the gap between expected results and actual results of ED use needs to be highlighted. We think the common use may be altered when young adult university students understand the limited activity of increasing attention

that is realistically obtained from EDs.

Our findings of poor sleep quality and frequent ED use, we think, provide strong evidence of detriment to sleep health from EDs. The frequent awakenings/fragmented sleep and general difficulty in falling asleep characterized by ED use warrants further investigations. While abstinence seems the most sensible, we believe further studies of the patterning of ED use (Bastita *et al.*, 2025; Protana *et al.*, 2022) may provide a measured recommendation of limited, strategic use of ED for alertness with expected outcomes. Until the science and patterning of ED is more certain and the measured certainty of ill effects on sleep quality, no ED use is advised.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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