Research Brief

Influence of Price and Labeling on Energy Drink Purchasing in an Experimental Convenience Store

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ABSTRACT

Objective: To examine the impact of energy drink (ED) pricing and labeling on the purchase of EDs.

Methods: Participants visited a laboratory-based convenience store 3 times and purchased a beverage under different ED labeling (none, caffeine content, and warning labels) and pricing conditions. The 36 participants (aged 15–30 years) were classified as energy drink consumers (≥ 2 energy drinks/wk) and nonconsumers (< 1 energy drink/mo). Data were log transformed to generate elasticity coefficients. The authors analyzed changes in elasticity as a function of price and labeling using mixed-effects regression models.

Results: Increasing the price of EDs reduced ED purchases and increased purchasing of other caffeinated beverages among ED consumers. Energy drink labels affected ED sales in adolescents.

Conclusions and Implications: These data suggest that ED pricing and labeling may influence the purchasing of ED, especially in adolescent consumers.

Key Words: caffeine, energy drinks, Food and Drug Administration, pricing, labels (*J Nutr Educ Behav*. 2015; ■:1-6.)

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INTRODUCTION

Caffeine is the most widely used psychoactive substance in the world.[1] Caffeine is classified as Generally Recognized as Safe by the Food and Drug Administration (FDA), but the influx of highly caffeinated energy drinks (EDs) marketed to adolescents and young adults has prompted the FDA to consider regulating nonalcoholic caffeine-containing beverages for the first time in over 6 decades.[2] Some potential regulations include adding caffeine content or warning labels, restricting sales of EDs to minors, and taxing EDs. To date, no studies have investigated the impact of such strategies on ED purchasing and consumption.

Behavioral economic principles state that as the cost of a product increases, purchasing of that product decreases.[3] Behavioral economic approaches have been used to study a range of purchasing behavior to predict the price at which purchasing decreases. Examining the impact of price changes on the purchasing of foods and beverages provides empirical data on the effectiveness of taxes and subsidies. Studies in vending machines,[4] restaurants,[5] and cafeterias[6,7] have shown that increasing the price of less healthy food decreases purchases. One study using a laboratory-based grocery store showed that selective taxation of high-calorie-for-nutrient food decreased the total energy purchased, with the greatest influence on energy from fats and carbohydrates.[8]

Another factor that influences purchasing of beverages and foods is labeling. To provide consumers with nutrition information, the FDA requires labels on all packaged foods.[9] It is possible that providing information about caffeine content on beverages would also be beneficial[10] and may allow consumers to better regulate caffeine intake.[11] Empirical data on the relationship between food labeling and food purchasing are weak and inconsistent. Two studies reported that providing calorie information at the point of purchase reduced energy purchased[12,13] but the majority showed that point-of-purchase labeling did not affect purchasing or consumption.[14-17]

The purpose of this study was to test the hypotheses that (1) increasing the price of EDs decreases purchasing of EDs in consumers, and (2) adding labels that provide more information about EDs reduces purchasing of EDs in consumers. In addition, the relationship between changes in ED purchasing and purchasing of potential substitute beverages was examined in a laboratory-based convenience store.

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METHODS

Participants

Participants aged 15–30 years were recruited using direct mailings, flyers, and word of mouth from January to June, 2014. Potential participants were screened by telephone for medical and demographic information as well as amount of caffeine and EDs used on a daily or weekly basis. Eligible participants had no known allergies to the study foods and beverages and had not had an adverse reaction to caffeine. Individuals classified as non-ED consumers (consumed EDs less than once per month) or ED consumers (consumed EDs 2 or more times per week) were enrolled. The researchers chose the population of non-ED consumers as a comparison group to make sure that the experimental environment and procedures would not entice individuals who would not normally purchase EDs to try them. Potential participants were excluded if they reported consuming EDs between once per month and once per week, if they were not willing or able to visit the laboratory 3 times, or if they were pregnant. A total of 36 15- to 30-year-olds (n = 18 males and 18 females) were eligible and completed the study during the recruitment period. Participants in this age range were chosen because data suggest that ED use is rising fastest in adolescents and young adults.

Procedures

Each participant visited the laboratory 3 times between 11 AM and 7 PM, with 1–3 days between each appointment. At the beginning of the first visit, participants completed consent and demographic forms. For participants aged 15–17 years, parents completed consent forms and a demographic questionnaire. All other visit documents, including an assent form, were completed by the adolescent participant. Participants then completed a caffeine use questionnaire. Participants were told that the purpose of the study was to determine how different factors influence convenience store purchasing. Then, participants were given $6.00 to purchase food and beverages from the laboratory-based convenience store. After each trial, the participants left the room while the shelves were restocked and the prices of EDs were changed. Participants then completed another purchasing trial and were allowed to keep the purchases from 1 of the 3 trials on each visit. Each visit day, participants received 1 of 3 ED labeling conditions: no label, a label including absolute milligrams of caffeine in the ED, and a caffeine warning label listing the possible negative effects of excessive caffeine consumption, the order of which was counterbalanced. Study staff developed the warning label used in this study to provide information about potential dangers of caffeine. It read: "High levels of caffeine intake can cause headache, nausea, anxiety, irregular heartbeat, vomiting, and, in extreme cases, death. Use caution when consuming caffeine."

Within each session, the price of EDs was manipulated. The 3 price conditions were the reference price ($1.56/serving), a 50% increase ($2.35/serving), and a 100% increase ($3.12/serving). The reference price was based on an average price for each ED used from 3 convenience stores in the Buffalo, NY area. This experimental marketplace model has been used by experts in the field of behavioral economics[18-20] to simulate real-world purchasing in a setting in which prices and food labels can be experimentally manipulated, which is not possible to do in an actual grocery store or convenience store. These types of purchasing tasks have been shown to have good external[21,22] and internal validity.[23,24] The University at Buffalo Institutional Review Board reviewed and approved these procedures.

Convenience Store

The experimental convenience store used for this study contained 50 items with the following product distribution: 40% beverages, 10% potato chips/pretzels, 10% cookies/donuts, 15% candy, 6% gum, 6% miscellaneous salty snacks (nuts and beef jerky), 8% granola and cereal bars/toaster pastries, and 5% fruit. Ratios of products were determined by visiting 3 area convenience stores and cataloguing all items, putting them into categories, and calculating ratios of product categories.

Questionnaires and Measurements

A demographic questionnaire providing information about household income, education, profession, and race/ethnicity was completed. In addition, medical conditions or medications being taken that may influence responses to caffeine, such as attention deficit hyperactivity disorder were reported during screening. Finally, participants were asked to report whether they had ever had an adverse reaction to caffeine.

The researchers measured height and weight using a digital scale and stadiometer (SECA, Hanover, MD, 2008) at the end of the third visit. On the basis of the height and weight data, body mass index (BMI) or BMI percentile was calculated using the Centers for Disease Control and Prevention BMI Calculators according to the following formula: (BMI = kg/m^2).[25]

The caffeine use questionnaire was designed to assess sources, amounts, and frequency of caffeinated beverage and substance intake in adolescents and young adults.[26,27] The authors used answers on this questionnaire to determine average daily caffeine intake (milligrams per day). Questions for each beverage included *Do you drink _____?* If yes, *How often do you drink _____?* with the following choices: *1 time/mo*, *2–3 times/mo*, *1 time/wk*, *2–3 times/wk*, *4–5 times/wk*, or *every day*. When there was a range, the midpoint was selected. Then, participants were asked to provide a volume of beverage consumed on a typical day: *1 can, 2 cans … more than 7 cans*. Beverages listed on the questionnaire were as follows: *soda with caffeine*, *tea (hot or iced)*, *coffee*, and *energy drinks*.

Debriefing

Participants underwent a structured debriefing. During this debriefing, participants were asked what they believed the nature of the experiment was and how they felt about the experiment. They were then told the purpose of the experiment and were compensated.