Adolescent Attitudes and Beliefs Regarding Caffeine and the Consumption of Caffeinated Beverages

Paige Turton, MScFN, RD; Len Piché, PhD, RD; Danielle S. Battram, PhD, RD

ABSTRACT

Objectives: To explore adolescents' attitudes and beliefs toward the consumption of caffeinated beverages and factors influencing their caffeinated beverage choice and consumption patterns.

Design: Twenty focus groups were conducted with grades 9 to 12 secondary school students.

Setting: Two secondary schools in London, Ontario, Canada.

Participants: This study included 166 adolescents, 42% of whom were male and 72% of whom were in grades 9 and 10.

Phenomenon of Interest: Adolescent views regarding caffeine and caffeinated beverages.

Analysis: Three researchers independently conducted inductive content analysis on the data using the principles of the immersion-crystallization method.

Results: Awareness levels regarding types of caffeinated beverages and their negative health effects were high in adolescents whereas awareness of other aspects of caffeine itself and recommended consumption levels were low. Adolescents also identified reasons for caffeine use, including providing energy, taste, accessibility, and image enhancement. Influences for caffeine use most noted by participants included parental role modeling, media and advertising, and social norms.

Conclusions and Implications: Further education is needed to correct the misconceptions adolescents have regarding certain aspects of caffeine. By gaining a deeper understanding of adolescents' caffeine use, effective educational strategies may be developed to reduce its use and mitigate potential harms.

Key Words: adolescents, caffeine, caffeinated beverages, attitudes, focus groups (J Nutr Educ Behav. 2016;48:181-189.)

INTRODUCTION

Caffeine is the most available and widely used psychoactive substance in the world. It is also the only drug that is legally accessible and socially acceptable for consumption by children and adolescents. Currently, adolescents are the fastest-growing population of caffeine users, with caffeinated beverage consumption rates increasing consider-ably over the past decade. Recent studies have determined that 83.2% of adolescents consume caffeinated beverages regularly and at least 96% consume them occasionally. For adolescents who consume caffeine, their estimated intake ranges from 60 to 800 mg/d, which suggests that a percentage of this population may be overconsuming the substance. Mitchell et al. indicated that adolescents in the 90th percentile consume an average of 2.9 mg/kg body weight per day of caffeine, which exceeds Health Canada's current recommendation of 2.5 mg/kg body weight per day for this age group.

Because adolescents are consuming more caffeine, and more caffeinated products are available in the marketplace, there is reason to be concerned about the potential negative health effects of its use. Indeed, caffeine overconsumption and caffeine intoxication have resulted in serious health effects. Symptoms of caffeine intoxication include nervousness, anxiety, restlessness, insomnia, gastrointestinal upset, tremors, tachycardia, and in rare instances, death. The extent to which caffeine intoxication occurs in adolescents is currently unknown; however, even moderate doses of caffeine (100–400 mg) can result in nervousness and jitters in children and adolescents. To date, the majority of published research regarding caffeine has been conducted with adults, not adolescents. Furthermore, in-depth research has not been done to discover adolescents' perceptions and understanding. Although Ludden and Wolfson investigated caffeine use, reasons for use, and expectancies in adolescents, they used a survey with predetermined...
responses, and therefore did not allow adolescents to freely express themselves. Bunting et al.\textsuperscript{14} explored adolescents’ perceptions of caffeinated drinks through focus group discussions; however, they focused only on caffeinated energy drinks, not caffeine itself. This limits their findings to only 1 source of caffeine. Because only 10% of adolescents consume caffeinated energy drinks on a regular basis,\textsuperscript{4} a broader understanding of caffeine in general, from all sources, is warranted. Therefore, the aims of this study were to investigate (1) adolescents’ attitudes and beliefs toward caffeinated beverages, and (2) factors influencing their caffeinated beverage choice and consumption patterns.

**METHODS**

**Research Design**

A qualitative study design using focus groups as a means of data collection provided the framework for this study. The researchers also chose the PRECEDE-PROCEED model for Health Promotion Planning and Evaluation to guide this study because it includes a comprehensive diagnosis of the problem (PRECEDE; ie, social and environmental factors), while being mindful of collecting information for the future implementation and evaluation of programming (PROCEED).\textsuperscript{15} The authors obtained ethics approval from the research ethics boards at both Brescia University College and Western University.

**Sampling Methods and Recruitment**

Upon the researchers receiving permission from the local school board, 2 local high schools from different areas of the city were contacted by school board personnel. Because income level was not an area of interest in this study, these schools were selected randomly from the representative pool of schools contained within middle-income neighborhoods. The investigators then contacted health and physical education teachers (n = 5) at these schools, at which time the purpose of the study was explained. All teachers agreed to help recruit students from their respective classes and to aid in the logistics of conducting the focus groups. Investigators then attended these classes to explain the study to all eligible participants. Recruitment packages were handed out to all students (n = 230) with instructions to obtain informed, written parental consent and, when appropriate, students’ assent for those interested in participating in the study. Students were eligible to participate if they were in grades 9–12, currently enrolled in a health class, and aged 13–18 years. In total, 177 students agreed to participate in the study, which gave a response rate of 77%. Because focus groups were conducted during a designated date and time, all students absent from their designated session (n = 11) were removed from the study, which left a total of 166 participants.

**Focus Group Protocol and Data Collection**

Focus group sessions took place during a regularly scheduled class on a day predetermined by the classroom teacher. Each focus group was conducted by a trained moderator and an assistant moderator or note taker. Graduate students with an interest in adolescent health were chosen to assist with this study, because moderators who enjoy interacting with adolescents increase the success of focus groups.\textsuperscript{16} The moderator guided the focus group discussions using a guide developed by the researchers. Taking into consideration the population group, questions were short, unambiguous, and open-ended.\textsuperscript{17} The semi-structured nature of the interview guide ensured consistency and flexibility as the discussion unfolded within each focus group.\textsuperscript{18} After the first day of focus groups (n = 4), the moderators and researchers met to discuss the guide and modifications were made to improve clarity. The final guide consisted of 8 questions. Four questions focused on adolescents’ thoughts on caffeine: “What comes to mind when you hear the word caffeine?” “What effects does caffeine have on the body?” “Why do you think students your age use caffeine?” and “What do you think influences students your age to use caffeine?” Two questions explored their knowledge regarding which beverages contained caffeine and how much caffeine is recommended each day. The final 2 questions were: “What advice would you give your peers and younger siblings about caffeine?” and “Where would you go to get reliable information about caffeine?” Focus groups were stratified by sex and grade level to capture potential differences. For logistical reasons, 2 focus groups included both males and females. Focus groups ranged from 15 to 60 minutes in duration. Although the intent was to conduct focus groups until saturation was reached (12 focus groups), at the request of the schools, all students enrolled in a health and physical education class who wished to participate in the study (and had provided consent or assent) could do so (20 focus groups in total).

All transcripts were audio recorded and transcribed verbatim by a professional transcriptionist to ensure that all data were captured. To improve the trustworthiness of the data, a detailed journal was completed by the moderator after each set of focus groups, to serve as an audit trail. Member checking was conducted throughout the focus group discussions to ensure that participant responses were understood and clarification was obtained as needed. Debriefing sessions also were conducted at the end of each focus group to discuss overall impressions and any concerns with the session. These data provided the researchers with the context for each focus group. A brief demographic questionnaire with questions about age, sex, grade level, caffeinated beverage consumption patterns, and smoking habits was administered to participants upon completion of the focus group session. Because a detailed assessment of caffeine intake was not the purpose of this study, a comprehensive validated questionnaire was not used; rather, questions were asked only to obtain a general understanding of the frequency and types of caffeinated beverages consumed. Participants received a $10 iTunes gift card for participation and participating classes received a 90-minute interactive, educational lesson on caffeine, delivered by the researchers after the focus groups were completed.

**Data Analysis**

Using the principles of the immersion-crystallization method,\textsuperscript{19} the researchers used inductive content
analysis to analyze and explore the dominant and recurrent themes arising from the focus group data. All investigators coded the transcripts independently and then met to discuss their findings. Where coding discrepancies occurred, the group discussed and resolved these discrepancies by consensus until a common theme template was developed. Transcripts from male and female focus groups as well as from different grade levels were coded separately to explore possible differences. Data were managed using Microsoft Word (version 14.0.0, Microsoft Corporation, Santa Rosa, CA, 2010). The demographic data were analyzed by simple descriptive statistics using Microsoft Excel (version 14.0.0, Microsoft Corporation).

RESULTS

Twenty focus groups (n = 166) were conducted in 2 secondary schools in London, Ontario between December, 2013 and May, 2014. Each group was composed of 3–12 participants (average, 8.3 participants). Table 1 lists participant characteristics. With regard to caffeinated beverage consumption, 4.8% of participants reported never drinking caffeinated beverages, 11.4% reported drinking caffeinated beverages every day, 44.6% reported consuming caffeinated beverages 1–6 d/wk, and 39.2% reported drinking caffeinated beverages once in a while. The most popular beverages consumed were soft drinks (69.9%), coffee beverages (such as lattes) (48.2%), tea (41.6%), coffee (22.3%), and energy drinks (11.4%).

Supported by participant quotations, 3 important primary themes emerged during data analysis: (1) a generally high level of awareness and knowledge regarding caffeinated beverages and their negative health effects (Table 2), (2) reasons for caffeinated beverage consumption patterns (Table 3), and (3) key factors influencing caffeinated beverage choice and consumption patterns (Table 4). Secondary themes also are included in the respective tables. Sex and grade level differences were evident and are described subsequently where applicable.

| Table 1. Characteristics of the Study Participants (n = 166) |
|--------------|-------------|-------------|
|              | Male        | Female      | Total        |
|              | 42          | 58          | 100          |
| Sex (%)      |             |             |              |
| Age (mean [SD]) | 15.0 (1.29) | 15.0 (1.31) | 15.1 (1.30)  |
| Grade level (%) |             |             |              |
| 9/10         | 31          | 41          | 72           |
| 11/12        | 10          | 18          | 28           |
| Smoker (%)   |             |             |              |
| Yes          | 2           | 0           | 2            |
| No           | 98          | 100         | 100          |

Note: A sample size of 165 was used to calculate average age.

Awareness Level and Knowledge

Caffeine and caffeinated beverages. Overall, participants had a high level of awareness with regard to identifying beverages containing caffeine (eg, coffee, soft drinks, or energy drinks) (Table 2). Participants also were able to identify other sources of caffeine (eg, chocolate, chocolate milk, and hot chocolate), noncaffeinated soft drinks, and herbal teas. Despite this awareness, however, there appeared to be some confusion regarding which caffeinated beverages contained the most caffeine. Although coffee and energy drinks were most often reported, some participants were unclear about tea and soft drinks.

No participant was able to state Health Canada’s current recommendation correctly as to the maximum amount of caffeine to consume per day; the majority of participants referred to the maximum amount in cups of coffee rather than milligrams of caffeine per day. Despite this, when asked what they would tell their peers or younger siblings about caffeine, almost all participants stated that moderation should be exercised by their peers, whereas strict limits and avoidance should be imposed on their younger siblings.

When participants were asked, “What comes to mind when you hear the word caffeine?” the majority responded with an outcome expectancy of caffeine, such as “energy” or “hyper,” or with a caffeinated beverage such as coffee. Most adolescents did not understand what caffeine is, and often equated it with sugar. Their perception was that most caffeine-containing drinks (with the exception of coffee) contained sugar. Only a few participants (mostly older students in grades 11 and 12) mentioned caffeine as a drug.

Health effects of caffeine use. When participants were asked to state the potential effects of caffeine on the body, the majority of responses were related to perceived negative health effects. When further prompted by moderators, only a few positive effects were mentioned. Participants had a high level of awareness regarding the risks of consuming too much caffeine; the most cited effects were short-lived energy, elevated heart rate, insomnia, and shakiness or jitteriness. Stunting of growth also was noted as a dominant theme, but only by female participants. With regard to positive health effects, the most commonly stated ones included increased energy, wakefulness, and improved focus or concentration. When asked where they would go for reliable information, participants most often responded by saying the Internet (including company Web sites) and their parents, followed by their doctor or teachers.

Reasons for Caffeine Use

Energy provision. The most common reason mentioned by participants for consuming caffeinated beverages was the perceived outcome expectancy of alertness (Table 3). Caffeine was consumed in the morning, evening, and during exams to stay awake for class and to study. This energy provision, however, was strongly interconnected with the type of beverage, such as coffee and energy drinks. When asked how they would feel if caffeine...
were removed from these beverages, the majority of participants stated it would be problematic, particularly if the beverage were purposefully being used for energy. Furthermore, a few participants indicated that they co-consumed some caffeinated beverages (eg, coffee) for the perceived energy, despite not liking its taste. There was a significant sex difference in that only older male participants mentioned consuming caffeine for energy during sporting events, training, and social gatherings (eg, house parties). Finally, combining caffeinated beverages and alcohol was mentioned by a few male participants (grades 9–12) despite their understanding of potential negative health effects.

**Table 2. Representative Quotations Regarding Adolescents’ Awareness Level and Knowledge of Caffeine**

<table>
<thead>
<tr>
<th>Theme</th>
<th>Quotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caffeine and caffeinated</td>
<td>“Energy, like hyper.” (grade 12 girl)</td>
</tr>
<tr>
<td>beverages</td>
<td>“Coffee is the first thing you think of.” (grade 10 girl)</td>
</tr>
<tr>
<td></td>
<td>“I would say, like a cup, like 1 serving.” (grade 9 girl)</td>
</tr>
<tr>
<td>Health effects of</td>
<td>“Sugar rush.” (grade 12 boy)</td>
</tr>
<tr>
<td>caffeine use</td>
<td>“I would get really shaky.” (grade 12 girl)</td>
</tr>
<tr>
<td></td>
<td>“Like, even more tired when you crash, so it’s like you are kind of going backward by even drinking it in the first place.” (grade 12 girl)</td>
</tr>
<tr>
<td></td>
<td>“Completely messes with your blood sugar. Like, it spikes it and then you crash half an hour or an hour later.” (grade 12 boy)</td>
</tr>
<tr>
<td></td>
<td>“Like, coffee, everyone always says that if you drink too much it will stunt your growth.” (grade 9 girl)</td>
</tr>
</tbody>
</table>

**Table 3. Representative Quotations Regarding Adolescents’ Reasons for Caffeine Use**

<table>
<thead>
<tr>
<th>Theme</th>
<th>Quotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy provision</td>
<td>“Getting through the day.” (grade 10 girl)</td>
</tr>
<tr>
<td></td>
<td>“… For coffee and energy drinks, it’s more like the energy boost in the morning or through the day kind of deal.” (grade 12 boy)</td>
</tr>
<tr>
<td>Taste</td>
<td>“I think that it defeats the purpose of energy drinks if you were to take the caffeine out, but other beverages, I think its fine.” (grade 12 boy)</td>
</tr>
<tr>
<td></td>
<td>“I don’t really drink for the caffeine. I drink for the taste.” (grade 9 girl)</td>
</tr>
<tr>
<td></td>
<td>“… I only drink coffee for the caffeine. That’s all I drink with it. I don’t like the taste.” (grade 11 girl)</td>
</tr>
<tr>
<td>Accessibility</td>
<td>“Because it’s in what we drink.” (grade 10 boy)</td>
</tr>
<tr>
<td></td>
<td>“It’s in so much stuff that it gets to a point where you don’t exactly care what it’s in.” (grade 10 boy)</td>
</tr>
<tr>
<td></td>
<td>“Very convenient. Very easy to find.” (grade 12 boy)</td>
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<tr>
<td></td>
<td>“We can probably name 4 to 5 places on the corner within 100 feet or less that we could go get any type of caffeine…” (grade 12 girl)</td>
</tr>
<tr>
<td></td>
<td>“You can purchase it, like basically anywhere. So it’s not really anything bad like alcohol. You don’t have restrictions to buying it or using it.” (grade 9 girl)</td>
</tr>
<tr>
<td>Image enhancement</td>
<td>“Like, we as teenagers, we want to grow up and we feel that coffee kind of seems like a more mature adult beverage, so we want to drink it.” (grade 9 girl)</td>
</tr>
<tr>
<td></td>
<td>“My mom and dad are coffee drinkers, so I would always want to try it to be like them, even though I didn’t really like the taste, but now I find I am actually starting to accept the taste a little bit more.” (grade 9 student)</td>
</tr>
</tbody>
</table>
by younger participants (grades 9 and 10). Drinking caffeinated beverages, and in particular coffee, was seen as something older adolescents and adults do, and the ability to drink coffee without restriction by parents was seen as a sign of being grown-up.

Factors That Influence Caffeinated Beverage Choice and Consumption Patterns

**Parental role modeling.** Regardless of age or sex, when adolescents were asked what influences them to drink caffeinated beverages, parental role modeling was the most commonly mentioned response (Table 4). Adolescents most often mentioned observing their parents drinking caffeinated beverages (e.g., coffee in the morning), which implied that caffeine (coffee) was safe and acceptable for use. Adolescents also stated that parents’ purchase of caffeinated beverages outside the home (e.g., fast-food outlet) was a common routine before work and school. Whether prepared at home or bought on the way to work or school, participants mentioned that their parents either offered a caffeinated beverage to them directly or simply allowed free access to these beverages. Fewer participants stated that their parents had some control over what types of products were purchased and available at home, although control over the use of these beverages once in the home was not mentioned.

**Media and advertising.** Media and advertising of caffeinated beverages also emerged as major influencing factors for caffeinated beverage use. Although participants frequently mentioned the use of catchy phrases, attractive packaging, and role models (celebrities) as key ways by which companies promoted the appeal of their products, adolescents appeared to focus primarily on the frequency and placement of advertisements on television and in sport venues and how this affected their brand choice. Furthermore, participants seemed to have some awareness of the different marketing techniques used by companies to sell their products. This led to some discussion about the image often portrayed by energy drink advertisements, and how a specific product could boost sport performance. Finally, some participants also mentioned the use of incentives to influence their beverage choice and purchase, although this was a minor theme.

**Social norm.** Some participants mentioned social norms as a factor that influenced their choice and consumption of caffeinated beverages. Participants discussed how commonly these beverages are consumed by their peers and how it is perceived to be against the social norm when one of their peers declines drinking them. Some participants also mentioned that seeing their peers drinking a particular beverage could encourage them to try it themselves.

**DISCUSSION**

Adolescents provided a rich understanding of their overall attitudes
and beliefs regarding the consumption of caffeine and caffeinated beverages. Guided by the PRECEDE-PROCEED model, participants not only identified a variety of intrinsic, social, and environmental factors contributing to their intake but also provided some key insights into potential program planning regarding caffeine use in this population. Overall, participants exhibited high awareness regarding beverages that contain caffeine and the potential negative health effects of caffeine overconsumption. However, these findings are in contrast to those previously observed by both O’Dea and Bunting et al, who found that youth as well as adolescents and young adults (aged 11–18 and 16–21 years, respectively) had a low level of awareness regarding the potential health risks associated with energy drink consumption. It is possible that owing to their enrollment in a health class, participants in the current study had higher levels of awareness. Although caffeine and its health effects are addressed in the current provincial Health and Physical Education curriculum for grade 10 and therefore were taught to the majority of participants, when asked where they would go for credible information regarding caffeine, the dominant source mentioned was the Internet rather than their teachers. Regardless, there continues to be a lack of awareness about caffeine, the amount found in beverages, and the current recommendations for safe consumption.

Although participants’ awareness regarding the potential negative health effects of too much caffeine use may have been high, their caffeine consumption patterns were similar to those previously reported in the literature. Based on findings from the demographic questionnaire, 95% of participants reported consuming caffeinated beverages at least once in a while, which is similar to that reported by Temple et al. Furthermore, the types of caffeinated beverages consumed by participants (eg, soft drinks, coffee-type beverages, and energy drinks) were consistent with recent findings by Mitchell et al and Branum et al, which suggests that despite the increased awareness, participants appear to consume caffeinated beverages at a level similar to that of the general adolescent population. The concept of increased awareness not translating into better health behaviors was previously observed in adolescents with regard to healthy eating and is consistent with the notion that although awareness of health behaviors can be present, it is only at a later age that health consciousness develops and translates to choosing healthier products.

Participants identified many reasons for consuming caffeinated beverages. The finding that these adolescents consume caffeinated beverages for the outcome expectancy of providing energy is consistent with that previously reported for both adolescents and young adults. Bunting et al found that energy seeking was a dominant motivating factor for consuming energy drinks among 16- to 21-year-olds; however, whereas participants in that study sought the pleasurable kick of using energy drinks, the majority of adolescents in the current study did so to stay awake to study or to handle busy schedules. Furthermore, whereas Ludden and Wolfson found that experimentation and fun were reasons for caffeine use among high school students, this was rarely mentioned by participants in the current study. When caffeine use was mentioned for use at social gatherings by participants, it, too, was for the purpose of staying awake.

Taste continues to be a dominant reason for caffeinated beverage choice and is consistent with previous findings in children, adolescents, and young adults. Similarly, taste tends to override awareness of the negative health effects of consuming such beverages. This is in contrast to the idea that taste, too, could be ignored if a beverage were being used specifically for energy provision. The removal of caffeine from beverages consumed for taste was not deemed problematic by participants, unless the taste was altered by its removal. Although caffeine has been suggested to be a flavor enhancer in soft drinks, this remains controversial.

Participants noted that accessibility was a dominant reason for consuming caffeinated beverages, particularly within and in close proximity to the school environment. A negative correlation has been observed between accessibility and soft drink consumption in children. Furthermore, school-based policy interventions have been shown to be effective in reducing sweetened beverage consumption in the US. Although a School Food and Beverage Policy that limits the type of beverages sold within the school environment exists in Ontario, it does not address beverages purchased off-site and brought into the school environment.

Some younger adolescents (grades 9 and 10) found that drinking caffeinated beverages, and in particular coffee, made them feel mature. This is consistent with findings from Bunting et al, who found that adolescents and young adults value the image aspects of energy drinks even above their functionality of providing energy. This concept of maturity was further demonstrated by participants’ beliefs that these beverages (eg, coffee and energy drinks) should be limited or banned for consumption by younger siblings, and speaks to the influence of role modeling by older siblings and, more importantly, parents.

In addition to the reasons why adolescents consume caffeinated beverages, participants also mentioned some factors that influence their beverage choice and consumption. Parental role modeling was consistently mentioned by participants, particularly with respect to the availability and accessibility of caffeinated beverages both within and outside the home. This is consistent with previous findings indicating that the home food environment has a strong influence over children’s beverage consumption patterns. Furthermore, parental role modeling practices are also known to influence children’s eating behaviors and soft drink consumption. In contrast to that observed in children, parental control practices were not directly mentioned by participants. In a qualitative study involving both parents and adolescents, Bassett et al found that although adolescents have autonomy over their food choices, parents still exerted influence by control practices (eg, controlling household food supplies) and by coaching, coaxing, and coercing. One could argue that although adolescents in the current study did not acknowledge these control practices, they were present, because parents controlled the access.
of beverages in the home but also when frequenting food outlets on the way to school.

Media and advertising also were common influences noted by participants, which is consistent with previous literature involving energy drink use in adolescents.\textsuperscript{14,21,38} Whereas participants mentioned the attractiveness and appeal of certain products (commonly reported in the literature),\textsuperscript{12,21} the primary focus was on the frequency and placement of advertisements and messaging implied by beverage companies (e.g., enhanced sport performance). This, too, is consistent with previous research that has demonstrated the ability of media to have an impact on the dietary habits of children.\textsuperscript{39} In contrast to children, however,\textsuperscript{28} participants appeared to have some media literacy regarding the potential marketing strategies and underlying intentions of advertisers. The effect of media exposure and literacy on caffeinated beverage consumption patterns in adolescents is currently unknown. However, Chang et al.\textsuperscript{40} employed multivariate analysis to demonstrate higher alcohol and tobacco use among 10th graders with higher media exposure and lower media literacy for alcohol and tobacco, respectively. The modest media literacy observed in the current study's participants is in contrast to that observed by Bunting et al.,\textsuperscript{14} who found that with respect to energy drinks, adolescents had little media literacy. This may be because participants in the current study learned about media literacy in grade 9 as part of the health curriculum.\textsuperscript{52}

Adolescents also noted that social norms were a common influence on their caffeinated beverage choice and consumption patterns. This is similar to findings by Bunting et al.,\textsuperscript{14} who found that older adolescents and young adults (aged 16–21 years) were more conscious of social image and peer group norms than were older individuals (aged 22–35 years) with respect to energy drinks. The concept of social conformity has been reported among adolescents with respect to healthy eating,\textsuperscript{41} which suggests that whereas direct peer pressure (e.g., taunting or ridicule) may not have a significant role in choosing foods, the potential risk of not fitting in is enough to change behavior.

Only students enrolled in a health and physical education class were eligible to participate in this study. Therefore, it is possible that these students may have been more interested in health (and may avoid caffeine) and may have had a higher level of awareness regarding caffeine and its negative health effects. Although a comprehensive assessment of caffeine intake was not done, intake appears to be similar to that found by Mitchell et al.\textsuperscript{1} in the same age group, which suggests that the current sample did not avoid caffeine despite their exposure to the health curriculum. Furthermore, although the sex distribution of the current study's sample is representative of the school population (M. Reagan, oral communication, 2015), it contained a higher proportion of grade 9 and 10 students, which limits the current study's findings to younger adolescents. The greater proportion of grade 9 and 10 students is likely the result of more students being enrolled in lower-level health classes, because students are required to take only 1 of these classes to graduate. To ensure that the current findings were transferrable to all adolescents, the researchers compared focus groups by grade level and identified themes where appropriate. The number of participants per focus group ranged from 3 to 12 and may have influenced responses; however, debriefing notes suggest that this was not a concern. Finally, although not the focus of this work, both high schools were located in middle-income areas neighborhoods, and therefore the findings may not be transferrable to adolescents living in other income areas.

**IMPLICATIONS FOR RESEARCH AND PRACTICE**

Data emerging from this qualitative study add to the existing body of primarily quantitative knowledge concerning adolescents’ perceptions of caffeine and caffeinated beverages. Although awareness of certain aspects of caffeinated beverages was high among the current study’s participants, some misconceptions remain. In particular, the current Health Canada recommendation of caffeine in milligrams per body weight did not appear to resonate with participants; therefore, presenting these recommendations in more relatable and understandable ways (e.g., common serving sizes) may be warranted to improve awareness within this population.

Because caffeine consumption was strongly seen as an energy provider, to reduce caffeine use effectively in adolescents, a broader educational approach beyond caffeine may be needed and should include alternate strategies to improve perceived energy level, such as eating a healthy diet and getting adequate sleep. Furthermore, parents as role models and arbiters of adolescent intake were identified as a key influence on participants’ caffeine use. Therefore, it would appear that there is a continued need to include parents in educational strategies not only to understand their continued influence on adolescents’ beverage choices and consumption patterns but also to increase their awareness and knowledge with respect to the amount of caffeine deemed safe for use by their children.

In addition to education, participants suggested some potential policy and environmental influences that may inform strategies to reduce caffeine intake among adolescents. Because soft drinks contribute to the amount of caffeine in the adolescent diet,\textsuperscript{23} the reduction or removal of caffeine from these beverages could be a means of decreasing caffeine intake. Furthermore, because accessibility beyond the school environment was seen as a major influence on intake, advocating for policies regarding the built (and food) environment (e.g., limit vendors selling caffeinated beverages around school environments) may enhance and complement existing policies in the schools. Finally, renewed interest in advocating for policies regarding restricting advertising to children, in addition to continued education surrounding media literacy, appears warranted. By developing more comprehensive educational strategies and enhancing policies, it may be possible to decrease caffeine use in adolescents and mitigate the potential health risks of caffeine overuse within this population.
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CONFLICT OF INTEREST

D. Battram gave an invited lecture at the Dietitians of Canada conference in 2012 for PepsiCo. She received a monetary stipend for the presentation, for accommodation, and for the preparation of a handout for health professionals. The other authors have not stated any conflicts of interest.