

The **HYPER** (**H**earing **Y**oung **P**eople's Views on **E**nergy Drinks: **R**esearch) Study Final Report

September 2015

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Summary

Background

Around one in three young people report regular consumption of energy drinks, which typically contain high levels of caffeine and sugar in combination with other ingredients known to have stimulant properties. Survey evidence suggests that, on average, young people in the UK consume more energy drinks than those in other European countries.

Energy drink consumption in primary and secondary schools in County Durham was identified as a concern by parents, teachers and other stakeholders. Our study was designed to find out more about this issue in order to inform plans to develop tailored interventions and resources. It is the first UK-based study on this topic and the first in-depth qualitative study on energy drinks to involve primary school-age children.

Research design

Our study had three main elements:

1. A scoping review of previous studies relating to energy drinks was conducted to explore any evidence of associations between children and young people's consumption of energy drinks and their health and wellbeing, social, behavioural or educational outcomes.
2. A qualitative study involving four schools (two primary and two secondary) in County Durham was conducted. Thirty-seven pupils took part in one of eight focus group discussions. Eleven members of staff from across the four schools took part in semi-structured interviews and we also conducted three focus groups with parents.
3. A small group of year 6 or year 9 pupils from three of the schools helped us to carry out a participatory mapping exercise. The purpose was to involve young people in the process of mapping the accessibility and availability of energy drinks locally.

Key findings

- Our review of the existing literature demonstrated that consumption of energy drinks by children and young people is associated with a number of negative effects and risky behaviours, including: physical health complaints, such as headaches, palpitations and insomnia; higher rates of alcohol, smoking and substance use; absence from school; and regular consumption of fast food.

- There may be some benefits in terms of sport performance, but these findings were based on small numbers of elite junior athletes and should be treated with caution. Most of the studies were based on self-report data. None were conducted in the UK and very few involved primary school-aged children.
- The focus groups and interviews we carried out within primary and secondary schools highlighted a complex picture of energy drink consumption. Children and young people were aware of some of the contents of energy drinks and also of some of the health risks associated with consumption, but many still chose to drink them for reasons that included taste and cost.
- Our discussions suggested that energy drink use by school-aged children in County Durham was widespread. Branding, marketing and social norms were all important factors in influencing young people's consumption choices.
- Energy drinks were available in many local shops and there was often a wide variety of flavours and brands to choose from. In many shops, 'own brand' energy drinks were among the cheapest drinks available and often cheaper than water.
- Suggested interventions included: school-based activities such as assemblies and classroom discussions; improved labelling and marketing of energy drinks; peer-based approaches; and use of social media.

Implications for policy and practice

The complex picture surrounding children and young people's use of energy drinks presents challenges for policies and interventions which may seek to address this issue. The lack of a single dominant factor influencing consumption suggests that there is unlikely to be a policy 'silver bullet'. Participants in this study believed that better education about energy drinks would be the most useful form of intervention. There was some discussion about sales restrictions, but many were sceptical about the likely success of this form of intervention because of anticipated challenges associated with enforcement. The strong influence of the marketing activities of energy drink companies should not be underestimated. While young people often displayed a critical approach to claims made about their health or energy-boosting benefits, it was clear from the discussions and the published literature that energy drinks were seen as being associated with a number of activities which may enhance their appeal, including music, extreme sports, sexuality (both masculinity and femininity), computer gaming, alcohol consumption and general risk-taking behaviour. Any future interventions relating to this issue should include input from children and young people as far as possible.

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Acknowledgements

We would like to thank a number of people and organisations for their help in making this study a success. First and foremost, the Children’s Foundation, who funded the study. Colleagues from the Wolfson Research Institute (WRI) for Health and Wellbeing at Durham University – particularly Emma Flynn, Gill Cooper and Lois Grayson – provided valuable input into the initial funding application. Use of the extensive WRI and Fuse networks has helped to promote this work far and wide. Support, guidance and expertise offered by the project advisory group – particularly Joanne Boyd from Lifeline – has been invaluable in undertaking the study. Two key individuals played an important role in liaising with schools and assisting with recruitment to the study; they are not named here to preserve the anonymity of the participating schools, but we would like to acknowledge their contributions. We would also like to thank the head teachers of the four schools who allowed us to use their facilities and speak to their staff and pupils. Finally, we are extremely grateful to the school staff, parents and carers, and, most importantly, the children and young people who gave up their time to take part in the research. We hope we have represented their views accurately.

MC and AAL are members of Fuse, a UK Clinical Research Collaboration (UKCRC) Public Health Research Centre of Excellence. SV is an associate member. Funding from the British Heart Foundation, Cancer Research UK, Economic and Social Research Council, Medical Research Council and the National Institute for Health Research, under the auspices of the UKCRC, is gratefully acknowledged.

Disclaimer

This report is independent research commissioned and funded by The Children’s Foundation Child Health Research Programme 2013-14. The funders had no role in the study design, data collection and analysis, or preparation of the final report. The views expressed in this publication are those of the authors and not necessarily those of the Children’s Foundation or any other funder.

Introduction

Increasing numbers of children and young people report regular consumption of energy drinks, which are promoted as giving the consumer more ‘energy’ than other beverages. Consumption of these drinks in schools in County Durham was identified as a concern by parents, teachers and other local stakeholders. The **HYPER!** (Hearing Young People’s views on Energy drinks: Research) study was designed to inform the development, implementation and evaluation of policies, interventions and educational resources on this issue. This chapter sets out the policy and research context to the study.

Background

Energy drinks are non-alcoholic beverages that typically contain high levels of caffeine and sugar in combination with other ingredients known to have stimulant properties, such as guarana, taurine, or herbal substances. It is important to distinguish these drinks from sports or isotonic drinks, which primarily consist of carbohydrates and electrolytes and are intended to help athletes rehydrate after exercise (Committee on Nutrition and The Council on Sports Medicine and Fitness 2011). Energy drinks, on the other hand, are marketed explicitly as a way to relieve fatigue and improve mental alertness, illustrated by the well-known marketing strapline “*Red Bull gives you wings*”. See figure 1 below for examples. Caffeine stimulates the central and peripheral nervous system and, at moderate intakes, can enhance endurance performance and concentration in adults (Carroll 1998, Ganio 2009). However, when consumed in larger doses, it can cause anxiety, agitation, sleeplessness, gastrointestinal problems and arrhythmias (Nawrot, Jordan et al. 2003). Both the Food Standards Agency and the British Soft Drinks Association recommend that children should only consume caffeine in ‘moderation’, in recognition that childhood and adolescence are periods of rapid growth and important stages of brain development (Oddy and O’Sullivan 2009, NHS Choices 2014). Energy drinks have no therapeutic benefit and both the known and unknown pharmacology of the various ingredients suggest that they may put some children at risk of adverse health effects (Seifert, Schaechter et al. 2011). Several ‘extreme cases’ have been publicised in the popular media and the chief executive of the NHS, Simon Stevens, has called on the food and drink industry to stop ‘poisoning’ the public with these high sugar drinks (Warren 2013, Smith 2014, Neville 2015).

Figure 1: Examples of energy drink advertising¹



The soft drinks industry has acknowledged that, “Energy drinks, which appeal mainly to younger consumers, appear to be largely unaffected by the long-term challenge posed to the soft drinks sector by the health-conscious” (Key Note 2012). They also appear to be unaffected by the economic crisis, despite the relatively high cost of many well-known brands compared to other beverages (Carter and Drewnowski 2012). Consumption of energy drinks in the UK increased by 5.1% between 2012 and 2013, from 475 to 500 million litres (in contrast with a 3.9% decline in sports drinks, from 155 to 150 million litres) (BSDA 2014). This equates to a per capita consumption of 7.9 litres and a total value of £1.43 billion. A survey conducted across 16 European countries found that young people aged 10 to 18 years in the UK consumed more energy drinks on average than their counterparts in other countries (3.1 litres per month, compared to around 2 litres) (Nomisma-Arete Consortium 2013). Two-thirds (68%) of young people surveyed in the UK had consumed energy drinks in the past year and 13% were identified as high chronic consumers (i.e. consuming 4-5 times a week or more), compared with an average of 8% across Europe. Around half (53%) of the young energy drink consumers reported co-consumption with alcohol. This finding is supported by a recent survey on smoking, drinking and drug use among 11 to 15-year-olds in England (NatCen Social Research and National Foundation for Educational Research 2015). The 2014 survey included questions about energy drinks for the first time; 69% of respondents said they had consumed energy drinks and 6% said they had consumed them with alcohol (increasing to 15% of 15-year-olds). Young people mixing energy drinks with alcohol are an increasing focus of concern.

Policy and research context

Despite the growing energy drinks market and possible negative health outcomes linked to consumption, research into their use and effects has been sparse (Seifert, Schaechter et al. 2011). The scientific literature focuses largely on adults, who may experience temporary benefits such as increased cognitive performance, enhanced mood, more physical energy,

¹ Picture sources: <http://www.slideshare.net/jderemo/marketing-monster-energy-drink-presentation-4480618>
<https://redburnmonsters.wordpress.com/category/red-bull/>
<http://gb.rockstarenergy.com/>

and promotion of wakefulness (Alford, Cox et al. 2001, Scholey and Kennedy 2004, Peeling and Dawson 2007, Ganio 2009). However, some studies point to growing evidence on the harmful physiological and psychological effects of these drinks, and prolonged use may affect quality of life (Ishak, Ugochukwu et al. 2012). With children and young people, anecdotal evidence from media reports suggests that those who regularly consume energy drinks can become dependent on them and even moderate consumption may be detrimental (Tibbetts 2008, Ballinger 2009, Oddy and O'Sullivan 2009, Smithers 2015). Based on the known effects of caffeine, consumption of energy drinks may lead to: caffeine intoxication and withdrawal; sleep disruption and insomnia; and disruptive, hyperactive and risky behaviour (Committee on Nutrition and The Council on Sports Medicine and Fitness 2011, Seifert, Schaechter et al. 2011, Terry-McElrath, O'Malley et al. 2014). There are also likely to be health implications associated with excessive sugar intake, such as dental erosion, obesity and type 2 diabetes (Ludwig, Peterson et al. 2001, Mrdjenovic and Levitsky 2003, Harris, Nicoll et al. 2004). A report published recently by the Scientific Advisory Committee on Nutrition cited several studies demonstrating that consumption of sugar-sweetened beverages by children and adolescents results in greater weight gain and increases body mass index (SACN 2015).

Qualitative studies have tended to explore the views and experiences of university or college students, and focus on consumption of energy drinks in conjunction with alcohol. Participants in an Australian focus group study involving university students reported using energy drinks to continue partying and drinking alcohol over a longer period (Jones, Barrie et al. 2012). Many had experienced negative effects, ranging from difficulty sleeping to being admitted to hospital, but felt the drinks were associated with being popular or 'cool'. A second Australian study involving observations and interviews with young people (mean age 25 years) identified wakefulness and increased energy as the primary benefits, with taste, reduced and increased intoxication, and sociability reported as additional benefits (Pennay and Lubman 2012). Further research is needed to explore the views and experiences of those under 18 years of age, in a UK context, and without the emphasis on co-consumption with alcohol. This is crucial given that young people in the UK appear to be consuming energy drinks more regularly and in greater quantitative than those in other countries (Nomisma-Arete Consortium 2013). To our knowledge, there have been no studies conducted with parents or teachers to gather their insights into this behaviour.

In spite of the lack of research evidence, individual schools, localities and countries are increasingly exploring content and sales regulations of energy drinks from a cautionary viewpoint. For example, sales of energy drinks to those aged under 15 years are banned in Sweden and their sale is restricted to pharmacies in Norway, Denmark and France due to concerns over the side effects of excessive caffeine consumption (Oddy and O'Sullivan 2009). In the UK, some head teachers have banned them from their schools as a result of reported hyperactivity amongst pupils and disciplinary problems in classrooms (Boseley 2014). Concerns about energy drink use have also been expressed by teachers in a national

survey conducted by the NASUWT union (Espinoza 2015). However, their increasing popularity with young consumers is likely to be influenced by a combination of youth-aimed marketing, risk-taking adolescent tendencies and peer effects (Steinberg 2008, Smith, Chein et al. 2014). Our study was designed to add to existing knowledge on children and young people's motivations for consuming energy drinks, and also to seek their views on possible intervention options, in order to enhance the feasibility, acceptability and effectiveness of future policies and practices on this issue.

Research questions

Given the lack of robust evidence regarding the use and effects of energy drinks consumption on children and young people in the UK, we set out to address four questions:

1. Is there evidence of an association between children and young people's consumption of energy drinks and their health and wellbeing, social, behavioural or educational outcomes?
2. Why, when and how do some children and young people choose to consume energy drinks, and why do others choose to abstain?
3. Where, from whom and at what cost do children and young people obtain energy drinks?
4. What are the implications of these findings for policy and practice?

Our intention was that the findings and recommendations arising from this research would feed directly into proposals being discussed locally, including the implementation of education campaigns, school-based interventions and potential sales restrictions. We have developed good links with key partners, including: LifeLine drug and alcohol advice service; Durham County Council staff responsible for school health and trading standards; the Area Action Partnerships (AAPs); and the North East Public Health England (PHE) Centre. In turn, these partners have strong links with local schools, parents and young people. We have maintained regular communication with our partners over the duration of the study, through quarterly project advisory meetings and frequent email updates, to involve them as collaborators in the research and increase the likelihood that our findings will have direct relevance to policy and practice in relation to energy drinks.

Study Design

The research questions set out in the previous chapter have been addressed using a mixed methods approach delivered in three phases: a scoping review of the existing literature, a qualitative study and a participatory mapping exercise. These are described in turn below. The research has been informed by the literature on the social construction of childhood and forms part of a growing research tradition that treats young people as competent social actors, able to contribute to our understanding of their social lives (Fraser, Lewis et al. 2004).

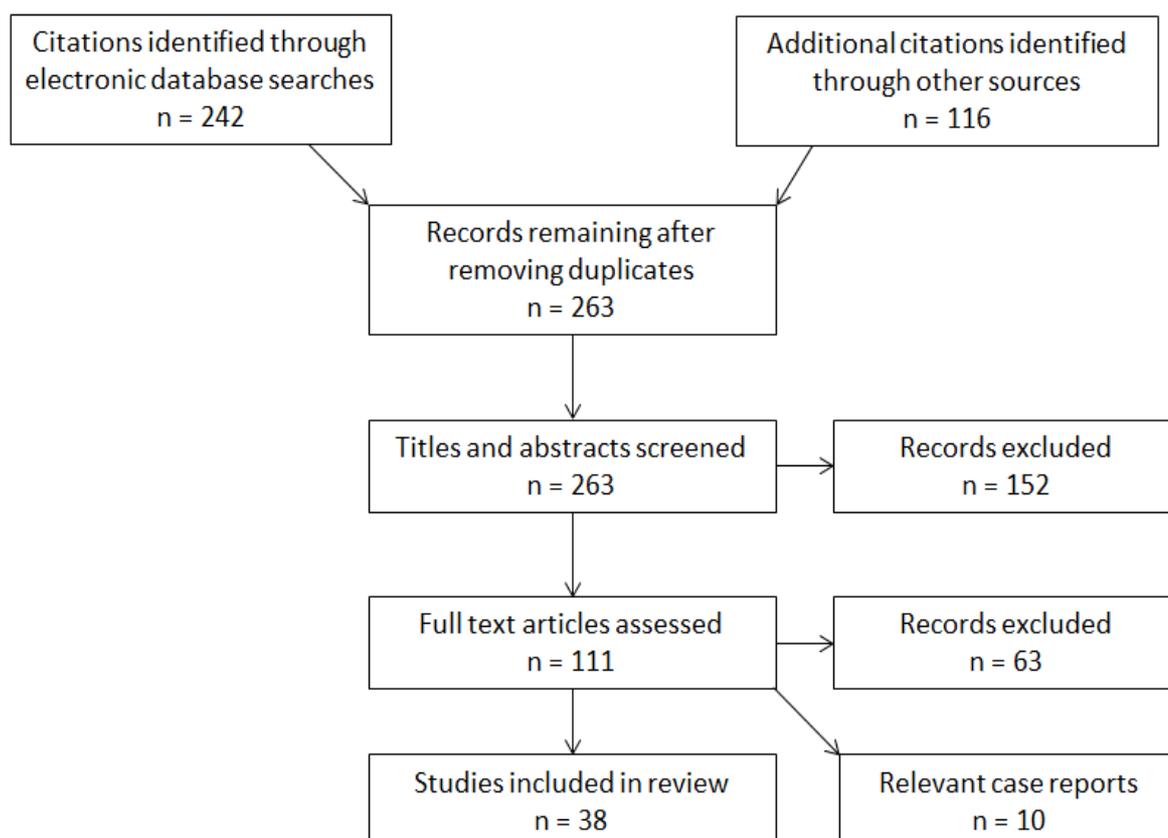
Phase I: Scoping review

A time-limited rapid review of relevant published and grey literature was undertaken to examine evidence of an association (if any) between energy drink consumption by children and young people and their health, social, emotional, behavioural and educational outcomes. Searches of the following major bibliographic databases were conducted: ASSIA, CINAHL, The Cochrane Library, DARE, EMBASE, ERIC, MEDLINE, PsycINFO and Web of Science. We also conducted searches of the internet using Google to locate grey literature. Specific search strategies were employed for each database. We included observational, experimental and simulation studies exploring the effects of energy drinks on children and school-age young people (up to 19 years if still in secondary education), as well as qualitative studies exploring children and young people's attitudes towards energy drinks. We excluded: opinion pieces and editorials; studies involving adults only (aged 18 years or over and not in secondary education); studies focusing on individual energy drink ingredients (e.g. caffeine or taurine); and articles not published in English.

Titles of studies identified from the searches were scanned by two team members to make an initial assessment of relevance. In cases where there was any doubt, abstracts were retrieved in order to make a further judgement. We obtained the full text of all references included after the initial screening stage and articles deemed potentially relevant were reviewed independently by two researchers. See figure 2 on the following page for details of the study selection process. Formal appraisal of eligible studies was undertaken using either the Quality Assessment Tool for Quantitative Studies developed by the Effective Public Health Practice Project (EPHPP) (Effective Public Health Practice Project 2009) or the Critical Appraisal Skills Programme (CASP) checklist for qualitative studies (CASP 2014). Both checklists have been widely used in previous reviews and allow for rapid evaluation of study quality. Each paper was independently appraised by two reviewers and any disagreements were resolved through discussion to reach an overall judgement (strong, moderate or weak). All publications that met the inclusion criteria were analysed

in a narrative synthesis (Popay, Roberts et al. 2006). The results were also used in developing data collection tools to be used in subsequent empirical work.

Figure 2: Study selection flowchart



Phase II: Qualitative study

A qualitative study – theoretically and procedurally informed by grounded theory (Corbin and Strauss 2008) – was undertaken to explore in-depth the views and experiences of children and young people, parents, teachers and other school staff in relation to the use of energy drinks, influencing factors, and perceived effects. We took a pragmatic approach in drawing our study population from localities suggested by our collaborators, in order to maximise the likelihood of achieving impact and reducing the burden on schools. Four schools in County Durham – two primary and two secondary – agreed to take part in the study and are not named here to preserve the anonymity of the participants.

Sampling and recruitment

Students from year 6 (aged 10-11 years) and year 9 (aged 13-14 years) were recruited to the study via their class teachers or form tutors. These year groups were chosen based on consultation with our collaborators and a small-scale survey conducted by local parents, highlighting relatively high energy drink consumption by these age groups. Teachers were encouraged either to randomly select volunteers to take part in the research (e.g. by drawing names from a hat) or, if they felt this was not appropriate, to select diverse groups of students (i.e. to minimise bias). Up to five boys and five girls from each class were chosen and given age-appropriate study information packs to consider before deciding whether or not to take part. Information about the research was also sent to their parents or carers, who were invited to opt-out of providing their assent (rather than opting-in) in an effort to reduce selection bias. A total of 37 young people consented to take part in the study (20 year 6 students and 17 year 9 students).

We aimed to recruit up to three parents or carers and two members of staff (teachers, teaching support assistants or learning mentors) from each participating school. This level of recruitment was felt to be both feasible and manageable within the remit and time frame of the research. Tailored study information packs for parents or carers were sent home with the young people who took part in the study, but this approach generated just two expressions of interest and no subsequent responses were received despite repeated phone calls from a researcher. Instead, we accessed existing parent groups within two of the participating schools and, in a third school, a class teacher assisted with study recruitment. We were able to recruit 15 parents or carers using this approach. Information about the study was provided by email to key members of staff in each of the four participating schools. A total of 11 staff members expressed an interest in taking part in the study and we chose to include them all, rather than selecting a sub-sample.

Data collection and analysis

Separate focus groups with boys and girls were conducted to explore why, when, where and how children and young people consume energy drinks – or why they choose to abstain – as well as asking them to reflect on how they feel these drinks affect consumers. The benefits of focus groups are well documented and include the explicit use of group interaction to produce data and insights (Kitzinger 1995, Barbour 2008). We chose to conduct single gender focus groups based on our experiences of conducting research with similar age groups on topics such as sexual health, physical activity, food and nutrition, and free school meals (Cheetham, Gordon et al. 2007, Cheetham 2010, Briggs and Lake 2011, Lake and Townshend 2013, Tyrrell, Townshend et al. 2015). The focus groups began with a practical sorting exercise to generate discussion on the participants' understandings of the differences between energy drinks, isotonic/sports drinks, and soft drinks (using empty cans and bottles). See figure 3 page for an illustration. The format of the focus groups was kept flexible, informal and fun to enhance comfort and foster openness. Team members

were experienced in undertaking research with children and young people, and every effort was made to ensure the participants were engaged positively and not wearied by the experience. The focus groups took place on school premises, during school hours, and refreshments were provided.

Figure 3: Sorting exercise



Our intention was to conduct one-to-one interviews with parents or carers to examine their views on energy drinks, reasons for allowing their children to consume them (or not), and the perceived impact on health, social, behavioural and educational outcomes of their child and his/her peers. However, the parents expressed a preference to speak to the researchers as a group and therefore three focus groups were conducted on school premises, at times chosen by the participants. School staff took part in semi-structured interviews on a one-to-one basis or in twos or threes, according to their preferences. These interviews took place on school premises, during school hours, and were conducted to gather staff views on the prevalence of energy drink consumption amongst their pupils and perceived impact within their school.

The focus groups and interviews were audio-recorded, transcribed verbatim and analysed using the constant comparative approach associated with grounded theory (Corbin and Strauss 2008). NVIVO qualitative analysis software v.10 was used to systematically organise and index materials. Initial analysis of four focus groups was undertaken by two team members (MC and SJC) to identify emerging themes. Primary codes were identified at this stage and discussed with the wider team. Themes were checked and further codes identified following subsequent analysis.

Phase III: Mapping exercise

A participatory mapping exercise was conducted by young people to determine the availability and accessibility of energy drinks in the areas around their schools. In undertaking this exercise, we drew on the principles of community-based participatory research (CBPR), which is ‘an applied collaborative approach that enables community residents to more actively participate in the full spectrum of research... with a goal of influencing change in community health, systems, programs or policies’ (National Institutes of Health 2014). Here, CBPR relates to young people and researchers working in partnership to combine knowledge and action on energy drinks.

Three of the schools who participated in phase II agreed to allow students to take part in the mapping exercise. Up to four students from each school who had taken part in the focus groups were invited to participate in this exercise. The purpose was to involve them in the process of generating data on the availability and accessibility of energy drinks locally, enabling them to gain basic research skills and allowing the research team to gain greater insight into the marketing and sale of energy drinks to young people. The purpose and methods were explained to participants, who then spent up to one hour walking around the local area (accompanied by at least one researcher and a member of school staff) to identify energy drink vendors. Based on earlier food environment work (Tyrrell, Greenhalgh et al. 2015), a template was designed to record the location, brands, prices and sizes of the drinks available, as well as the price and availability of other beverages (isotonic/sports drinks, soft drinks and water). Photographs were also taken, inside or outside the shops, where appropriate. See figure 4 for an example.

Figure 4: Mapping exercise



Observational data generated from the mapping exercise were analysed in conjunction with the qualitative data generated in phase II. Our initial analyses were discussed with members of the project advisory group, to obtain feedback on our interpretations of the data gathered across all three work packages and to generate further discussion on the implications and feasibility of possible interventions relating to energy drinks consumption.

Ethical considerations

All potential participants received tailored study information sheets that clearly explained the purpose of the research, what would be expected from them if they decided to take part and what will happen to the data collected. They were asked for their written consent to take part in the study, to have the discussions audio-recorded, and for (anonymised) information to be used in published material. A group agreement was developed for use in each focus group, explaining there were no right or wrong answers and clarifying the limits of confidentiality. It was made clear that participants were free to exit the study at any time and without giving a reason. Parents and carers were provided with separate information and invited to give assent for their child to take part in the research. They were asked to opt out by reply; a non-response was taken as indication of assent to avoid potential biases associated with an opt in approach. All data have been treated as confidential and kept secure at all times, in a locked cabinet or on a password protected PC at Durham or Teesside University. This includes participant contact details and anonymised transcripts; the former will be destroyed at the end of the study period.

Parents and young people each received a £10 gift voucher to thank them for their participation in the focus groups, and young people who conducted the mapping exercise received a second voucher (a potential total of £20). Debates in the literature on participant payments centre on freedom of choice and the potential for bias in study findings (Head 2009). We recognised that payments can offer benefits in terms of increasing study recruitment and acknowledging the contribution of participants, without representing a form of undue influence (Russell, Moralejo et al. 2000). The research conformed to the highest ethical standards in health and social research, and complied fully with both the Data Protection Act and the Health and Social Care Act. Furthermore, it was informed by good practice guidelines for research with children and young people (Shaw, Brady et al. 2011). Approval to undertake the research was sought from the head teacher of each participating school. The study was approved by the Research Ethics Sub-Committee of the School of Medicine, Pharmacy and Health at Durham University (ref. ESC2/2014/08).

Scoping Review Results

This chapter sets out the results of our scoping review of the existing literature. We set out to look for any evidence of associations between children and young people's consumption of energy drinks and their health and wellbeing, social, behavioural or educational outcomes. We were also interested in their attitudes towards energy drinks and, in particular, what factors motivate young people to consume or to abstain from consuming these drinks.

Study characteristics

A total of 263 studies were located through the review. Thirty-two quantitative studies, four qualitative or mixed method studies, and two literature reviews met our inclusion criteria (a total of 38 studies). See figure 5 for a summary of the included studies, which are also detailed in tables 1-4 at Appendix A. The majority involved: a cross-sectional survey design (n=24); adolescents aged between 11 and 18 years (n=30); and studies conducted in North America (n=18) or Europe (n=11). All of the qualitative or mixed method studies came from Australia or New Zealand. None of the studies were conducted in the UK.

Figure 5: Key study characteristics



Associations with health and other effects

Positive effects on sports performance

We identified two randomised controlled trials (RCTs) that reported positive effects on some aspects of sports performance in the intervention group; in both cases, this involved pre-exercise consumption of an energy drink that contained 3mg of caffeine per kilogram of body weight. In the first study, ingestion of the energy drink by 16 male basketball players (mean age 14.9 years) led to significant improvements in jump performance, mean leg muscle power output and perceived endurance, as well as a reduction in perceived exhaustion (Abian-Vicen, Puente et al. 2014). No improvements were observed in the precision of basketball shots, number of free throws per second or distances covered. The second study involved 14 male and female tennis players (mean age 16.4 years) and found increases in handgrip force, running pace at high intensity and number of sprints during a simulated match (Gallo-Salazar, Areces et al. 2015). No improvements were observed in peak running speed or ball velocity during serving. However, sweat rate during the simulated match was slightly increased, producing significantly higher dehydration. See table 1 at Appendix A for further details.

Although these studies appeared to be well designed and rigorously conducted, the results should be treated with some caution given the small sample sizes involved. Furthermore, they involved elite junior athletes and so it is not clear whether the results can be extrapolated to the general population. Both studies were conducted in Spain by teams of researchers with similar membership, who declared no conflicts of interest and stated that they received no funding to conduct either study.

Negative health effects and risk behaviours

Data from retrospective analyses of poison centre data indicated that consumption of energy drinks by children and young people may be linked to adverse health outcomes. Of the 2.4 million calls to the National Poison Data System in the USA between 2010 and 2011, 4854 calls were related to energy drink exposure cases and 46% of these involved children under six years old (Seifert, Seifert et al. 2013). However, adolescents reported the largest proportion of moderate or major effects such as cardiac rhythm disturbances and hyperthermia. Similar studies conducted in Australia and Italy have reported a range of symptoms that included hyperactivity, palpitations, fainting, abdominal pain, agitation, flushing, tachycardia, delirium, vomiting (Gunja and Brown 2012, Vecchio, Chiara et al. 2013). See table 2 at Appendix A for details.

Evidence from large-scale, often school-based surveys demonstrated that reported use of energy drinks by school-aged children was generally high and that it was associated with a number of unhealthy behaviours. Positive associations with smoking or susceptibility to smoking, alcohol use (including binge drinking and heavy drinking) and substance use (including marijuana and prescription drugs) have been observed in several studies

(Gambon, Brand et al. 2011, Locatelli, Sanchez et al. 2012, Cotter, Jackson et al. 2013, Gallimberti, Buja et al. 2013, Hamilton, Boak et al. 2013, Petrova, Duleva et al. 2013, Azagba and Sharaf 2014, Larson, DeWolfe et al. 2014, Terry-McElrath, O'Malley et al. 2014). Interestingly, energy drink use appears to be positively correlated both with sedentary behaviours (such as screen time) and also with physical activity or participation in team sports (Park, Blanck et al. 2012, Azagba, Langille et al. 2013, Al-Hazzaa, Al-Sobayel et al. 2014, Larson, DeWolfe et al. 2014). Individual studies have also found associations between consumption and absence from school (Azagba, Langille et al. 2013), depression and sensation-seeking (Azagba, Langille et al. 2014), medical treatment for injury (Hamilton, Boak et al. 2013), and regular consumption of fast food (Park, Blanck et al. 2012). A study by Huhtinen et al (2013) involving data from 10,406 adolescents in Finland found that daily use of energy drinks was strongly associated with four caffeine-induced health complaints: headache, sleeping problems, irritation and tiredness/fatigue. Those who used energy drinks several times a day were 4.5 times as likely to experience headaches and 3.5 times as likely to experience sleeping problems, in comparison with those who reported that they did not consume these drinks. A similar study involving 11,267 children (10-12 years) from Iceland found that the prevalence of physical complaints such as headaches, stomach aches and sleeping problems generally increased with greater reported energy drink use (Kristjansson, Sigfusdottir et al. 2014).

Consumption of energy drinks appears to be patterned by gender, with boys tending to consume more than girls and often in greater quantities (Ludden and Wolfson 2009, Gambon, Brand et al. 2011, Locatelli, Sanchez et al. 2012, Huhtinen, Lindfors et al. 2013, Azagba, Langille et al. 2014, Kumar, Park et al. 2014, Larson, DeWolfe et al. 2014, Musaiger and Zagzoog 2014, Terry-McElrath, O'Malley et al. 2014). It may also vary by age, social class, income and ethnicity, although these patterns are less clear cut. For example, some studies demonstrate that levels of consumption are highest amongst younger children and adolescents (Azagba, Langille et al. 2013, Azagba, Langille et al. 2014), whereas others have found that consumption increases with age (Gallimberti, Buja et al. 2013, Kumar, Park et al. 2014). Studies conducted in Brazil and Canada found that students with \$40 or more weekly spending money were more likely to consume alcohol mixed with energy drinks (AmED) and that the prevalence of AmED increased with socioeconomic class (Locatelli, Sanchez et al. 2012, Azagba, Langille et al. 2013). Others have highlighted factors negatively associated with consumption of energy drinks by children and young people, which include parental education and having two parents at home, as well as feeling more connected to school, having a high academic average and beverage vending machines in the school (Park, Blanck et al. 2012, Azagba, Langille et al. 2013, Terry-McElrath, O'Malley et al. 2014). Awareness of the damage caused by energy drinks has also been shown to act as a protective factor that reduced the likelihood of young students consuming such drinks (Gallimberti, Buja et al. 2013). See table 3 at Appendix A for details.

Consumer motivations and attitudes

A number of key findings emerged from the four qualitative or mixed method studies included in this review. The study by O’Dea (2003) involved focus groups young people (n=78) aged 11-18 years who were recruited from an Australian high school. Energy drinks were seen as popular among participants of all ages, who described perceived short-term health benefits, prevention of illness, improved immunity, and a desire to rectify a poor diet. Some participants said they used energy drinks as soft drink substitutes when they could afford them, as they were seen as expensive. Young men involved in sport reported using energy drinks as stimulants to enhance their sports performance, to give them ‘an energy boost’. None of the participants discussed any negative or harmful effects, suggesting they were either unaware of, or chose to ignore, the possible risks. Many reported parental supply of energy drinks, highlighting the significant influence of others, such as mothers, peers and sports coaches in young people’s choices.

A multi-method study by Jones (2011) explored consumption and perceptions of alcohol-energy drinks (AEDs) among 12-17 year olds in Australia. Twelve single gender focus groups were conducted with young people (n=95) from three cities in New South Wales, and the findings used to inform a survey conducted through schools and the internet (n=1263). Findings from the focus group discussions indicated that all age groups recognised AEDs and reiterated their popularity, stating that energy levels and fun increased when drinking them. Taste was highlighted as an important factor in their decision to consume particular brands and girls in particular emphasised the sweet taste of some AEDs. Taste has also been found to be a key motivating factor in surveys of energy drink use, along with thirst/refreshment, energy seeking and wanting to improve sports performance (Nelson, Giveans et al. 2008, Champlin and Pasch 2013, Santangelo, Lapolla et al. 2013, Musaiger and Zagzoog 2014). Only a small number of participants highlighted negative consequences, which related to the inclusion of a stimulant and depressant in a single drink, and difficulties sleeping after consuming AEDs. The packaging of products (to look like soft drinks) was found to have a positive influence, particularly for girls and younger teenagers compared to older teens. Participants commented on the similarities between the physical appearance and taste of non-alcoholic energy drinks and AEDs. Some thought others might be unaware they were consuming alcohol in these drinks.

Bunting et al (2013) conducted separate focus groups with participants of different ages (16-21, 22-28, 29-35 years) and found a number of similarities and differences between the groups. Participants in the youngest age group reported the most frequent consumption of energy drinks. All groups consistently reported taste as a major influence when purchasing energy drinks and energy seeking was also a motivating factor, with the younger age group highlighting the ability of energy drinks to provide a ‘hit’ or a ‘kick’ associated with enjoyment. The physiological effects of these drinks were regarded as positive, pleasurable and effective. The youngest group believed energy drinks were safe

because they did not think they would be on sale if caffeine levels were too high. Advertising emerged as a dominant theme, with the 16-21 year olds appearing to be more conscious of the social image they were portraying in their choices. Industry marketing was seen to target specific drinks at males or females, using sexualised imagery and humour. Brand loyalty emerged as a common theme in all of the groups.

The final study by Costa et al (2014) explored perceptions of energy drinks and patterns of use through school-based focus groups with 12-15 year olds (32 boys and 8 girls). Findings highlighted limited knowledge of the ingredients of energy drinks and there was some confusion, particularly among younger participants, about the differences between these drinks and other soft drinks. It was generally agreed that energy drinks were easily accessible. Participants reported seeing them advertised on TV, the internet, through games promotions, via sports sponsorship and in shops. Three main reasons emerged for energy drink consumption: enjoyment, function and social. Participants enjoyed the taste or flavour of particular brands, and reported consuming energy drinks when they felt tired, or were playing sport. The stimulant effects were largely described as positive when used to improve alertness and relieve fatigue. Social situations and spending time with friends were a common context for energy drink consumption. Parents also appeared to play a key role in influencing participants' use of energy drinks, either by disapproving or endorsing their use. See table 4 at Appendix A for details.

Gaps in the evidence base

We identified a number of gaps in the existing evidence base in relation to children and young people's consumption of energy drinks. Only two robust RCTs on this topic were located; both involved small numbers of elite junior athletes and found some evidence of positive effects in relation to sports performance. For various ethical and practical reasons, there have been no experimental studies to examine potential negative effects in relation to children and young people's health and wellbeing. There is a need for research that examines the short- and long-term impact of energy drinks in relation to health, as well as a wider range of relevant outcomes (i.e. educational, behavioural, social and emotional). Previous studies have tended to involve older adolescents (generally high school students), rather than younger children. There is therefore a need for further research with primary school-age children, as well as teachers and parents or carers, including longitudinal and survey research. A major gap is the lack of research conducted in a UK context, which provides the rationale for our qualitative study described in the following chapter.

Qualitative Study Findings

This section reports findings from our focus group discussions with students from primary and secondary schools in County Durham. It also includes findings from the interviews with school staff, focus groups with parents and carers, and the mapping exercise undertaken by a sub-sample of young people. The findings are organised around themes arising from the data and illustrated using direct quotations from participants. The quotes are attributed using the participants' year group and gender – or role, in the case of staff – to preserve their anonymity.

Knowledge of energy drinks

Children and young people who participated in the research appeared to be quite knowledgeable about different aspects of energy drinks, including brand names, prices, ingredients and the potential health risks associated with consumption. However, there were some areas where confusion and uncertainty were evident.

Brands and prices

Children and young people generally had a very high level of knowledge about many of the different brands of energy drinks; for example, the marketing slogan '*Red Bull gives you wings*' was quoted in the majority of focus groups. In some cases, their awareness of the differences between energy drinks, isotonic/sports drinks and soft drinks matched, or exceeded, the knowledge of the adults:

"I don't think that some teachers understand what the energy drinks are. Like sometimes we bring them into school and the teachers say they're energy drinks when they're not, like the isotonic. And sometimes we'll be drinking energy drinks but they won't notice." (Boy, year 9)

Young people were also very aware of the prices of particular energy drink brands, as well as the existence of various promotions and multi-purchase offers available in local shops. In the practical sorting exercise during one of the focus groups, one participant explained:

"Because like these [pointing to cans of energy drink] are like £1.90 and these are £1 because I buy them. These are 89p but then these ones are, that's 35p, these ones are the same, and that's tiny and it's £1.19." (Girl, year 6)

Contents

Participants were generally well-informed about the fact that energy drinks usually contain high volumes of caffeine and sugar. The caffeine content in particular was often highlighted

as being the main difference between energy drinks and other types of beverage. There appeared to be less knowledge about how much sugar or caffeine was in these drinks, and even when this information was included on the label, there were concerns that some children might have difficulty interpreting what it meant:

“There’s more sugar in them [points to energy drink] than what’s in them [points to sports drink], because there’s about 10 spoons of sugar I think in them.” (Girl, year 9)

“Some younger kids they read it but say they don’t know what ... 4.8 sugars mean. They don’t know what it means, like is that a lot or is it not a lot?” (Girl, year 6)

Knowledge of the contents of energy drinks amongst school staff and parents varied, with some of the adults we spoke to being very knowledgeable and others demonstrating more limited awareness:

“Quite a lot of the ones that I’ve looked at, the caffeine content when I’ve compared it to sort of espressos and things is the equivalent of maybe six or eight shots of something on some of the really high ones.” (Teaching assistant, year 9)

The presence of empty cans and bottles on the table throughout each focus group (as a result of the sorting exercise) often led young people to discuss the differences in content between the different drinks. These discussions highlighted that while young people were familiar with the names of some vitamins and additives in energy drinks, they were not always aware of what these ingredients actually were or what function they performed. For example, at least one young person in all but one of the focus groups thought that taurine was bull sperm, horse sperm or horse testicles:

Researcher: *“What else might be in energy drinks that isn’t in other drinks?”*
Boy: *“Bull sperm.” (Boy, year 6)*

Health risks

Children and young people appeared to be broadly aware that there were some risks associated with energy drink consumption and reported a range of possible negative effects, as well as potential benefits. However, there was some confusion about exactly how consumption of energy drinks could affect biological and/or physical functioning, as well as uncertainty about the meaning of terms such as insomnia. Young people reported that energy drinks: made your heart speed up; made your heart slow down; give you heart attacks and palpitations; rotted your teeth; rotted your insides; made you fat; put chemicals in your blood; and caused sleeplessness.

Researcher: *And do you think that’s what happens when people drink it?*

Girl 1: *Yeah, their heart beats faster... because of all the caffeine.*

Girl 2: *I know but your windpipe doesn’t go to your heart...*

Girl 1: *No, because the caffeine and the sugar go around your body and lead to your heart.*

Girl 2: *Oh, does it?*

Girl 1: *Yeah... It makes you fat... Because all the fat and sugar like clog up your heart. Apparently all the fat goes to your heart and your heart gets surrounded by fat.*

(Exchange between two year 9 girls)

Several young people also highlighted extreme cases – often derived from media reports – where consumption of energy drinks had been linked to the death of a young person or adult:

“I’m not too sure but I think I saw something on the news about somebody having an energy drink every day for like two months or something, I think he had about two or three a day, and he’d died of a heart attack.” (Boy, year 9)

“Not long ago on the news a girl had a heart attack and she died. And it was saying, putting pictures on like the news of like Relentless and Rock Star and all that that we drink, and we could die.” (Girl, year 6)

Some participants made comments demonstrating awareness that energy drinks would affect children differently to adults as a result of their different physiologies. The long-term risks of high caffeine consumption were highlighted as a particular concern for a number of the parents and staff members:

“All the caffeine and the calories are not meant for our young bodies, because our bodies are still growing, it’s not very good for us.” (Girl, year 6)

“I’m more, my concern is for their health and the long-term health risks of taking in that much caffeine at that age.” (Teacher, year 6)

“I know orange juice and fruit juice have got risks as well, but from a health perspective, it’s infinitely better than a multi-caffeine shock product.” (Parent, year 6)

Awareness of the unsuitability of energy drinks for children and pregnant women was quite patchy; some young people knew that consumption was not recommended for these groups, while others were not. Some questioned why this should be the case. However, our findings challenge assumptions (by adults) that young people are unaware of, or not interested in, the contents of energy drinks. While they were not always knowledgeable about the precise effects of caffeine and sugar, they knew some of the risks and were generally keen to find out more:

“It’s scary the fact that the kids think it’s okay. They don’t see the danger in it. They don’t see the risks involved.” (Teacher, year 6)

Boy 1: *“Does it affect your lungs or your heart?”*

Researcher: *Your heart it might. Not so much your lungs. Smoking would affect your lungs but not caffeine so much.*

Boy 2: *"Would it make like the blood stop running that fast, and then your heart like pounds a bit faster to try and get the blood to speed back up?"* (Year 6 boys)

Consumption patterns

Participants were asked to describe use of energy drinks by local children and young people, in terms of where, when, why, how much and what types of energy drinks were being consumed. Our findings suggest a remarkably complex picture.

Prevalence

Children and young people generally believed that energy drink usage was widespread amongst their peer groups. All of the focus groups thought that at least 50% of their classmates drank energy drinks and most young people put the figure higher at around 75% to 80%. Some made a distinction between those who had never tried energy drinks and regular consumers:

"About everyone's tried one, but I don't think they keep on trying it. About five or four people haven't tried them or had a drink of them." (Boy, year 6)

School staff tended to believe that energy drink consumption was a lot lower amongst their students, suggesting that around 25% to 30% of children and young people drank these drinks. A number of staff members associated energy drink use with a certain demographic of young people, where positive parental influence and supervision might be lacking:

"Some of them will have them for breakfast. Because quite a few of our children don't have breakfast." (Teaching assistant, primary school)

"I think the ones that don't [drink energy drinks] are the ones who don't knock about on the streets at night. They're the ones who are doing after school activities or mams know where they're going, or they don't have pocket money to just go to the shop before and after school because their parents bring them to school and drop them off at school, then they pick them up from school. So there's no like scope for them to be hanging around the shop buying all load of rubbish. So I think it's that to be honest, the ones that are guided more by their parents don't seem to do it." (Teacher, primary school)

Frequency and quantity

The frequency of energy drink consumption by young people often varied considerably, with some suggesting that they drank them on a regular, almost daily basis, while others reported consuming them very occasionally:

"That's the people who drink them every day. Some people will drink them twice a week or something." (Girl, year 9)

"I have to say sometimes maybe get like, I get once every like, sometimes I get one every day" (Boy, year 6)

This was not an issue covered in great detail during the focus groups with children and young people because the focus of these discussions was not on their own personal consumption. The preference for particular brands and can sizes was, however, highlighted as an important factor in determining the quantities consumed. Most of the young people in our focus groups who consumed energy drinks reported a preference for smaller-sized, cheaper 'own brand' varieties as opposed to some of the better-known premium brands. For others, the larger cans or bottles were preferred because "you get more for your money" and these could be shared between friends:

"We get a big bottle of Emerge and share it." (Boy, year 9)

Time and place

Young people identified a number of different times that they, and others like them, consumed energy drinks. Much of the discussion focused on the journey to and from school. However, young people also described drinking energy drinks with their friends on evenings and at weekends. A lot of consumption appeared to take place around unstructured recreational activities, such as playing computer games or socialising with friends:

"When you're out with your mates on the night." (Girl, year 9)

When organised activities were discussed, such as scouts or sporting clubs, energy drinks were almost always seen as being discouraged and sometimes banned. School food policies seemed, in general, to inhibit energy drink consumption during school hours, particularly in the primary schools. However, some examples were given of pupils finding ways around these rules and also of school staff confiscating energy drinks during the school day:

"Because after school you don't get wrong if you get caught with them, but sometimes they do take it off you." (Boy, year 9)

Young people reported consuming energy drinks in a wide variety of places, including public spaces such as on the street, in parks or at leisure facilities such as football pitches, BMX tracks and skate parks. Some reported consuming energy drinks at home, often linked to computer gaming and sometimes to sleepovers and other occasions where they were allowed to stay up late, but this did not appear to be a typical or regular pattern of consumption:

"Because Saturday is like a day, sometimes it's sleepover day when your mates come round. So you go to the shop, you get loads of, you get energy drink and you go in your house and you just play on your X-Box and stuff like that." (Boy, year 6)

Age and gender

It was suggested that energy drink consumption started at around 8 or 9 years of age, although some participants gave examples of seeing very young children drinking these drinks and others associated them more with older teenagers:

"About from eight years and up I'd say" (Boy, year 6)

"I've seen some kids that are about six and they give them them and I don't really think they should, to be honest" (Girl, year 9)

There appeared to be a general perception that boys were more likely to drink energy drinks than girls, and also to consume these drinks in greater quantities. This was often put down to boys being more active, taking part in more sports or exercise-related activities, or their bodies needing more calories. However, there was also evidence that energy drink consumption amongst girls was quite high:

"Boys have them like every day" (Girl, year 6)

"You do get some girls that actually do drink actually quite a lot of energy drinks." (Boy, year 9)

Consumption amongst boys was often described as being linked to wanting to look 'hard' or 'tough' or attractive to girls, whereas girls were described as liking 'softer' versions and 'expensive-looking' brands such as Red Bull that come in smaller cans. The latter were seen as being more sophisticated, linked to the discussion on branding below. These comments highlight the importance of the social meanings of energy drinks. There was also a feeling amongst some of the girls that the marketing of these drinks was often aimed at boys and one suggested this was 'a bit awkward' for girls wanting to purchase energy drinks:

"Sometimes say if you have a girlfriend or something, like boys like to drink them then, because they think, sometimes the boys think that they look proper rock hard when they have them in front of girls and stuff. And then when they go out you buy like three and stuff because they reckon they're rock hard and stuff." (Boy, year 6)

Gender was also discussed in relation to parenting and, in some cases, there was disagreement between parents about whether a young person should be allowed to drink energy drinks:

"And there could be arguments, because I remember my mum and dad having a little bit of an argument over if I'm allowed one and then my dad just ended up giving in to my mum" (Girl, year 6)

Motivating and influencing factors

Participants identified a range of factors that might influence a young person's decision to consume or abstain from consuming energy drinks. However, there was some disagreement between the views of the children and young people and those of the adult participants.

Taste

One of the main reasons that children and young people gave for consuming energy drinks was because they believed they tasted nice. There were noticeable differences in young peoples' perceptions of the smell and taste of energy drinks compared with adults' views:

"Everybody only drinks them for their taste. They don't really want them for the hyper; they just want them for the taste." (Boy, year 9)

"It's those horrible drinks that stink. They absolutely reek... They're usually full of caffeine and all sorts of chemicals and additives and sugar and yuck." (Pastoral support staff, secondary school)

"I mean I've tasted them and they're horrible. They're just not pleasant at all." (Parent, year 9)

Cost

The cost of certain energy drink brands, particularly relative to other types of beverage, was identified as being a key influence in young people's decision to purchase and consume these drinks. Participants highlighted how the low prices of these drinks meant they could use leftover change or small amounts of money given to them by their parents:

"Like, because they're only cheap and plenty of people get money, so instead of looking for one of them [points to isotonic drink] that's 95p at that shop down there, they look at the energy drinks, that's only 35p." (Girl, year 6)

These drinks are often included in multi-purchase offers, where buying more than one results in a discount. Some young people reported pooling their money and sharing energy drinks to take advantage of either special offers or the proportionately lower price for large cans or bottles:

"In [name of shop] you can get four for like a pound. You know them little cans like the Emerge? You can get like four for a pound." (Girl, year 9)

The mapping exercise revealed that the availability of 'own brand' energy drinks from small convenience stores (e.g. *Best-In*, *Euroshopper*) meant that energy drinks could be purchased for as little as 35p each or two for 60p (250ml cans). This exercise also confirmed the view that some energy drinks were cheaper than other carbonated

beverages, with well-known brands such as *Fanta*, *Coca-Cola* and *Lilt* retailing at 50p-60p for a 330ml can:

"I think it's because like a normal can of Coke is like 70p, and they [energy drinks] are like 35p or something." (Girl, year 9)

"And the problem is, at 35p it's cheaper to buy one of them than it is to buy a bottle of water or to buy a normal drink, and that's the issue." (Teacher, secondary school)

Access and availability

The children and young people who told us they consumed energy drinks appeared to find them very easy to obtain. Most purchased the drinks themselves, often using dinner money or spending money received from their parents. They were able to easily identify local shops that sold energy drinks and, in some cases, believed it was easier to name the shops that did not sell them:

"I think every shop apart from the pet shop and the furniture shop sells energy drinks" (Girl, year 6)

The mapping exercise highlighted the widespread accessibility and availability of energy drinks, with some convenience stores stocking large numbers of brands and flavours. These drinks tended to be positioned near or opposite the front door and were often given greater shelf or fridge space than other carbonated drinks. It was not uncommon to see seven or eight varieties of *Rockstar*, *Relentless* and *Monster* on sale, in addition to various sizes and prices of 'own brand' energy drinks. See figure 6 on the following page for an illustration. Parents and school staff were also aware that energy drinks were widely available and easily accessible to young people:

"It's getting to the point where the energy drinks has overtaken the soft drinks. You go in [to shops] now and it's very difficult to avoid them, especially if you know you don't want your kids to have them. It is very difficult to avoid them." (Parent, year 6)

"It's only a small village but, I mean, there's about five corner shops that I would know that would sell them." (Lunchtime assistant, primary school)

The ease with which energy drinks were obtained was sometimes accompanied by surprise that they were so accessible to young people, with some children and adults believing that they were already an age restricted product. One shop that participated in the mapping exercise gave free energy drinks to the young researchers (aged 10-11 years) as a reward for their good behaviour, suggesting that the retailer saw no problem with them being consumed by primary school-aged children.

Figure 6: Positioning of energy drinks in a local store



However, young people also identified shops or, more usually, individual employees or shopkeepers who would restrict sales of energy drinks to children. This would be done either through limiting the number of energy drinks that children could purchase or by applying their own age limits:

"There's this old woman that works in [name of shop] and she doesn't sell, she reads all the cans before she sells you any drink. But then it depends who's serving you." (Girl, year 6)

Branding and marketing

In addition to seeing energy drinks on sale in local shops, participants highlighted a range of different media through which they were targeted with promotional messages about particular brands. These included: the internet (in the form of 'pop-ups' or 'banners' at the side of webpages); television (including adverts between programmes and energy drink consumption or product placement during popular shows such as soap operas, *The Apprentice* and *The Big Bang Theory*); computer games; bus stops; supermarket promotions; and sponsorship of sports or other events:

"Yeah, if you're playing on your tablet or something and you're playing a game, an advert pops up for like Relentless or something." (Girl, year 6)

"It sponsors like big BMX games and stuff like that... Yeah, like extreme sports generally and stuff, it like sponsors all of them and that." (Boy, year 9)

As a consequence, young people displayed a strong awareness of the branding associated with many of the well-known energy drinks such as Red Bull and Monster, and many were familiar with particular advertising slogans and strategies. Participants generally thought that the branding and packaging of these drinks helped them to stand out and made them attractive to children and young people. Some were identified as targeting boys in particular, through the brand names, size of the cans, the colours used on the packaging and the association with extreme sports:

"I think that the drinks are a little bit sexist because they have all these boyish kind of patterns but you never see any girly ones which is kind of awkward." (Girl, year 6)

"The branding's quite clever though. It kind of makes it look very, I would say, more adult with the colouring and the darkness and all this kind of... It's also interesting that the Red Bull thing, the whole... it's cartoons and cartoons are aimed at children, surely" (Parent, year 6)

Parents also commented on promotional activities, such as free samples being distributed at sporting events and in shopping centres, which attract young audiences:

"We've been in the Metro Centre when Monster Energy's been in there, and they've been dishing it out." (Parent, year 9)

The use of video game console or computer games as a way of promoting energy drink purchase and consumption was particularly interesting. Young people reported that certain energy drinks contained codes under the ring pull which could be used to boost the stamina or energy levels of characters in the iconic game 'Call of Duty: Advanced Warfare'. Other examples identified during the focus groups included Sunset Overdrive, Saints Row, Grand Theft Auto and Dead Island. All of these games carry age restrictions and are marketed as being suitable for players 18 years and over, but the boys (aged 10-14 years) in all of the focus groups were familiar with them:

"There's a game called Dead Island where you sometimes get them to fill your health up. You drink them to fill your health up." (Boy, year 6)

"[In Saint's Row] you own this energy drink company and you start selling them to gangs and everything." (Boy, year 6)

Young people were sceptical of some of the claims made by energy drinks companies in adverts and on packaging. Many were aware that these tactics were used to encourage more people to buy them, thereby creating more profit for the manufacturers:

"Like once I was playing on this game and the Monster advert popped up, and it said sugar free, fat free, caffeine free, and good for you. And I was like no." (Girl, year 6)

"They put it [the codes] on so that Monster can make more money because they put stuff on, free stuff that you can put in your games console." (Boy, year 9)

Parental and family influences

Parents, siblings and other family members played a role in children and young people's decision to consume energy drinks, either by facilitating or prohibiting access to these drinks or by modelling this type of behaviour. In some cases, parents reportedly provided energy drinks for their children as a treat, or to rehydrate after sports activities, sometimes choosing sugar-free options as 'healthier' alternatives. Other young people mentioned parents, aunts and grandparents refusing to allow them energy drinks, generally because of concerns about possible health and behaviour-related effects:

"My dad says, sometimes he says to me go down the shop, go to [name of shop] and get us, I don't know, some washing up liquid, and he says there's a can of Red Bull in there with your name on it." (Boy, year 6)

"My dad refuses to buy me them because I get too hyper." (Girl, year 9)

"My mum thinks that they're a waste of money and my auntie says if I do drink them I shouldn't drink a lot of them." (Boy, year 9)

The general perception amongst school staff seemed to be that parents were largely responsible for influencing and controlling their child's energy drink consumption. This appears to relate to the view amongst some participants that energy drink consumption is only an issue in certain households:

"I think certainly some will buy them on their way to school, definitely, but I think others will get them from their house with parents. Because I think it's a, well it's, when you walk around anywhere on a Saturday morning or a Sunday morning, people are drinking them constantly to help them get over their excesses of the night before. Yeah? So I think in a lot a lot of households they'll be there and will be commonplace, yeah." (Teacher, secondary school)

The young people gave examples of family members who themselves drank energy drinks and were ambivalent about children and young people also drinking them, while others were more firmly 'against' energy drinks and did not allow children to consume them. There were also examples given of other positive adult role models, such as sports coaches, influencing this behaviour. However, some young people stated that they did not consume energy drinks in their home and, as a result, their family members were unaware of them doing so:

"The coach just cares for you and he wants to look out for you. And he doesn't want your heart full of junk." (Boy, year 6)

"Yeah, some parents don't allow people to drink energy drinks, so they just drink them when they're out." (Girl, year 9)

Some of the adult participants discussed energy drink consumption by their friends or partners. This was occasionally linked to alcohol consumption or a specific purpose, for example, to stay awake during long journeys. According to the school staff, none of their children consumed energy drinks:

"My husband will buy them when we're on the drive down to visit my dad, which is a seven hour drive, and he will have a can if he starts to feel tired driving and that's it." (Teacher, secondary school)

"All of my friends drink them, especially on a Friday or Saturday in pubs with a bit of Jägermeister!" (Teaching assistant, secondary school)

"My son begs me to let him have one, he's 10. And I wouldn't let him have one." (Pastoral support staff, secondary school)

Social norms

Given that most of the young people in the focus groups thought that energy drink usage was widespread amongst their peer groups, peer influence is likely to be an important factor. Many of the adults we spoke to thought that 'peer pressure' was a major factor in young people choosing to drink energy drinks, highlighting a desire to 'fit in'. This was supported to some extent by the feedback from the young people:

"I guess if you've got eight kids, all you need is four of the cool ones to do it, and the others just follow, don't they?" (Parent, year 6)

"I think as well because say your friend, he has something that looks really, really nice, an energy drink like a Monster, but you only have a bottle of water – you're tempted to get that because it looks cooler and what your friends have you want, so you don't want to be left behind." (Girl, year 6)

Most adults appeared to view the influence of peers as negative and a way to be 'part of the crowd'. However, young people also reported positive instances where friendships groups had collectively decided to abstain, or at least cut back, on energy drink usage:

"We did it and then we stopped because then we knew what the effects were." (Boy, year 6)

A number of participants believed that young people drank energy drinks to enhance their image or their identity. Young people suggested that other people their age consumed energy drinks to make them look 'hard', 'grown up' or 'more attractive'. However, none of the participants suggested that this was a motivating factor or influence on their own consumption:

"Show offs do it a lot, like big boys who think they're tough and who are the most popular in the class, they play football the best, so people think of more like the tougher people." (Girl, year 6)

A number of parents and school staff also thought that young people drank energy drinks as a rite of passage in an attempt to look older or more adult. There was a suggestion that consuming these drinks were seen as 'a bit naughty', although, again, there was little evidence of this in the young people's responses:

"And it's a bit not naughty but it's like well, I'm pushing the boundaries. So I'm not just drinking normal pop, I'm nearly going up. Yeah, I think it is. And I think with my son it definitely is that, yeah. He sees the older ones doing it, so I'll be like them." (Teacher, primary school)

"It is, it's seen as a way into the adult world, which is legal for them, but they still see it, I think, as an adult drink, and something that they all sort of try and get away with if we let them." (Teacher, secondary school)

Some parents indicated that they saw energy drink use as an 'age thing', 'a fad' or a phase their children were going through, possibly connected with participation in team sports. It was also suggested that children might be looking up to, and modelling, the behaviours of older young people:

Parent 1: *"Whether it's an age thing, yeah"*

Parent 2: *"I think it starts when they start playing football. A lot of them start drinking them when they start playing football." (Exchange between two parents, year 9)*

"I think the younger kids as well see the secondary school kids on the streets with them, as well, and they probably think, oh well, they look cool drinking them, I'll go and get one of them." (Parent, year 6)

Perceived effects

Participants were asked about any beneficial or detrimental effects they perceived that energy drinks produced in young consumers. A number of young people stated that one of the reasons they drank these drinks (although rarely the primary reason) was because of the energizing effects they produced. They spoke about using energy drinks when they felt tired, wanted to get 'psyched' or when they needed a physical or mental 'boost', which appears to be supported by the suggestion that the journey to school tends to be one of the key times for consumption:

"If you want to be woken up you drink the big ones" (Girl, year 9)

"Because everybody stays up so late they need to get a bit of a boost." (Boy, year 9)

Parents described the 'vicious cycle' potentially created by young people consuming energy drinks late at night to stay awake - often while gaming - which resulted in them being tired the next morning and needing to consume additional energy drinks to wake up for school:

Parent 1: *"I guess it will cause loads of problems with kids; you drink it late at night, you won't get to sleep"*

Parent 2: *"Yeah, you'll be like hyperactive"*

Parent 1: *"Messes up the sleep patterns and all that sort of stuff"*

Parent 2: *"And there'll be a drop at some point as well, if the blood sugar's gone up"*

Parent 1: *"And that's why they're on their Xboxes until two o'clock in the morning, because they've got all that energy to do that."* (Exchange between two parents, year 9)

These effects were perceived to arise from the high sugar content of most energy drinks, as well as the high caffeine content:

"It's the highs and the dips, isn't it, like sugar rush basically isn't it? The buzz and then wiped out when it's worn off." (Parent, year 6)

School staff perceived energy drinks as being a cause of bad behaviour in classrooms and young people appeared to acknowledge this. Some participants recognised that any 'benefit' of energy drink usage in terms of increased energy was often followed by a 'slump' or period of tiredness once the effects of the caffeine and sugar wore off:

"Other children are high as kites until break-time, and then you do see a physical slump in their body language, and you know, in their, the way that they sit at the seat, isn't it, they're kind of like laying about the table." (Teacher, year 6)

"Some people go to the shop on the morning and drink them then so they think that they've got more energy in lesson time. But energy drinks they don't give you energy, they tire you out after you drink it." (Girl, year 6)

Parents wondered about the effects of energy drinks resulting in some children's behaviour being labelled as 'naughty'. One teacher commented that in her experience it was the children who were already poorly behaved who drank energy drinks, while others drew a distinction between the effects of energy drinks on different 'types' of children:

"Up high, jumping about. There's been assaults and everything, and we've took energy drinks off them. So it definitely does affect the behaviour. But some of them are already poorly behaved if that makes sense." (Teacher, year 9)

"If you've got someone who's really studious and they're thinking oh I'm shattered today, I've have a can of Red Bull and then I'll be able to do my exam prep or something like that, who has common sense anyway. That sounds awful, common sense, but you know. And then you've got someone else who is probably one of the

evolve groups thinking I'll have a can of Red Bull, it will not be for the same reason. It won't be so they can do their exam prep." (Pastoral support staff, secondary school)

Young people also talked about the impact that energy drinks had on their behaviour and some reported abstaining from consumption because they did not like the perceived negative effects. However, others reported liking energy drinks because they made them take risks and do things which they might not otherwise have done:

"Like when I drank one a long time ago, me and my sisters, I just started like jumping on the bed and doing things I shouldn't be doing." (Girl, year 6)

Boy 1: *"It makes you want to do something that you wouldn't do if you didn't have one."*

Boy 2: *"Run fast and jump high"* (Exchange between two year 6 boys)

Potential interventions

During our discussions with children and young people, parents and school staff, a number of suggestions for policy and practice interventions around energy drinks emerged. These included educational interventions delivered in school settings, peer-led activities, better labelling of energy drinks, and making them an age restricted product. However, there was some scepticism, particularly from the children and young people, as to whether anything could or should be done to restrict access to energy drinks.

School-based interventions

A number of participants suggested that in-school interventions could be used to raise awareness of the potential effects of energy drinks on children and young people. Previous examples of talks, lessons and assemblies were highlighted and the young people appeared to have retained some of the key information, although this was not always appreciated by staff members. Some parents also appeared sceptical about efforts to educate children and young people:

"I don't think they know the risks. I mean, the school nurse has done a few things around risks. And when we banned them from school we had assemblies on them and said they're really not good for you." (Pastoral support staff, year 9)

Parent 1: *"I think it's like a lot of things when you're young, you don't think"*

Parent 2: *"They don't care"*

Parent 1: *"They're not bothered"* (Exchange between two parents, year 9)

Teachers highlighted potential curriculum areas, such as science, citizenship and PSHE (personal, social and health education), where energy drinks could be used to provide a 'real-life', relevant case study in terms of health education for young people. One head teacher emphasised the need to involve young people in the development of resources and

offered opportunities to pilot these during tutor time or as part of science lessons. Some of the children and young people agreed that these types of lessons would be beneficial:

"I suppose you could look at the curriculum and see where it goes in. For example year 4 do teeth. I mean, you could get it into the year 4 science curriculum through teeth and the fact that it rots your teeth, what kind of drinks do you drink at home, and just slip it in there. I know, I think year 5 do the body and circulation, you could get it in there in the science. There's places where it could sit, so I think it should be taken on as part of the healthy promotion in school." (Teacher, year 6)

"Yeah, because if you have a lesson of them you might get to understand them more, and you know that they're bad for you. And so you just shouldn't drink them." (Girl, year 6)

Teachers also thought that there was a need to educate the parents of young people who consumed energy drinks. Some believed this was a role for the school, while others believed this may be better coming from another source. Parents themselves identified the need for them to have more information about energy drinks, as many admitted to not being fully aware of the contents and potential harmful effects on young children. However, this was not a potential intervention strategy that came up in the discussions with young people.

"Yeah, and teaching parents about it as well, because most parents won't - I mean I must say myself, I know they're not good for you, but I don't know the full details about it, I don't. I mean I could probably make them up but I'm not 100% certain. And I know they're not good for you, but I couldn't tell you the details why or why not. And I'm sure a lot of our parents haven't a clue. So parents, parent education as well, useful." (Teacher, year 6)

The existing arrangements within schools for engaging with parents and students, such as carousels, open days and summer fairs, were believed by some to offer good opportunities to talk about energy drinks:

"If we do get the parent fair up and running, because we had to put that on hold, it would be quite nice if they had a little stall there and they could answer questions. This is our study, this is what we did." (Teacher, year 9)

Age restricted purchases

Many participants suggested that there should be age restrictions or related bans on children and young people purchasing energy drinks, similar to those in place for cigarettes and alcohol. In fact, there was widespread confusion as to whether such age restrictions were already in place, with a number of participants believing that people had to be 16 years old to purchase these drinks:

Parent 1: *"I thought there was an age restriction on them to be quite honest, I really did."*

Parent 2: *"Maybe it should have 'not recommended for under 18s and only one a day'"*
(Exchange between two parents, year 9)

In the absence of any legislation regarding sale of energy drinks to children and young people, several participants suggested voluntary schemes involving local retailers. Some believed that, if they knew of the health risks associated with energy drink consumption by young people, they would stop selling them. This solution was already informally in place in some areas, where concerned teachers or parents had spoken to local shopkeepers. However, most thought such an approach would be unworkable because some retailers would be unlikely to participate in a voluntary scheme. The importance of energy drink-related income to small local shops was also noted. The picture was complicated by the existence of national chains, where decisions about such matters would not be taken locally.

"Tell the shopkeepers not to sell to kids" (Boy, year 9)

"I actually went in [to a local shop] and asked about the policy on energy drinks and she assured me that there was absolutely no way would she be stocking them or selling them to any students here." (Teaching assistant, year 9)

"They know that they're going to get lots of children coming in after or before school, they're going to want them to spend their money, aren't they, on things like that. So I mean you could, but I don't know whether it would have an effect on them." (Teaching assistant, year 6)

Furthermore, there was little agreement on what would be an appropriate age for restricting purchases; participants suggested a range of ages between 8 and 18 years. Most participants, including children and young people themselves, also believed that this type of intervention would be easily overcome by asking older friends, siblings and/or parents to purchase the drinks for them. Parents and teachers also raised the question of how it would be 'policed'. However, it would help to send a clear message that these products are not recommended for children and young people:

"I think you maybe should make a certain age for certain ones, such as Monster maybe, no Relentless, 16, maybe Monster." (Boy, year 9)

"They would get older people to buy it for them, and then the people from comp or older brothers and sisters would say oh well I'm 16, I'm 17, I'll buy it for you. But it would help. I think it should help." (Teacher, year 6)

Improved labelling and age-appropriate marketing

Some young people thought that the design of energy drink packaging could be improved to raise awareness of the potential health risks amongst consumers. During the sorting

exercise, they noted that the health warnings tended to be located on the back of the cans or bottles, in very small writing, and sometimes in a colour that made it difficult to read. Participants highlighted the contrast with the big, bold, bright lettering on the front of the packaging, which proclaimed health benefits and 'healthy' ingredients of the drinks. It was suggested that information about sugar and caffeine content could be presented in ways that are easier for young people to understand; for example, by displaying this information in 'spoonfuls' of sugar or via a ruler on the side of the can showing how much of the drink consisted of sugar. Other suggestions included using plain English (instead of unfamiliar terms like 'insomnia'), including a 'Think before you drink' sign, or a logo for energy drinks:

"It doesn't exactly say 'don't give it to someone under age 16'." (Girl, year 6)

Girl 1: *"I think they should just make it bigger writing"*

Girl 2: *"Make it more in your face"*

Girl 1: *"If you put it on the front of it"*

Girl 2: *"Like eye catching"* (Exchange between two girls, year 9)

It was suggested that energy drink companies also have a role to play by not marketing these products to children and young people, although there was little discussion about stronger forms of regulation or restrictions on energy drinks manufacturers. One group of parents issued a note of caution about the dangers of inadvertently promoting energy drinks by making them seem like 'forbidden fruit', instead of educating young people of the risks:

"Shouldn't promote it, shouldn't promote it like they are. The way they're promoting it, they're aiming it at kids, so you need to change the way they promote it." (Parent, year 6)

"I think at the same time, you need to be careful with that because sometimes even when you're trying to warn kids off it, what you're actually doing is promoting it, and they think, 'get in!'" (Parent, year 6)

Use of social media

Parents in two of the focus groups talked about the possibilities of using social media, for example, Facebook and YouTube as a way to get messages to young people. These methods could also be used to reach parents who are 'social media savvy':

"There are some senior school kids that go onto Facebook, Instagram and all sorts. And those things do seemingly quite quickly spread like wildfire, so that would be helpful." (Parent, year 6)

"It's very rarely they're not on Facebook so. I know with other groups if they want to get anything out to kids they put it on Facebook, so that's where they read it from." (Parent, year 6)

Peer-led approaches

The potential for peer-led interventions was discussed, in terms of training children and young people as advocates or 'experts' on energy drinks who could provide advice for other children of a similar age. The involvement of young people in designing and developing interventions was a theme which ran through the discussions:

"They'd probably listen better, because they're hearing it from people their own age."
(Parent, year 6)

"Or get the kids to do like a leaflet, once they're aware of what they can do, then they could maybe publish it to other schools." (Teacher, year 9)

"People should, like a group like this and people who drink a lot of energy drinks should go out with someone and then they'll talk why you shouldn't drink them and then people who don't drink energy drinks they could stay in class and learn more."
(Girl, year 6)

Discussion

The purpose of this study was to better understand children and young people's reasons for consuming energy drinks and the reported effects on their health and wellbeing, as well as any behavioural, social or educational outcomes, with a view to using these insights to inform policy and practice. This section summarises our findings and our reflections on the process, and sets out a number of implications for policy, practice and future research.

Summary of key findings

Scoping review

Our scoping review of the existing literature has demonstrated that consumption of energy drinks by children and young people is associated with a number of adverse outcomes and risky behaviours. A total of 263 studies were located, with 38 meeting the inclusion criteria. None of the studies were conducted in the UK and there were very few robust experimental studies. The two RCTs demonstrated that pre-exercise ingestion of an energy drink had a positive impact on some aspects of sports performance. However, these studies both involved very small numbers of elite junior athletes. Other studies indicate that energy drink use by children and young people is associated with higher rates of alcohol, smoking and substance use, as well as being linked to physical health complaints, such as headaches, stomach aches, hyperactivity and insomnia. However, it is important to note that these are cross-sectional studies relying on self-report data. Previous research suggests that use is patterned by gender, with boys consuming more energy drinks than girls, and also by age, although there was some disagreement between studies. The highest consumption levels have been observed in sedentary individuals and in physically active individuals. Qualitative studies have reported perceived beneficial effects on participants' bodies, enjoyment and sports performance, with little mention of any negative effects and limited knowledge of energy drink ingredients. Taste and energy seeking were identified as key drivers for consumption. Advertising and brand loyalty have been highlighted as major influences, and peers, parents and siblings also played an important role.

Qualitative study and mapping exercise

The qualitative research we carried out within primary and secondary schools in County Durham highlighted a complex picture of energy drink consumption by local children and young people. In contrast with the findings of the scoping review, we found a degree of awareness amongst young people of the contents of energy drinks and possible health risks associated with consumption. Adults tended to assume that young people were lacking in

knowledge, but also tended to have gaps in their own knowledge about energy drinks; for example, whether or not they were already age restricted products. There was also an assumption that children and young people consumed these drinks as a rite of passage, to appear 'cool' or seem more grown-up, whereas taste, cost and widespread availability were highlighted as the main motivating factors by the young people themselves. Social situations in which energy drinks are consumed were also important to young people. The accessibility of these drinks was confirmed through the mapping exercise, which highlighted the diverse range of flavours and sizes, the low cost of 'own brand' drinks, and the multi-buy offers available in many local shops. Gendered branding and marketing also emerged as an influential factor, as it did in the qualitative studies identified through the scoping review. However, many of the young people we spoke to displayed a critical approach to the marketing tactics and nutritional claims of energy drink manufacturers.

Children and young people reported widespread energy drink use amongst their peers, while most adults believed that consumption was restricted to smaller numbers of young people. School staff in particular believed that use was most common in certain 'types' of families and linked to 'poor parenting'. It was clear from the focus groups with young people that some parents prohibited or restricted their consumption, but that there were ways to obtain these drinks without their parents' knowledge. There were also examples of parents and other family members supporting or condoning children's use of energy drinks, sometimes inadvertently or reluctantly. Young people reported consuming these drinks at a range of times and for a variety of purposes, generally linked to social activities, sports and computer gaming (particularly amongst boys). Some drank them every day, others less often, and some chose not to drink them at all. The energy 'boosting' effects induced by the high caffeine and sugar content of energy drinks were mentioned as a potential benefit, but all participant groups recognised that these effects were short-lived. Social norms were also identified as a key factor, in that adults assumed young people used energy drinks as a result of 'peer pressure' or to 'follow the crowd'. This was supported to an extent by the discussions with young people. However, rather than signifying peer pressure, these discussions appeared to suggest autonomous, rational decision-making; for example, friendship groups 'clubbing together' to make drinks purchases more affordable or, on occasion, trying and then choosing to abstain from energy drinks as a group.

This complexity in children and young people's energy drink use has implications for the design and implementation of any potential interventions, which participants advised should include input from young people as far as possible. Suggestions included school-based interventions, improved labelling and marketing of energy drinks, peer-based approaches and use of social media. These are discussed in greater detail below.

Reflections on the process

To our knowledge, this is the first in-depth qualitative study on energy drink awareness and consumption among school-aged children in the UK. Findings are drawn from a small sample taken from one geographical area within North East England and may not be representative. Data were collected in schools and provide insights from participants at a particular time and place. This research does not tell us about the prevalence of energy drink consumption amongst children and young people more widely. While the study design included efforts to reduce bias, there remains the possibility of selection bias in the convenience sample of schools who agreed to take part in the study and also in the recruitment of participants by teachers, who may have had particular views about energy drinks and the students they associate with them. We asked schools to randomly select students to take part in the study from relevant year groups, but some opted to select certain students, using different criteria in different schools. It is also likely that our sample of parents reflects those with particular interests in, or concerns about, energy drinks, which may have skewed the data. Two parents of year 6 students opted out of allowing their children to participate in the study; we have no means of ascertaining the reasons for their decision.

Our decision to recruit participants via schools resulted in a number of practical, ethical and methodological challenges, as well as benefits in terms of organising the focus groups and providing safe venues. Although schools were provided with study information packs and asked to distribute these to potential participants, it was clear that some children and young people had not read the information. Before giving their informed consent, we ensured that participants understood the purpose of the study and had the opportunity to ask questions. Children and young people were required to miss lessons by participating in the research. We made efforts to minimise the disruption, and in some groups, shortened our discussions to fit in with the school timetable. Parents and young people were offered refreshments, vouchers and 'freebies' (University-branded notepads and pens) as thanks for their participation. These were either given to the participants directly (in the case of parents and secondary school students) or via their teachers (in one of the primary schools). The head teacher of one primary school opted to use the vouchers for whole class activities and resources. We recognise that providing rewards to a small number of children who had either been randomly chosen or selected by their teachers created an inequity between them and their classmates. The provision of vouchers to individuals in some schools and to a whole class in one school also created an inequity between schools. However, we felt it was important to acknowledge the contribution to the research made by the participants.

We opted for single gender focus groups with children and young people (facilitated in most cases by a researcher of the same gender) in the belief that this would maximise opportunities for participation. Informal feedback from one group of primary school girls

indicated that they liked this approach. However, it may have informed the data in ways we did not anticipate. The combination of practical sorting exercises (involving empty drinks cans and bottles) and discussion-based activities appeared to work well, with the cans and bottles often acting as prompts for further discussions on branding and content. Young people engaged enthusiastically with the research process and informal feedback indicated that they found the discussions more enjoyable than they had anticipated. The focus groups and interviews with parents and school staff were discussion-based and while we made efforts to adopt a non-judgemental approach, we recognise that it may have proved difficult for some participants to voice dissenting views, given the strong, often condemnatory, views held by some of the other participants. Overall, we believe that our approach was successful in generating valuable insights on awareness and consumption of energy drinks by children and young people.

Implications for policy and practice

The complex picture surrounding energy drink consumption by children and young people presents challenges for policies and interventions which may seek to address this issue. The lack of a single dominant factor influencing consumption suggests that there is unlikely to be a policy ‘silver bullet’. Furthermore, the size and scope of the present study make us cautious about making specific recommendations, but the research has highlighted lessons which can be learnt for future policy and practice in this area. Any policies, interventions or educational resources designed to reduce consumption of energy drinks by children and young people need to recognise that the relatively low cost and widespread availability of these drinks represent key factors influencing their purchases. Young people, many of whom will not have an income of their own, highlighted that these purchases were at least partially motivated by straightforward economics – energy drinks were among the cheapest drinks available locally, allowing them to purchase them in greater quantities or use remaining money to buy other items. This finding is supported by national sales data, which demonstrate that in spite of the 5.1% increase in energy drink consumption during 2012-13, value grew by just 2%, suggesting that budget brands and promotions or price cuts to premium brands are becoming increasingly widespread (BSDA 2014).

Young people highlighted that energy drinks were widely available in many local retail outlets. Their knowledge of the potential risks associated with consumption did not appear to prevent them from purchasing a cheap, readily available drink that they felt tasted good and that was heavily marketed towards them. The strong influence of the marketing activities of energy drink companies should not be underestimated. While young people often displayed a critical approach to claims made about their health or energy-boosting benefits, it was clear from the discussions and the published literature that energy drinks were associated, in different ways, with a number of activities which might increase their appeal to many young people, including music, extreme sports, sexuality (both masculinity and femininity), gaming, alcohol consumption and general risk-taking behaviour. Future

interventions need to recognise and counter the strength and pervasiveness of this marketing, possibly by adopting a social marketing approach. Social marketing combines ideas from commercial marketing and social science to bring about positive social change (Hastings and Saren 2003). It has been advocated as a way of bridging the gap between public health and the food and alcohol industries, and has been used successfully to address alcohol use and smoking by young people; for example, Truth, an effective and cost-effective national tobacco prevention counter-marketing campaign in the US (Hicks 2001, Legacy 2015). It should be noted, however, that social marketing initiatives alone are unlikely to be able to counter the messages produced by global drinks companies.

Young people can provide valuable insights into policy design that adults may not possess. In discussing their own perceptions, preferences and practices relating to energy drinks, the young people in our study articulated a far more nuanced picture than many of the adults, some of whom reduced consumption to poor parenting practices and a simple desire to look 'cool'. The social meanings and social context of energy drink consumption emerged as important influences on young people's choices about where, when and what they consumed. The input of young people should be integral to any interventions designed to address energy drink consumption amongst their peers. Previous school-based interventions such as assemblies and classroom discussions appeared to have increased awareness and knowledge among children and young people, but evidence that these had changed their behaviours or consumption preferences was lacking. School staff suggested that parents and children needed *education*, while parents themselves asked for more *information* on energy drinks. The difference may be subtle, but it is also significant. There should be opportunities to develop and build on existing critical and analytical thinking about energy drinks amongst young people through school curriculum areas. This is supported by a growing evidence base suggesting that preventative interventions that target multiple health-related behaviours and skills development can be more effective than single topic education programmes (ACMD 2015). School staff highlighted areas where this had already taken place and potential areas for developing new projects or pieces of work related to energy drinks. These could include PSHE, Business Studies, Economics, Biology, Chemistry, Physical Education and other associated curriculum areas.

Recommendations for future research

This small-scale qualitative study has identified a number of areas for future research to examine and explore. The scoping review in particular highlighted that more research is needed to investigate the short- and long-term effects associated with consumption of energy drinks by children and young people, as well as determining the effects of high acute and high chronic use. These have been defined in a previous study as consuming at least one litre of energy drink in a single session and consuming energy drinks at least four times per week, respectively (Nomisma-Arete Consortium 2013). Our study revealed that energy drink consumption by children and young people appears to be more widespread

than most adults believe and that it does not seem to be confined to those from certain socio-economic backgrounds. Further exploration of patterns and reasons for energy drink consumption may help interventions to ensure appropriate behaviours are targeted and are relevant to the at-risk population. A survey based on, or included within, existing Health Related Behaviour Surveys administered in many schools in the UK would allow researchers to explore the prevalence and patterns of energy drink consumption, as well as any trends over time. Future research might also seek to explore the effectiveness of the inclusion of energy drinks in wider resilience or skills-based prevention programmes for children and young people.

Previous qualitative research on the use of energy drinks by young people has tended to be conducted in Australia or New Zealand, and limited to university-age young people and older adults. Our study suggests that more research with school-age children and young people is needed, in a UK context, to explore potential differences in motivations, experiences and perceptions amongst young people from different geographies and socio-economic backgrounds. Research with retailers who sell energy drinks to young people (and those who choose not to) would complement studies which sought to include the views and voices of children and young people. Such research could examine, among other issues, the potential feasibility and acceptability of voluntary codes relating to energy drink sales. Future research should also pay attention to the marketing and promotional activities of energy drinks companies and the way in which these drinks are associated with leisure activities that tend to be attractive to children and young people. Ideally, this would involve talking to young people outside of school settings; for example, at sports clubs or youth clubs. Similarities between the strategic Corporate Social Responsibility activities of major carbonated drinks manufacturers and tobacco companies of previous decades have already been highlighted by other academics (Dorfman, Cheyne et al. 2012, Stuckler and Nestle 2012). Comparisons between the marketing and branding activities of energy drink companies and tobacco companies would benefit from similar scrutiny.

Conclusion

This study was designed to add to existing knowledge on children and young people's motivations for consuming energy drinks, and also to seek their views on possible intervention options. The focus of the research has often been on localised spaces and practices and this is also the case for many of the interventions suggested by participants. When considering what can or, indeed, should be done about children and young people consuming energy drinks, we should remember that the people we have spoken to in this study are not the only, or indeed, the principal actors in terms of ensuring young people are able to lead healthy lifestyles. Young people play an important part in shaping interventions targeting them, but the potential roles of politicians, regulators and energy drinks companies themselves also need to be considered.

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Appendix A: Tables of included studies

Table 1: Experimental studies

Study	Subjects	Study design	Intervention and dose	Outcome measures	Main findings
(Abian-Vicen, Puente et al. 2014)	Boys (n=16) Mean 14.9 +/- 0.8 years Spain	Double-blind, placebo-controlled experimental design with repeated measures	A commercially available ED (dose: 3mg caffeine per kg body weight)	Jump performance, power, endurance and shot precision in highly skilled basketball players	Significant increases in: jump height, mean leg muscle power output, perceived muscle power, endurance and vigour during the hours following the test Decreased rate of perceived exhaustion No difference in: precision of basketball shots, total number of free throws per second or distances covered
(Gallo-Salazar, Areces et al. 2015)	Boys and girls (n=14) Mean 16 +/- 1 year Spain	Double-blind, placebo-controlled experimental design with repeated measures	A commercially available ED (dose: 3mg caffeine per kg body weight)	Physical performance in elite junior tennis players	Significant increases in: handgrip force, running pace at high intensity, and number of sprints during a simulated match No difference in: peak running speed; ball velocity during the serving test Sweat rate during the simulated match was slightly increased, producing significantly higher dehydration
(Temple, Dewey et al. 2010)	Boys and girls (n=52) 12-17 years USA	Double blind, placebo-controlled experimental design	Drinks containing 0 mg, 50 mg, 100 mg or 200 mg of caffeine	Cardiovascular and subjective responses to caffeine and snack food ingestion	Dose-dependent increases in diastolic blood pressure (DBP) and decreases in HR In boys, high-caffeine consumers showed greater increases in DBP over time than did low-consuming boys

					High--caffeine consumers had more energy, protein and fat in their typical diet
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Table 2: Retrospective studies

Study	Subjects	Study design	Outcome measures	Main findings
(Gunja and Brown 2012)	Boys and girls (n=62) All ages Australia	Retrospective review of NSW Poisons Information Centre data (Jan 2004 – Dec 2010)	Calls relating to caffeinated ED ingestion	62 children were reported to have accidentally ingested EDs (mean age 36 months, range 7-120 months) 14 had symptoms probably related to EDs (most commonly hyperactivity) and 9 required hospital assessment
(Hernandez, Villarreal et al. 2009)	Boys and girls (n=428) All ages USA	Retrospective statistical analysis of Texas regional poison centres data	Calls relating to ED ingestion, negative health consequences	The largest affected group was teenagers (n=114, compared to 84 cases <5 years) Significant increases were noted between 2000 and 2001 (+100%); 2003-2044 (+87.5%) and 2005-2006 (+85%) Major complaints were: rapid heart rate, nervousness/agitation, nausea, vomiting, upset stomach, dizziness, tremors, chest discomfort and headache
(Seifert, Schaechter et al. 2011)	Boys and girls (n= 1568) All ages USA	Retrospective analysis of US National Poison Data System	Exposure to EDs, adverse health events (toxicity)	Single product, caffeine-containing exposures disproportionately involved those aged <20 years (particularly males) compared with other substance exposures Age groups in this category were: 47% children <6 years, 13% 6-12 years, 19% 13-19 years, 12% 20-25 years, 9% >25 years 13-19 year olds had the highest proportion of moderate or major effects (19%); the latter included cardiac disturbances, hypertension and hyperthermia
(Seifert, Seifert et al. 2013)	Boys and girls (n=4854) All ages USA	Retrospective analysis of US National Poison Data System	ED use and ED-related toxicities	Of the 4854 calls relating to ED exposure, 3192 cases were categorised as 'unknown', 1480 were non-alcoholic and 182 alcoholic Children <6 had the highest proportion of unintentional exposures to non-alcoholic ED; minor or moderate adverse effects were reported Adolescents (13-19) had the highest proportions of intentional exposures and the largest proportion of cases of minor to moderate effects, with one major effect

				For alcoholic ED, 54.3% ingestions were 13-19 years, 4.1% 6-12 years and 9.8% <6 years; a greater proportion of alcoholic ED cases were advised to seek treatment
(Vecchio, Chiara et al. 2013)	Boys (n= 24) All ages (mean 26.5 years) Italy	Retrospective analysis of Pavia Poison Control Center data	Use / abuse of EDs, voluntary / accidental, any co-assumed substance, clinical picture	Of those aged under 18, all were male and all had consumed Red Bull (0.5-2 cans, where known) Four had co-ingested with alcohol, plus other substances in two of these cases Symptoms: malaise, palpitations, fainting , abdominal/gastric pain, agitation, flushing, tachycardia, motor incoordination, confusion, hallucinations, delirium, vomiting, drowsiness, mydriasis (dilation of the pupil), tremors

Table 3: Cross-sectional studies

Study	Subjects	Study design	Outcome measures	Main findings
(Al-Hazzaa, Al-Sobayel et al. 2014)	Boys and girls (n=2908) 15-19 years	Multicentre cross-sectional study	Weight, height, BMI, total daily screen time (ST), physical activity (PA) and dietary habits (DH) using self-report questionnaires	Significant associations of higher consumption of EDs with both higher PA levels and higher ST PA did not correlate with consumption of sugar-sweetened drinks overall but did associate significantly with intake of EDs Insignificant associations between PA and the intake EDs in females
(Aluqmany, Mansoor et al. 2013)	Girls (n=600) 15-18 years (mean 17 years, SD 0.98 years) Saudi Arabia	Cross-sectional secondary school based survey	Knowledge of ED and effects, reasons for consumption, personal consumption	55.5% prevalence of ED consumption, although 45.0% used them irregularly Most had close friends who consumed EDs; current consumption was correlated with consumption by a family member or friend 69.6% of the students did not know the active ingredients of energy drinks 35.0% attributed their popularity to advertising, 25.6% used EDs to increase vitality and 20.8% used them to be alert 27.5% had tried stopping use, and 34.9% of them had had withdrawal symptoms
(Azagba, Langille et al. 2013)	Boys and girls (n=36,155)	Cross-sectional, classroom-	Consumption, mixed or premixed with	About 20% reported using alcohol mixed with EDs in the last year; prevalence of use was highest among Aboriginal

	12-18 years Canada	based, biennial Youth Smoking Survey	alcohol during the past 12 months	(33.8%) and black (25%) students Students who were older; currently smoked; were involved in heavy drinking in the past year; used marijuana in the past year; were absent from school; participated in school team sports; and had \$40 or more weekly spending money were more likely to consume alcohol mixed with EDs in the previous year Students who felt more connected to school and who had an academic average of 70% or higher were less likely to consume these drinks
(Azagba and Sharaf 2014)	Boys and girls (n=15,875) 14-18 years Canada	Cross-sectional, classroom-based, biennial Youth Smoking Survey	Susceptibility to smoking, consumption of alcohol mixed with ED (AmED)	About 13% of students used AmED A statistically significant positive association was identified between consuming AmED and susceptibility to smoking among adolescent students Never-smoking students who reported consuming AmED had higher odds of susceptibility to smoking
(Azagba, Langille et al. 2014)	Boys and girls (n=9226) 12-13 years, 14-16 years, 17-18 years	Cross-sectional, high school-based Student Drug Use Survey	ED usage	62% reported consuming EDs at least once in the previous year, with about 20% reporting use once or more per month Sensation seeking, depression, and substance use were all higher among ED users relative to non-users, and in higher frequency users relative to lower frequency users Males were much more likely to report ED consumption than female students Rates of ED use were higher among younger students and the prevalence of consumption decreased with age
(Champlin and Pasch 2013)	Boys and girls (n=356) 16-18 years USA	Cross-sectional high school based survey.	ED use and reasons for use	ED use was highly prevalent, with 81.1% reporting ever consuming an ED Among users, the most common reasons given for consumption were: it tastes good (73.7%), refreshment (59.9%), needing more energy in general (45.8%), and hydration and thirst quenching (38.1%); the least common reasons were: weight management (7.9%), health and nutrition (11.9%), and to replace a meal (13.8%)
(Cotter, Jackson et al. 2013)	Boys and girls (n=43)	Cross sectional computerised	Prevalence, quantity and coingestion of	ED drink use among adolescents far exceeded that of alcohol, "street" or illicit drug and tobacco usage. Those who

	13-17 years USA	questionnaire with sub-critically ill or injured adolescents in paediatric emergency department	alcohol, caffeinated beverages, pills, illicit drugs and tobacco use over previous 30 days and lifetime usage Reasons for ED use	reported ED use had higher prevalence of street drug use than non-ED users On a typical day adolescents drank 1.5 EDs (range, 0-7 drinks) The most highly cited reasons for ED use were: 29.4% "to play sport better", 23.5% "to keep awake for school", 23.5% "because your friends or others were using them", 23.5% "to party", 11.8% "to lose weight" (less cited reasons: 5.9% "to not feel hungry", "to keep awake for work", "to do better at work", "to keep awake while driving")
(Gallimberti, Buja et al. 2013)	Boys and girls (n=913) 11-13 years Italy	Cross-sectional school-based survey	Consumption of EDs, other substance abuse	Use of EDs increased significantly with age, from 17.8 % among sixth graders to 56.2 % among eighth graders Among the male student population, 16.5 % of those in the eighth grade and 6.21 % of those in the sixth grade drank them at least once a week Independent variables conferring a higher likelihood of being at least once-a-week ED consumers were smoking and alcohol consumption. Awareness of the damage caused by EDs emerged as a protective factor that reduced the likelihood of young students consuming such drinks
(Gambon, Brand et al. 2011)	Boys and girls (n=502) 12-19 years Netherlands	Cross-sectional school-based survey, single centre	Data on consumption of EDs, soft drinks, sports drinks and alcopops	39.4% used EDs (in comparison with 85.2% soft drinks, 44.7% sports drinks, 12.8% alcopops) Boys consumed soft drinks, EDs and sports drinks more frequently than girls, and on average also consumed higher amounts of these drinks Significant positive associations were observed between the consumption of soft drinks, EDs and/or sports drinks. Alcopop consumption was only associated with EDs The mean consumption of soft drinks, EDs and sports drinks was highest at 14-15 years, after which it declined
(Hamilton, Boak et al. 2013)	Boys and girls (n=4,472) 12-19 years Canada	Retrospective review of Ontario Student Drug Use and Health Survey	ED intake	49.6% of adolescents had consumed EDs in the previous year Energy drink consumption in the previous year was highly associated with tobacco, cannabis and non-medicinal use of prescription drugs use in the previous year,

				and binge drinking in the previous month. Consumption was also highly associated with sensation-seeking and self-reports of medical treatment for an injury (reported by 16% and 42% of adolescents)
(Huhtinen, Lindfors et al. 2013)	Boys and girls (n= 10,406) 12-18 years Finland	Adolescent Health and Lifestyle Survey, postal and online survey	Association between EDs and four caffeine-induced health complaints (headache, sleeping problems, irritation, tiredness / fatigue)	44% of adolescents used EDs at least sometimes (2% of girls and 4% of boys used them daily, 0.5% several times a day) Daily use of EDs was strongly associated with the four health complaints. In adjusted models, health complaints among those who used EDs several times a day were multi-fold compared with the non-users: headache (OR = 4.5), sleeping problems (3.5), irritation (2.4) and tiredness/fatigue (3.4).
(Kristjansson, Sigfusdottir et al. 2014)	Boys and girls (n=11,267) 10-12 years Iceland	Population-based primary school survey	Prevalence of caffeinated sugar-sweetened beverages (CSSBs) and the relationship with common physical complaints	Just over 7% of boys and almost 3% of girls report consuming EDs on a daily basis Use of CSSBs is more common among boys and physical complaints are more common among girls. About one in five girls reported having headaches, stomach aches and/or sleeping problems sometimes or often during previous 7 days. For boys and girls the prevalence of physical complaints generally increased with greater ED use
(Kumar, Park et al. 2014)	Boys and girls (n=840) 12-17 years USA	Online survey	ED consumption	9% reported consuming ED \geq 1 time/week Significant differences were found by age and gender (increasing prevalence among older teens and in males) but not for the other characteristics examined. Only 11.5% were ever asked by their doctor/nurse about how often they drank EDs, and 11.1% were ever recommended by their doctor/nurse to not drink EDs The proportion of youth who consumed energy drinks \geq 1 time/week was higher among youth who were asked by their doctor/nurse about how often they drank energy drinks than by youth who were not
(Larson, DeWolfe et al. 2014)	Boys and girls (n=2793) Mean 14.4 years (SD 2.0 years) USA	Cross-sectional school based survey (questionnaire plus anthropometric measures)	Sport and ED intake, PA and sport participation, media use, sleep, cigarette smoking, breakfast frequency and	Overall, EDs were consumed at least 1/wk by 14.7% of the sample (significantly higher among boys than girls). Differences in ED consumption by ethnicity were statistically significant only among girls Regular ED consumption was associated with measures of media use, other beverage intake, and cigarette use, but

			other beverage intake, weight status, demographics	<p>was unrelated to measures of PA. For both genders, regular consumption was positively associated with ever having smoked cigarettes and weekly video game use</p> <p>There was a significant association between regular ED consumption and higher daily intake of sugar-sweetened soft drinks and fruit drinks. For girls only, there was also a significant association with lower frequency of breakfast</p>
(Locatelli, Sanchez et al. 2012)	Boys and girls (n=2705) 15-17 years Brazil	Self-administered questionnaire in private high schools	Alcohol use by socioeconomic level and gender	<p>31.6% reported having used alcohol and ED together at least once in life. Boys reported a higher prevalence of frequent alcohol use, binge drinking, and the combination of alcohol with ED</p> <p>Mixing alcohol and ED was most common in students from class A1 (45.5%) and decreased gradually with socioeconomic class to 17.7% in classes D/E [high to low]</p>
(Ludden and Wolfson 2009)	Boys and girls (n=197) 14-18 years USA	Self-report measures completed during school hours	Patterns of caffeine use, linking to reasons for use, expectancies and sleep patterns	<p>Among those who used caffeine yesterday, 6.1% reported ED use (compared with 60.5% soda, 19.3% coffee, 4.4% tea and 8.8% other)</p> <p>Males drank soda and ED more frequently, although females were more likely to report withdrawal/dependence caffeine expectancies and appetite suppression expectancies</p>
(Musaiger and Zagzoog 2014)	Boys and girls (n=1,061) 12-19 years Saudi Arabia	School based short questionnaire extracted from a validated questionnaire, after modifications to include ED	Knowledge, attitudes and intake of energy drinks among adolescents	<p>31.9% of males and 24.7% of females drank EDs 1–2 days per week, with a significant difference between the genders</p> <p>Advertisements were the main single source of information on ED. The main reasons for consumption were for their taste and flavour (58.4%), in order to 'try them' (51.8%) and to 'get energy' (43%)</p> <p>About half did not know the ingredients of ED and a similar proportion knew they contained caffeine. Two-thirds viewed EDs as soft drinks</p>
(Nelson, Giveans et al. 2008)	Boys (n=305) 14-18 years USA	School based multiple choice survey,	Rates and characteristics of ED consumption among athletes	<p>49% used 1-10 cans in the past month, while 9% used greater than 10 cans in the past month. Among these modest and high consumers, the most usual times of ED use were: before football (39%), before school (23%), at social gatherings (22%), after football (20%), during school (14%), during football (11%) and while studying (11%).</p>

				Most popular reasons for ED use were: to increase energy (61%), enjoyment of taste (56%), thirst (33%) and increase alertness (27%). 18% believed EDs help them play better. Reported side effects were: rapid heartbeat (11%), light-headedness (9%), muscle cramping (7%) and diarrhoea (6%)
(Park, Blanck et al. 2012)	Boys and girls (n= 11,029) 14-18 years USA	School-based survey	Demographic characteristics, weight status, availability of school vending machines, and behavioural factors with sugar-sweetened beverage (SSB) intake	Mean total ED intake was 0.2 times per day and only ~5% of students reported drinking a can, bottle or glass ≥ 1 time per day. Being male, non-Hispanic black, or Hispanic (vs. non-Hispanic white), eating at fast-food restaurants ≥ 3 time per week and watching television > 2 hours per day were significantly associated with greater odds of drinking EDs ≥ 1 time/d, whereas having beverage vending machines in the school was significantly associated with reduced odds of drinking EDs ≥ 1 time/d
(Petrova, Duleva et al. 2013)	Boys and girls (n= 4322) 6-18 years Bulgaria	Cross-sectional nutrition survey, including Food Frequency Questionnaire	Use of EDs and correlation with alcoholic drinks	Consumption of ED starts in the age 6-9 years. 50.4% of 10-18 year olds were non-consumers of ED (never consumed and consumed less than once monthly). 18.3% of 10-13 year olds and 33.5% of 14-18 year olds consumed at least one ED per week. 13.4% of boys in the 14-18 years group ingested ED every day (7.3% more than one per day) Significant correlations between use of ED and consumption of spirits and beer, and co-occurrence of EDs and alcoholic drinks in older age groups, were found
(Santangelo, Lapolla et al. 2013)	Boys and girls (n= 1232) 12-19 years (mean 14.8, SD 3.8) Italy	School based self-report questionnaire	ED consumption - levels and motivating factors	EDs were consumed by 30.7% of the sample; 7.1% drank ED at least 1 time/day, 32.3% 1-2 times/week and 47.3% 1-2 times/month 90.2% consumed EDs for the flavour, 38.9% found them refreshing, 18% and 10.3% wanted to achieve an improvement in sports performance and intellectual activity, respectively. 71.4% consume EDs when outside, 28% at meals, 19.6% in front of TV/PC, 10.3% at school and 10% during or after physical exercise
(Terry-McElrath, O'Malley et al. 2014)	Boys and girls (n=21,995) 13-18 years USA	Classroom based self-completion questionnaire	ED consumption and substance use	ED/shot use was higher among boys, younger students and those residing outside of metropolitan areas. There were negative relationships with two parents in the home and higher average parental education. Neither race/ethnicity nor region associated with ED/shot use and consumption did not significantly change

				between 2010 and 2011 ED/shot use frequency was significantly and positively correlated with past 30-day use frequency of all substance use measures (alcohol, cigarettes, marijuana, and amphetamines) for all grades
(Van Batenburg-Eddes, Lee et al. 2014)	Boys and girls (n= 509) 11-16 years (mean 13.1 years, SD 0.85) Netherlands	Cross-sectional school based survey, part of a larger longitudinal project	Executive functions, plus caffeine and ED intake	6% reported consuming on average at least one ED a day. Problems with falling asleep and waking up were reported most often (23%). Consuming on average one ED or more a day was associated with problems with self-reported behaviour regulation. Participants who drank at least two consumptions of caffeine or ED also had more problems with meta-cognitive skills
(Vilija and Romualdas 2014)	Boys and girls (n= 1747) 12-13 years Lithuania	Cross sectional school based study using self-administered questionnaire	Posttraumatic stress (PTS) symptoms, lifetime traumatic experiences, food frequency scale, sense of coherence scale	21.0% consumed EDs on a daily basis. All lifetime traumatic events were associated with unhealthy foods (including EDs) and sense of coherence weakened the strength of the associations.

Table 4: Qualitative or mixed method studies

Study	Subjects	Study design	Aims	Main findings
(Bunting, Baggett et al. 2013)	Boys and girls (n= 12) 16-21 years New Zealand	Focus groups stratified by age (16-21, 22-28 and 29-35 years)	To obtain participants' perceptions of caffeinated EDs	Themes: advertising, age, alcohol, brand, efficacy, energy-seeking, gender, health, peer influence, product attributes, and safety. Taste appeared to be the primary driver motivating the purchase and repurchase of EDs 16-21 year olds reported more frequently purchasing and consuming EDs, and appeared to be more conscious of social image, despite showing health awareness and the potential for negative health consequences
(Costa, Hayley et al. 2014)	Boys and girls (n= 40) 12-15 years Australia	Focus groups	To explore perceptions, patterns, and contexts of ED use	Themes: knowledge about ED brands and content, ED use, reasons for ED use, physiological effects, and influences on ED use 12-15 year olds were familiar with a range of EDs and most had used them at least once, but had limited

				<p>knowledge of ED ingredients and could not easily differentiate them from other drink types.</p> <p>EDs were used as an alternative to soft drinks, to provide energy, and in social contexts, and use was associated with short-term physiological symptoms</p> <p>Perceptions and use of EDs were influenced by parents and advertising</p>
(Jones 2011)	<p>Boys and girls (n=95)</p> <p>12-14 years 15-17 years</p> <p>Australia</p>	<p>Focus groups (separate by age and gender), supplemented with school and online survey data</p>	<p>To explore perceptions and consumption of alcohol EDs (AEDs)</p>	<p>Many participants commenting that they had consumed AEDs, or seen others consuming them. Findings suggest they may be particularly popular among young females</p> <p>Drinking in the 15-17 age group took place predominantly at parties and friends' houses, as well as at family gatherings</p> <p>Young people liked AEDs because they give the consumer increased energy while allowing them to feel the effects of alcohol. Apart from increasing the 'fun' at parties and acting as a 'pick me up', they are also popular due to their similarity to non-alcohol EDs and soft drinks</p> <p>Only a small number of survey respondents raised negative consequences of consuming AEDs</p>
(O'Dea 2003)	<p>Boys and girls (n= 78)</p> <p>11-18 years</p> <p>Australia</p>	<p>Focus groups</p>	<p>To explore the type of nutritional supplements and drinks consumed by adolescents, along with reasons for consumption</p>	<p>In the 2 weeks prior to the focus groups, 42.3% of participants had consumed EDs (compared with 54.6% who consumed sports drinks)</p> <p>Reasons for consumption of EDs: energy, taste, sports performance, soft drink substitute, peer group pressure, attractive packaging.</p> <p>Typical responses from adolescents: 'Makes me feel more energetic', 'Other guys in the team take it', 'I had it because I was thirsty', 'Wakes you up, makes you feel alert and it tastes nice', 'I only bought it because there was no water', 'It makes me go hyper', 'I drink it before soccer and I don't lose</p>

				<p>energy as fast' 'I like the can—it looked cool so I bought it', 'They're like a soft drink'</p> <p>EDs were very popular among participants of all ages and they talked enthusiastically about the perceived beneficial effects on their bodies and their sports performance (particularly males). Others referred to enjoying the taste. They were consumed as soft drink substitutes, but only when participants had enough money to buy them, as they were perceived to be more expensive</p>
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