

## Supplementary file

### Section 1: Databases searched and MEDLINE search strategy

The following databases were searched: Bielefeld Academic Search Engine (BASE); BIOSIS (Web of Science); Google Scholar; MEDLINE (OVID); PsycInfo (OVID); Scopus; Web of Science Citation Indexes: Emerging Sources Citation Index, Science Citation Index, Social Sciences Citation Index.

#### MEDLINE search strategy

Databases: Ovid MEDLINE(R) Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) <1946 to Present>

Date searched: 15 May 2018

No. of results: 99

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1 ((energy adj3 drink?) or (energy adj3 beverage?) or (soft adj3 drink?) or (soft adj3 beverage?) or (carbonated adj3 drink?) or (carbonated adj3 beverage?) or (sport? adj3 drink?) or (sport? adj3 beverage?) or (sugar? adj3 drink?) or (sugar? adj3 beverage?) or (soda? adj3 drink?) or (soda? adj3 beverage?) or (flavor\* adj3 drink?) or (flavor\* adj3 beverage?) or (flavour\* adj3 drink?) or (flavour\* adj3 beverage?) or (sweet\* adj3 drink?) or (sweet\* adj3 beverage?)).ti,ab,kw. (9509)

2 (caffeine\* or guarana).ti,ab,kw. or Caffeine/ (32008)

3 1 and 2 (852)

4 exp Energy drinks/ (551)

5 3 or 4 (1150)

6 (((("synthesis" or "systematic") and ("evidence" or "research" or "review")) or ("review" and (integrat\* or critical\* or "mapping" or "comprehensive" or "evidence" or "research" or "literature")))).ti. or ((systematic adj2 review\*) or ("meta-analysis" or "Review articles" or "systematic review\*" or "Overview of reviews" or "Review of Reviews") or ("data synthesis" or "evidence synthesis" or "metasynthesis" or "meta-synthesis" or "narrative synthesis" or "qualitative synthesis" or "quantitative synthesis" or "realist synthesis" or "research synthesis" or "synthesis of evidence" or "thematic synthesis" or "systematic map\*" or "metaanaly\*" or "meta-analy\*" or "systematic overview\*" or "systematic review\*" or "systematically review\*" or "bibliographic search" or "database search" or "electronic search" or "handsearch\*" or "hand search\*" or "keyword search" or "literature search" or "search term\*" or "literature review" or "overview of reviews" or "review literature" or "reviewed the literature" or "reviews studies" or "scoping stud\*" or "overview study" or "meta-ethnograph\*" or "meta-epidemiological" or "data extraction" or "meta-regression" or "narrative review" or "art review" or "scoping review" or "iterative review" or "meta-summary"))).ti,ab,kw. (421553)

7 limit 5 to (meta analysis or "review" or systematic reviews) (148)

8 5 and 6 (49)

9 7 or 8 (158)

10 limit 9 to yr="2013 -Current" (99)

The searches were re-run on 2<sup>nd</sup> July 2021.

## Section 2: Articles excluded at full-text assessment

### Original search on 15<sup>th</sup> May 2018 – excluded on full text

#### Excluded as Not in English

1. Manrique CI, Arroyave-Hoyos CL, Galvis-Pareja D (2018) CEDs: Neurological and cardiovascular effects. *latreia* 31: 65-75.
2. Petit A, Karila L, Lejoyeux M (2015) [Abuse of energy drinks: does it pose a risk?]. *Presse Medicale* 44: 261-270.
3. Shalygin LD, Eganyan RA (2016) Energy drinks are a real danger to the health of children, adolescents, young people, and the adult population. Part 2. Risks associated with consumption of alcohol-containing energy drinks. World Health Organization guidelines. Legislative regulation in different countries. *Profilakticheskaya Meditsina* 19: 51-57.

#### Excluded on Design – not a systematic review

1. Ahluwalia N, Herrick K (2015) Caffeine intake from food and beverage sources and trends among children and adolescents in the United States: review of national quantitative studies from 1999 to 2011. *Advances in Nutrition* 6: 102-111.
2. Al-Shaar L, Vercammen K, Lu C, Richardson S, Tamez M, Mattei J (2017) Health Effects and Public Health Concerns of Energy Drink Consumption in the United States: A Mini-Review. *Frontiers in Public Health* 5: 225.
3. Arria AM, Bugbee BA, Caldeira KM, Vincent KB (2014) Evidence and knowledge gaps for the association between energy drink use and high-risk behaviors among adolescents and young adults. *Nutrition Reviews* 72 Suppl 1: 87-97.
4. Beauchamp G, Amaducci A, Cook M (2017) Caffeine Toxicity: A Brief Review and Update. *Clinical Pediatric Emergency Medicine* 18: 197-202.
5. Bedi N, Dewan P, Gupta P (2014) Energy drinks: potions of illusion. *Indian Pediatrics* 51: 529-533.
6. Blankson KL, Thompson AM, Ahrendt DM, Patrick V (2013) Energy drinks: what teenagers (and their doctors) should know. *Pediatrics in Review* 34: 55-62.
7. Breda JJ, Whiting SH, Encarnacao R, Norberg S, Jones R, Reinap M, Jewell J (2014) Energy drink consumption in europe: a review of the risks, adverse health effects, and policy options to respond. *Frontiers in Public Health* 2: 134.
8. Campbell B, Wilborn C, La B, Taylor L, Nelson MT, Greenwood M, Ziegenfuss TN, Lopez HL, Hoffman JR, Stout JR, Schmitz S, Collins R, Kalman DS, Antonio J, Kreider RB (2013) International Society of Sports Nutrition position stand: Energy drinks. *Journal of the International Society of Sports Nutrition* 10: 58
9. Cappelletti S, Piacentino D, Sani G, Aromatario M (2015) Caffeine: Cognitive and physical performance enhancer or psychoactive drug? *Current Neuropharmacology* 13: 71-88.
10. Carskadon MA, Tarokh L (2014) Developmental changes in sleep biology and potential effects on adolescent behavior and caffeine use. *Nutrition Reviews* 72 Suppl 1: 60-64.
11. Curran CP, Marczynski CA (2017) Taurine, caffeine, and energy drinks: Reviewing the risks to the adolescent brain. *Birth Defects Research* 109: 1640-1648.
12. EFSA NDA Panel (2015) Scientific Opinion on the safety of caffeine. *EFSA Journal* 13: 4102.
13. Franke AG, Bagusat C, Rust S, Engel A, Lieb K (2014) Substances used and prevalence rates of pharmacological cognitive enhancement among healthy subjects. *European Archives of Psychiatry & Clinical Neuroscience* 264 Suppl 1: S83-90.
14. Gonzalez W, Altieri PI, Alvarado E, Banchs HL, Colon E, Escobales N, Crespo M (2015) Celiac trunk and branches dissection due to energy drink consumption and heavy resistance exercise: case report and review of literature. *Boletin - Asociacion Medica de Puerto Rico* 107: 38-40.

15. Grandner MA, Knutson KL, Troxel W, Hale L, Jean-Louis G, Miller KE (2014) Implications of sleep and energy drink use for health disparities. *Nutrition Reviews* 72 Supplement 1: 14-22.
16. Harris JL, Munsell CR (2015) Energy drinks and adolescents: what's the harm? *Nutrition Reviews* 73: 247-257.
17. Ibrahim NK, Iftikhar R (2014) Energy drinks: Getting wings but at what health cost? *Pakistan Journal of Medical Sciences* 30: 1415-1419.
18. Linden AN, Lau-Barraco C (2014) A qualitative review of psychosocial risk factors associated with caffeinated alcohol use. *Experimental and Clinical Psychopharmacology* 22: 144-153.
19. Mangi MA, Rehman H, Rafique M, Illovsky M (2017) Energy Drinks and the Risk of Cardiovascular Disease: A Review of Current Literature. *Cureus* 9: e1322.
20. Marczyński CA, Fillmore MT (2014) Energy drinks mixed with alcohol: what are the risks? *Nutrition Reviews* 72 Suppl 1: 98-107.
21. Marczyński CA (2015) Can energy drinks increase the desire for more alcohol? *Advances in Nutrition* 6: 96-101.
22. Mattioli Anna V (2015) Caffeine and atrial fibrillation. In: Preedy V (ed.) *Coffee in Health and Disease Prevention*. Elsevier, pages 691-698.
23. Mattioli AV (2014) Beverages of daily life: Impact of caffeine on atrial fibrillation. *Journal of Atrial Fibrillation* 7: 59
24. Meyer F, Timmons BW, Wilk B (2013) Water, Hydration and Sports Drink. In: *Nutrition and Enhanced Sports Performance: Muscle Building, Endurance, and Strength*. Elsevier Inc., pages 377-384.
25. Miller P (2013) Energy drinks and alcohol: Research supported by industry may be downplaying harms. *BMJ (Online)* 347.
26. Mosca A, Della C, Sartorelli MR, Ferretti F, Nicita F, Vania A, Nobili V (2016) Beverage consumption and paediatric NAFLD. *Eating & Weight Disorders: EWD* 21: 581-588.
27. Nelson ME, Bryant SM, Aks SE (2014) Emerging drugs of abuse. *Disease-a-Month* 60: 110-132.
28. Owens J, Au R, Carskadon M, Millman R, Wolfson A, Braverman PK, Adelman WP, Breuner CC, Levine DA, Marcell AV, Murray PJ, O'Brien RF (2014a) Insufficient sleep in adolescents and young adults: An update on causes and consequences. *Pediatrics* 134: e921-e932.
29. Owens JA, Mindell J, Baylor A (2014b) Effect of energy drink and caffeinated beverage consumption on sleep, mood, and performance in children and adolescents. *Nutrition Reviews* 72: 65-71.
30. Pennella S, Farinetti A, Mattioli AV (2015) Caffeine, energy drinks and atrial fibrillation: a mini-review. *BAOJ Nutrition* 1: 1-4.
31. Pomeranz JL, Munsell CR, Harris JL (2013) Energy drinks: An emerging public health hazard for youth. *Journal of Public Health Policy* 34: 254-271.
32. Rotstein J, Barber J, Strowbridge C, Hayward S, Huang R, Godefroy Samuel B (2013) Energy drinks: an assessment of the potential health risks in the Canadian context. InTech.
33. SafeFood (2016) *Energy drinks in Ireland - a review*. SafeFood. <https://doi.org/10.14655/105129-975722>
34. Sanchis-Gomar F, Pareja-Galeano H, Cervellin G, Lippi G, Earnest CP (2015) Energy drink overconsumption in adolescents: implications for arrhythmias and other cardiovascular events. *Canadian Journal of Cardiology* 31: 572-575.
35. Schaffer SW, Shimada K, Jong CJ, Ito T, Azuma J, Takahashi K (2014) Effect of taurine and potential interactions with caffeine on cardiovascular function. *Amino Acids* 46: 1147-1157.
36. Smith AP (2013) Caffeine and CEDs. In: *Principles of Addiction*. Elsevier Inc., pages 777-785.
37. Smolinske Susan C (2017) Dietary supplements in children. *Pediatric Clinics of North America* 64: 1243.

38. Striley CW, Khan SR (2014) Review of the energy drink literature from 2013: findings continue to support most risk from mixing with alcohol. *Current Opinion in Psychiatry* 27: 263-268. 60
39. Turagam MK, Velagapudi P, Kocheril AG, Alpert MA (2015) Commonly consumed beverages in daily life: do they cause atrial fibrillation? *Clinical Cardiology* 38: 317-322.
40. Visram S, Hashem K (2016) *Energy drinks: what's the evidence?* The Food Research Collaboration.
41. Waheed A, Sadhna D, Gupta A, Patel P, Jabin F, Rajput SK (2015) Beverages: alternative medicine and health benefits. *International Journal of Pharmacy and Technology* 6: 7568-7586.
42. Wassef B, Kohansieh M, Makaryus AN (2017) Effects of energy drinks on the cardiovascular system. *World Journal of Cardiology* 9: 796-806.
43. Wesensten NJ (2014) Legitimacy of concerns about caffeine and energy drink consumption. *Nutrition Reviews* 72 Suppl 1: 78-86.
44. Zacher J, May E, Horlitz M, Pingel S (2018) Binge drinking alcohol with caffeinated "energy drinks", prolonged emesis and spontaneous coronary artery dissection: a case report, review of the literature and postulation of a pathomechanism. *Clinical Research in Cardiology* 04: 04.
45. Zucconi S, Volpato C, Adinolfi F, Gandini E, Gentile E, Loi A, Fioriti L (2013) Gathering consumption data on specific consumer groups of energy drinks. *EFSA Supporting Publications* 10: 394E.
46. Zulli A, Smith RM, Kubatka P, Novak J, Uehara Y, Loftus H, Qaradakh T, Pohanka M, Kobylak N, Zagatina A, Klimas J, Hayes A, La R, Soucek M, Kruzliak P (2016) Caffeine and cardiovascular diseases: critical review of current research. *European Journal of Nutrition* 55: 1331-1343.

#### **Excluded on Exposure – not about CEDs (or no section on ED)**

1. Clark I, Landolt Hans P (2017) Coffee, caffeine, and sleep: A systematic review of epidemiological studies and randomized controlled trials. *Sleep medicine reviews* 31: 70-78.
2. Ruxton CH (2014) The suitability of caffeinated drinks for children: a systematic review of randomised controlled trials, observational studies and expert panel guidelines. *Journal of human nutrition and dietetics: the official journal of the British Dietetic Association* 27: 342-357.

#### **Excluded on Population – not about Children (or no separate data for children)**

1. Benson S, Verster JC, Alford C, Scholey A (2014) Effects of mixing alcohol with caffeinated beverages on subjective intoxication: a systematic review and meta-analysis. *Neuroscience and biobehavioral reviews* 47: 16-21.
2. Burrows T, Pursey K, Neve M, Stanwell P (2013) What are the health implications associated with the consumption of energy drinks? A systematic review. *Nutrition Reviews* 71: 135-148.
3. Correa M, San M, López-Cruz L, Bayarri P, Monferrer L, Salamone JD (2014) Caffeine modulation of alcohol intake: Impact on its psychomotor effects and withdrawal. In: *Caffeine: Consumption, Side Effects and Impact on Performance and Mood*. Nova Science Publishers, Inc., pages 89-112.
4. Grasser EK, Miles-Chan JL, Charriere N, Loonam CR, Dulloo AG, Montani JP (2016) Energy drinks and their impact on the cardiovascular system: potential mechanisms. *Advances in Nutrition* 7: 950-960.
5. Lalanne L, Lutz PE, Paille F (2017) Acute impact of caffeinated alcoholic beverages on cognition: a systematic review. *Progress in Neuro-Psychopharmacology & Biological Psychiatry* 76: 188-194.
6. Ok G, Lee Nan H, Jung Hyun C, Jeon S, Kim K, Kang M, Lee S (2017) Effects of energy drink on power performance: meta-analysis. *Medicine & Science in Sports & Exercise* 49: 294.

7. Peacock A, Pennay A, Droste N, Bruno R, Lubman DI (2014) 'High' risk? A systematic review of the acute outcomes of mixing alcohol with energy drinks. *Addiction (Abingdon, England)* 109: 1612-1633.
8. Souza DB, Del C, Casonatto J, Polito MD (2017) Acute effects of caffeine-containing energy drinks on physical performance: a systematic review and meta-analysis. *European Journal of Nutrition* 56: 13-27.
9. Verster JC, Benson S, Johnson SJ, Scholey A, Alford C (2016) Mixing alcohol with energy drink (AMED) and total alcohol consumption: a systematic review and meta-analysis. *Human Psychopharmacology* 31: 2-10.
10. Voskoboinik A, Kalman JM, Kistler PM (2018) Caffeine and arrhythmias: time to grind the data. *JACC: Clinical Electrophysiology* 4: 425-432.
11. Whitehead N, White H (2013) Systematic review of randomised controlled trials of the effects of caffeine or caffeinated drinks on blood glucose concentrations and insulin sensitivity in people with diabetes mellitus. *Journal of Human Nutrition and Dietetics* 26: 111-125. 62

**Excluded on Data – no extractable relevant data**

1. Shah SA, Chu BW, Lacey CS, Riddock IC, Lee M, Dargush AE (2016) Impact of acute energy drink consumption on blood pressure parameters: a meta-analysis. *Annals of Pharmacotherapy* 50: 808-815.

**Search update on 2<sup>nd</sup> July 2021 – excluded on full text****Duplicate**

1. Bleich S, Vercammen K. The negative impact of sugar-sweetened beverages on children's health: an update of the literature. Figshare; 2018.
2. Temple JL. Review: Trends, Safety, and Recommendations for caffeine use in children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2019;58(1):36-45.
3. Verster JC, Benson S, Johnson SJ, Alford C, Godefroy SB, Scholey A. Alcohol mixed with energy drink (AMED): a critical review and meta-analysis. *Comment in: Hum Psychopharmacol* 2018 Jul;33(4):e2664; PMID: 29901237 [<https://www.ncbi.nlm.nih.gov/pubmed/29901237>]. 2018;33(2):e2650.

**Excluded as Not in English**

1. Aydın S, Dede BN. Toxicological evaluation of energy drinks on health effects. *Hacettepe University Journal of the Faculty of Pharmacy*. 2016;36(1):89-127.
2. Rivera Ramirez LA, Ramirez Moreno E, Valencia Ortiz AI, Ruvalcaba JC, et al. Review of the composition of energy drinks and health effects perceived by young consumers; Revisión de la composición de las bebidas energizantes y efectos en la salud percibidos por jóvenes consumidores. 2020.

**Excluded on Design – not a systematic review**

1. Adamczak M, Wiecek A. Food Products That May Cause an Increase in Blood Pressure. *Current Hypertension Reports*. 2020;22(1):2.
3. Alhumud M, Moore S, Morgan K. Energy drink mechanisms of harm in young people and adolescents: a narrative review. *Journal of Food and Nutrition Research*. 2020;8(1):33-8.
4. Ali A, Wham C, Wolber F, Dickens M, O'Keeffe K, Thunders M, et al. The highs and lows of caffeine intake in New Zealand children. *Journal of Caffeine and Adenosine Research*. 2018;8(3):86-98.

5. Butler AE, Qian W, Leatherdale ST. Caffeinated energy drink consumption and predictors of use among secondary school students over time in the COMPASS cohort study. *Preventive Medicine Reports*. 2019;15.
6. Chaudhary NS, Pitale PM, Mondesir FL. Sleep and the impact of caffeine, supplements, and other stimulants. *Sleep and Health*: Elsevier; 2019. p. 303-17.
7. Ehlers A, Marakis G, Lampen A, Hirsch-Ernst Karen I. Risk assessment of energy drinks with focus on cardiovascular parameters and energy drink consumption in Europe. *Food and Chemical Toxicology*. 2019;130:109-21.
8. Gutierrez-Hellin J, Varillas-Delgado D. Energy drinks and sports performance, cardiovascular risk, and genetic associations; future prospects. *Nutrients*. 2021;13(3).
9. Haque M, McKimm J, Sartelli M, Samad N, Haque SZ, Bakar MA. A narrative review of the effects of sugar-sweetened beverages on human health: a key global health issue. *Journal of Population Therapeutics and Clinical Pharmacology*. 2020;27(1):e76-e103.
10. Higashi Y. Coffee and endothelial function: a coffee paradox? *Nutrients*. 2019;11(9).
11. Higgins JP, Liras GN, Liras IN. Some popular energy shots and their ingredients: are they safe and should they be used? A literature review. *Beverages*. 2018;4(1):10.
12. Ioannidis K, Chamberlain SR, Muller U. Ostracising caffeine from the pharmacological arsenal for attention-deficit hyperactivity disorder - was this a correct decision? A literature review. *Journal of Psychopharmacology*. 2014;28(9):830-6.
13. Jewell J, Norberg S, Whiting SH, Jones R, Reinap M, Breda JJ, et al. Energy drink consumption in Europe: a review of the risks, adverse health effects, and policy options to respond. 2014.
14. Jovanov P, Đorđić V, Obradović B, Barak O, Pezo L, Marić A, et al. Prevalence, knowledge and attitudes towards using sports supplements among young athletes. *Journal of the International Society of Sports Nutrition*. 2019;16(1).
15. Kawada T. Non-alcoholic beverage and depression. *European Journal of Clinical Nutrition*. 2019;73(1):157.
16. Lasheras I, Seral P, Alonso-Ventura V, Santabarbara J. The impact of acute energy drink consumption on electrical heart disease: a systematic review and meta-analysis. *Journal of Electrocardiology*. 2021;65:128-35.
17. Levy S, Santini L, Capucci A, Oto A, Santomauro M, Riganti C, et al. European Cardiac Arrhythmia Society Statement on the cardiovascular events associated with the use or abuse of energy drinks. *Journal of Interventional Cardiac Electrophysiology*. 2019;56(1):99-115.
18. Mattioli AV, Puviani MB, Farinetti A. Caffeine in beverages: cardiovascular effects. *Caffeinated and Cocoa Based Beverages: Volume 8 The Science of Beverages*: Elsevier; 2019. p. 257-84.
19. Morgan K, Moore S, Alhumud M. Energy drink mechanisms of harm in young people: a narrative review. *Journal of Food and Nutrition Research*. 2019;7.
20. Olas B, Brys M. Effects of coffee, energy drinks and their components on hemostasis: The hypothetical mechanisms of their action. *Food and Chemical Toxicology*. 2019;127:31-41.
21. Peerapen P, Thongboonkerd V. Caffeine in kidney stone disease: risk or benefit? *Advances in Nutrition (Bethesda, Md)*. 2018;9(4):419-24.
22. Peerapen P, Thongboonkerd V. Caffeine and kidney diseases. *Caffeinated and Cocoa Based Beverages: Volume 8 The Science of Beverages*: Elsevier; 2019. p. 235-56.
23. Pennella S, Farinetti A, Mattioli AV. Caffeine, energy drinks and atrial fibrillation: a mini-review. 2015.
24. Piccioni A, Covino M, Zanza C, Longhitano Y, Tullo G, Bonadia N, et al. Energy drinks: a narrative review of their physiological and pathological effects. *Internal Medicine Journal*. 2021;51(5):636-46.
25. Porrini M, Bo CD. Ergogenic aids and supplements. In: Lanfranco F, Strasburger CJ, Eds.: *Karger*; 2016.



26. Raizel R, Coqueiro AY, Bonvini A, Tirapegui J. Sports and energy drinks: aspects to consider. *Sports and Energy Drinks: Volume 10: The Science of Beverages*: Elsevier; 2019. p. 1-37.
27. Roemer A. The role of alcohol and energy drinks in the risk of injury: a systematic review. *Alcoholism Clinical and Experimental Research*. 2016;40(Suppl. 1, Sp. Iss. SI):182A.
28. Ruiz LD, Scherr RE. Risk of energy drink consumption to adolescent health. *American Journal of Lifestyle Medicine*. 2019;13(1):22-5.
29. Sankararaman S, Syed W, Medici V, Sferra TJ. Impact of energy drinks on health and well-being. *Current Nutrition Reports*. 2018;7(3):121-30.
30. Somers KR, Svatikova A. Cardiovascular and autonomic responses to energy drinks-clinical implications. *Journal of Clinical Medicine*. 2020;9(2).
31. Tarragon E, Calleja-Conde J, Gine E, Segovia-Rodriguez L, Duran-Gonzalez P, Echeverry-Alzate V. Alcohol mixed with energy drinks: what about taurine? *Psychopharmacology*. 2021;238(1):1-8.
32. Temple JL. Trends, safety, and recommendations for caffeine use in children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2019;58(1):36-45.
33. Zahoor S, Rehman RSU, Mahboob HM, Asif S, Malik U, Jehangir HMS. Association between energy drinks and cardiovascular events: a literature review. *Pakistan Heart Journal*. 2020;53(4):298-305.

**Excluded on Exposure – not about CEDs (or no section on ED)**

1. Korekar G, Kumar A, Ugale C. Occurrence, fate, persistence and remediation of caffeine: a review. *Environmental Science and Pollution Research International*. 2020;27(28):34715-33.
2. Lorenzo C, Jorge, Fei X, Dominguez R, Pareja-Galeano H. Caffeine and cognitive functions in sports: a systematic review and meta-analysis. *Nutrients*. 2021;13(3).
3. Torres-Ugalde YC, Romero-Palencia A, Roman-Gutierrez AD, Ojeda-Ramirez D, Guzman-Saldana RME. Caffeine consumption in children: innocuous or deleterious? A systematic review. *International Journal of Environmental Research and Public Health*. 2020;17(7):13.

**Excluded on Population – not about Children (or no separate data for children)**

1. Alwis Upeksha S, Haddad R, Monaghan Thomas F, Abrams P, Dmochowski R, Bower W, et al. Impact of food and drinks on urine production: a systematic review. *International Journal of Clinical Practice*. 2020;74(9):e13539.
2. Arias-Oviedo GM, Castillo-Hernandez I, Jimenez-Diaz J. Meta-analysis of the acute effect of energy drinks on anaerobic performance: a meta-analysis. *Pensar En Movimiento-Revista De Ciencias Del Ejercicio Y La Salud*. 2019;17(2):23.
4. La Vieille S, Gillespie Z, Bonvalot Y, Benkhedda K, Grinberg N, Rotstein J, et al. Caffeinated energy drinks in the Canadian context: health risk assessment with a focus on cardiovascular effects. *Appl Physiol Nutr Metab*. 2021(ja).
5. Mattioli AV, Nasi M, Toni S, Farinetti A. The complex relationship between caffeine and arrhythmias. *Acta Medica Mediterranea*. 2021;37(1):27-33.
6. Scholey AB, Benson S, Alford C, Verster JC. Meta-analysis on the effects of mixing alcohol with caffeinated beverages on subjective intoxication. *Alcoholism Clinical and Experimental Research*. 2013;37(Suppl. 2, Sp. Iss. SI):91A.
7. Striley CW, Swain MJ. Interventions for excessive energy drink use. *Current Opinion in Psychiatry*. 2019;32(4):288-92.
8. Tahmassebi JF, BaniHani A. Impact of soft drinks to health and economy: a critical review. *Eur Arch Paediatr Dent*. 2020;21(1):109-17.

**Excluded on Data – no extractable relevant data**

1. Kutia S, Kriventsov M, Moroz G, Gafarova E, Trofimov N. Implications of energy drink consumption for hepatic structural and functional changes: a review. *Nutrition and Food Science*. 2020;50(5):937-53.



### Section 3: Characteristics and summaries of the two additional included systematic reviews

First Author (Year) and Review aims	Methods	Population	Exposure and Outcomes
<b>Nadeem (2021)</b> <i>- Canada</i>  <b>Aims of the review</b> <i>- To evaluate and report potential adverse health effects after consumption of energy drinks</i>  <b>Focus</b> Health effects  <b>Funding</b> <i>- Not reported</i>	<b>Sources searched</b> <i>- PubMed and EMBASE</i>  <b>Search range of dates</b> <i>- Inception to November 2019</i>  <b>Number of primary studies</b> <i>- 10 out of 32 on children</i>  <b>Country of relevant studies</b> North America - <i>n</i> =2 Europe (non-UK) - <i>n</i> =1 Asia - <i>n</i> =1 Australia - <i>n</i> =1  <b>Design of relevant studies</b> Surveys - <i>Nine cross-sectional</i> Intervention - <i>One RCT</i>	<b>Target population</b> General - adults and children  <b>Participant age</b> Whole review <i>: 11 to 63 years (mean 15.2)</i> Relevant studies <i>- 11 to 19 years</i>  <b>Participant gender</b> Whole review <i>- 52.1% (49,219/94,438) male</i> Relevant studies <i>- not reported</i>  <b>Participant SES</b> Whole review <i>- not reported</i> Relevant studies <i>- not reported</i>	<b>Number/frequency of drinks</b> <i>- 8/10 reported frequency ranging from &lt;1 per year to &gt;1 per day</i>  <b>Caffeine content</b> <i>- not reported</i>  <b>Social context of intake</b> <i>- three studies reported - energy, awake, education settings</i>  <b>Named drink/s</b> <i>- Fure (one study)</i>  <b>Physical effects</b> <i>- Cardiovascular, gastrointestinal, immune, muscular, neurological, physiological, renal</i>  <b>Mental effects</b> <i>- Stress, depressive mood, suicide ideation/plan/attempt, agitation, irritable</i>
<b>Yasuma (2021)</b> <i>- Japan</i>  <b>Aims of the review</b> <i>- To examine the association between ED consumption and SU in adolescence, focusing on prospective cohort studies.</i>  <b>Focus</b> Health effects  <b>Funding</b> <i>- No funding</i>	<b>Sources searched</b> <i>- PubMed, Embase, PsycINFO/ARTICLES and the Japan Medical Abstracts Society database</i>  <b>Search range of dates</b> <i>- Up to 14th August 2019</i>  <b>Number of primary studies</b> <i>- Five</i>  <b>Country of relevant studies</b> North America – <i>n</i> =4 Europe (non-UK) – <i>n</i> =1  <b>Design of relevant</b>	<b>Target population</b> Children in general  <b>Participant age</b> Whole review <i>- 11 to 19 years</i> Relevant studies <i>- 11 to 19 years</i>  <b>Participant gender</b> Whole review <i>- not reported</i> Relevant studies <i>- not reported</i>  <b>Participant SES</b> Whole review <i>- not reported</i> Relevant studies <i>- not reported</i>	<b>Number/frequency of drinks</b> <i>- Amount or frequency over one week to four months.</i>  <b>Caffeine content</b> <i>- not reported</i>  <b>Social context of intake</b> <i>- Not reported</i>  <b>Named drink/s</b> <i>- Two studies mentioned Red Bull, Monster, Rock Star, Full Throttle or other drinks</i>  <b>Behavioural Effects</b> <i>- Alcohol, tobacco and</i>

	<b>studies</b> - All were prospective cohort, with exposure to ED determined by self-report questionnaire		<i>drug use (illicit and prescription drugs and analgesics)</i>
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**Yasuma N, Imamura K, Watanabe K, Nishi D, Kawakami N, Takano A. (2021). Association between energy drink consumption and substance use in adolescence: a systematic review of prospective cohort studies. *Drug and Alcohol Dependence* 219:108470.**

This systematic review (Yasuma 2021) aimed to examine the association between energy drink consumption and substance use in adolescence, focusing on prospective cohort studies. Five studies were included (published between 2010 and 2019), involving 2,863 children aged 11 to 19 years, residing in the USA (four studies) or Switzerland (one study).

All of four studies found an association between energy drink and alcohol use at follow-up. One of two studies found an association with smoking and illicit drugs (two years later), but the other study did not (one year later).

This review was rated as 'low' using the AMSTAR 2 critical appraisal tool, with no list of excluded studies and no description of the included studies' funding sources. The five included studies were rated as being at severe risk of bias. Four of them were conducted in the USA, so the results may not be applicable to other countries.

**Nadeem IM, Shanmugaraj A, Sakha S, Horner NS, Ayeni OR, Khan M. (2021). Energy Drinks and Their Adverse Health Effects: A Systematic Review and Meta-analysis. *Sports Health* 13(3):265-277.**

This systematic review (Nadeem 2021) aimed to evaluate and report potential adverse health effects after consumption of energy drinks. Of the 32 studies included, one RCT and nine cross-sectional studies (published between 2014 and 2018) involved 89,836 adolescents and children aged 11 to 19 years. These studies on children were conducted in a range of non-UK countries (Australia, Iceland, Korea, Poland, Portugal, Slovakia, Spain and USA).

Across the 10 studies, the reported physical symptoms were palpitations (17.5%; 174/995), chest pain (19.6%; 154/786), dyspnoea (17.1%; 134/784), tachycardia (12.5%; 127/1016), abdominal pain (14.5%; 1691/11,637), low appetite (17.3%; 256/1483), gastrointestinal upset (9.3%; 83/893) muscle soreness or backache (14.4%; 1266/8803), headaches (20.9%; 2501/11,972), dizziness (10.0%; 885/8875), tremors (8.1%; 130/1606), insomnia/sleeping-related symptoms (35.4%; 28,371/80,173), weakness (28.9%; 172/596), dehydration (20.8%; 123/592), and increased urination (16.4%; 97/592). No children reported allergic reactions.

The reported mental health effects were stress (35.4%; 24,054/68,043), depressive mood (23.1%; 17,757/76,859), and suicidal ideation/plan/attempt (19.8%; 15,278/77,004).

This review was rated as 'critically low' using the AMSTAR 2 critical appraisal tool. There was no report of a protocol, and very little description of the search. The quality of the included studies was assessed, using MINORS, and was described as fair for all studies, not just studies of children. This review focussed on energy drinks, with a short section on children.

## Section 4: Quality assessment of the included reviews for efficacy and safety, genotyping, and self-monitoring

First author (year)	1. PICO components	2. Protocol	3. Study design explanation	4. Comprehensive search strategy	5. Duplicate study selection	6. Duplicate data extraction	7. Details of excluded studies	8. Description of included studies	9a. Risk of Bias assessment (RCTs)	9b. Risk of Bias assessment (NRSIs)	10. Funding source	11a. RCTs Meta-analysis	11b. NRSIs Meta-analysis	12. Meta-analysis: RoB in individual studies	13. RoB: discussion of results	14. Heterogeneity	15. Publication bias	16. Reporting of conflict of interest	Relevance	Overall rating
Alhyas (2016)	Y	N	N	P	N	N	N	P	NA	N	N	NA	Y	N	N	N	N	Y	P	CL
Ali (2015)	N	N	N	P	Y	N	N	P	NA	N	N	NA	NA	NA	N	N	NA	Y	P	CL
Bleich (2018)	Y	N	N	P	N	N	N	Y	NA	N	N	NA	NA	NA	N	N	NA	Y	P	CL
Buck (2013)	Y	N	N	P	N	Y	N	N	NA	N	N	NA	NA	NA	N	N	NA	Y	P	CL
Bull (2015)	Y	Y	N	P	Y	Y	P	P	NA	P	N	NA	NA	NA	N	Y	NA	N	P	Low
Dawodu (2017)	Y	N	N	P	Y	N	N	P	NA	N	N	NA	NA	NA	N	N	NA	Y	Y	CL
Goldfarb (2014)	N	N	Y	P	Y	N	N	P	NA	N	N	NA	NA	NA	N	Y	NA	Y	P	CL
Lippi (2016)	N	N	Y	P	Y	N	N	P	NA	N	N	NA	NA	NA	Y	Y	NA	Y	P	CL
Nadeem (2021)	Y	N	N	N	Y	Y	N	P	N	P	N	NA	NA	NA	N	Y	NA	Y	P	CL
Richards (2016)	N	N	N	P	N	N	N	Y	N	N	N	NA	NA	NA	Y	N	NA	Y	P	CL
Roemer (2017)	N	P	N	P	N	Y	N	Y	NA	P	N	NA	NA	NA	Y	Y	NA	Y	P	CL
Verster (2017)	N	N	Y	P	N	N	N	P	N	N	N	N	N	N	N	N	N	Y	P	CL
Verster (2018)	Y	N	Y	P	N	N	N	P	NA	N	N	NA	NA	NA	Y	Y	NA	Y	P	CL
Visram (2016)	Y	P	Y	P	Y	N	N	Y	Y	Y	N	NA	NA	NA	Y	Y	NA	Y	Y	Low
Yasuma (2021)	Y	Y	Y	P	Y	Y	N	Y	NA	Y	N	NA	NA	NA	Y	Y	NA	Y	Y	Low

P = partial yes, NA = not applicable, CL = critically low, Y = yes, N = no, RoB = risk of bias, MA = meta-analysis, PICO = participants, intervention, comparator & outcome

**High** - Zero or one non-critical\* weakness: The systematic review provides an accurate and comprehensive summary of the results of the available studies that address the question of interest. **Moderate** - More than one non-critical weakness: The systematic review has more than one weakness, but no critical flaws. It may provide an accurate summary of the results of the available studies that were included in the review. **Low** - One critical flaw with or without non-critical weaknesses: The review has a critical flaw and may not provide an accurate and comprehensive summary of the available studies that address the question of interest. **Critically low** - More than one critical flaw with or without non-critical weaknesses: The review has more than one critical flaw and should not be relied on to provide an accurate and comprehensive summary of the available studies. \*Critical domains: 2, 4, 7, 9, 11, 13 and 15.<sup>16</sup>

### Section 5: Overlap in studies included in reviews for each section

The calculation for the corrected covered area is  $(n-r)/(rc-r) \times 100$  (for percentage), where  $r$  is the number of rows (primary studies),  $c$  is the number of columns (reviews) and  $n$  is the total number of included studies (with double counting). Values of 0-5 are considered slight, 6-10 moderate, 11-15 high and over 15 very high.

$c=15$  reviews,  $r=85$  studies,  $n=123$ ,  $CCA=3.2\%$  - slight overlap

	Review	Nadeem 2021	Yasuma 2021	Bleich 2018	Verster Koenig 2018	Verster 2018	Dawodu 2017	Roemer 2017	Alhyas 2016	Lippi 2016	Richards 2016	Visram 2016	Ali 2015	Bull 2015	Goldfarb 2014	Buck 2013	Overlap
	Included Studies																
1	*Abian-Vicen (2014)	√										√					2
2	Al-Hazzaa (2011)								√								
3	Al-Hazzaa (2014)											√					
4	Almalak (2014)								√								
5	Aluqmany (2013)								√								
6	Arria (2010)		√														
7	Arria (2014)											√					
8	*Azagba (2013)					√						√					2
9	*Azagba (2014)			√			√				√	√					4
10	*Azagba & Sharaf (2014)					√						√					2
11	Barrense-Dias (2016)		√														
12	*Bashir (2016)	√		√													2
13	Beckford (2015)				√												
14	Branum (2014)				√												
15	Bryant Ludden (2010)											√					
16	Bunting (2013) <sup>1</sup>											√					
17	*Choi (2016)		√									√					2
18	Cotter (2013)											√					
19	Costa (2014)											√					
20	Costa (2016)	√															
21	*Di Rocco (2011)												√ <sup>5</sup>		√	√	3
22	*Dufendach (2012)/Gray (2012) <sup>2</sup>														√	√	2
23	EFSA (2015)				√												
24	*Emond (2014)						√					√					2
25	*Evren (2015)						√				√	√					3
26	Faris (2015)											√					
27	Flotta (2014)					√											

	Review	Nadeem 2021	Yasuma 2021	Bleich 2018	Verster Koenig 2018	Verster 2018	Dawodu 2017	Roemer 2017	Alhyas 2016	Lippi 2016	Richards 2016	Visram 2016	Ali 2015	Bull 2015	Goldfarb 2014	Buck 2013	Overlap
	Included Studies																
28	Galaxy poll (ABC) (2013)				√												
29	*Gallimberti (2013)						√					√					2
30	Gallimberti (2015)											√					
31	Gallo-Salazar (2015)											√					
32	Gambon (2011)											√					
33	Gunja (2012)											√					
34	*Hamilton (2013)						√					√					2
35	Hernandez (2009)											√					
36	Holubcikova (2017)	√															
37	Huhtinen (2013)											√					
38	*Ilie (2015)							√				√					2
39	*Izquierdo 2012												√		√		2
40	Jones (2011)											√					
41	Kilani (2013)								√								
42	Kim (2018)	√															
43	*Koivusilta (2016)			√								√					2
44	Kponee (2014)							√									
45	*Kristjansson (2014)	√		√								√					3
46	Kumar (2014)											√					
47	Lachenmeier (2013)				√												
48	*Larson (2014)						√					√					2
49	Locatelli (2012)											√					
50	Lubman (2014)											√					
51	*Magnezi (2015)					√						√					2
52	Marmorstein (2016)			√													
53	Marmorstein (2019)		√														
54	Martins (2018)	√															
55	*Martz (2015)					√		√				√					3
56	Mitchell (2014)				√												
57	*Miyake (2015)		√				√					√					3
58	*Musaiger (2014)								√			√					2
59	NZCNS (2002)				√												
60	Nordt (2017)	√															
61	*Nowak (2015)						√					√					2
62	Nowak (2016)	√															
63	O'Dea (2003)											√					
64	Park (2012)											√					

	Review	Nadeem 2021	Yasuma 2021	Bleich 2018	Verster Koenig 2018	Verster 2018	Dawodu 2017	Roemer 2017	Alhyas 2016	Lippi 2016	Richards 2016	Visram 2016	Ali 2015	Bull 2015	Goldfarb 2014	Buck 2013	Overlap
	Included Studies																
65	*Park (2016)	√		√													2
66	Peters (2010)										√						
67	Polat (2013)									√							
68	Reid (2015)											√					
69	*Richards & Smith (2015) <sup>3</sup>			√							√						2
70	Richards (2015)										√						
71	Richards (2016)											√					
72	Schoffl (2011)													√			
73	*Schwartz (2015)						√					√					2
74	*Seifert (2011) <sup>4</sup>											√		√			2
75	Seifert (2013)											√					
76	Temple (2010)											√					
77	Terlizzi (2008)															√	
78	*Terry-McElrath (2014)						√					√					2
79	Tucker (2016)					√											
80	Usman (2012)												√				
81	*Van Batenburg-Eddes (2014)						√					√					2
82	*Vilija (2014)										√	√					2
83	*Wilson (2012)									√			√		√		3
84	Wing (2015)										√						
85	Zucconi (2013)				√												
	Totals	10	5	7	8	6	11	3	5	2	7	46	4	2	4	3	

\*cited in more than one included review.

<sup>1</sup> The study by Bunting et al (2013) collected data from focus groups participants aged (16–21). The proportion of the sample that was under 18 years old is not reported.

<sup>2</sup> Buck et al. (2013) detailed a case cited by Gray et al (2012). However, in the paper by Gray et al., the same case is attributed to Dufendach et al. (2012).

<sup>3</sup> The three papers by Richards et al. report outcomes from one research study

<sup>4</sup> Seifert et al. (2011) is a review not a primary study

<sup>5</sup> The study by Di Rocco et al. (2011) was not cited in the review by Ali et al (2015). However, one of the age-relevant cases included in the Ali et al. (2015) review was consistent with the details reported by Di Rocco and so was attributed to that paper.

Section 6: Dataset analysis tables

Table 1. Smoking & Drinking Survey: Frequency of Caffeinated Energy drink use by Gender

		Boy	Girl	Total
Never	Weighted %	23.9	36.9	30.4
	Unweighted N	736.0	1068.0	1804.0
Not in past week	Weighted %	39.0	37.9	38.5
	Unweighted N	1145.0	1107.0	2252.0
Less than a can	Weighted %	7.8	7.1	7.4
	Unweighted N	235.0	213.0	448.0
One can or more	Weighted %	29.3	18.1	23.7
	Unweighted N	917.0	566.0	1483.0
Total	%	100.0	100.0	100.0
	Unweighted N	3033.0	2954.0	5987.0
	Weighted N	3019.6	2975.0	5994.6
Observations		5987		
P		<0.001		



**Table 2. Smoking & Drinking Survey: Frequency of Caffeinated Energy Drink use by Region**

		North East	North West	Yorks. and Humber	East Midlands	West Midlands	East of England	London	South East	South West	Total
Never	Weighted %	23.8	27.3	28.4	28.9	26.6	30.0	33.1	34.3	34.7	30.4
	Unweighted N	175.0	166.0	160.0	184.0	214.0	213.0	230.0	256.0	206.0	1804.0
Not in past week	Weighted %	34.3	37.7	33.5	37.2	39.5	36.8	39.8	41.8	40.6	38.5
	Unweighted N	248.0	222.0	185.0	225.0	307.0	254.0	267.0	301.0	243.0	2252.0
Less than a can	Weighted %	8.9	7.5	8.4	8.0	6.2	8.1	7.2	7.4	6.2	7.4
	Unweighted N	65.0	45.0	46.0	48.0	49.0	57.0	48.0	53.0	37.0	448.0
One can or more	Weighted %	33.1	27.4	29.6	26.0	27.6	25.1	19.9	16.5	18.6	23.7
	Unweighted N	240.0	162.0	161.0	157.0	219.0	174.0	133.0	122.0	115.0	1483.0
Total	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Unweighted N	728.0	595.0	552.0	614.0	789.0	698.0	678.0	732.0	601.0	5987.0
	Weighted N	275.6	793.8	602.6	515.1	650.6	690.6	879.3	1001.4	585.6	5994.6
Observations		5987									
P		<0.001									

**Table 3. Smoking & Drinking Survey: Frequency of Caffeinated Energy Drink use by Free School Meals Eligibility**

		Not eligible for free school meals	Eligible for free school meals	Total
Never	Weighted %	30.9	26.3	30.2
	Unweighted N	1544.0	217.0	1761.0
Not in past week	Weighted %	39.4	34.6	38.7
	Unweighted N	1927.0	299.0	2226.0
Less than a can	Weighted %	7.1	9.6	7.4
	Unweighted N	353.0	87.0	440.0
One can or more	Weighted %	22.6	29.5	23.6
	Unweighted N	1169.0	282.0	1451.0
	%	100.0	100.0	100.0
Total	Unweighted N	4993.0	885.0	5878.0
	Weighted N	5012.2	874.1	5886.3
Observations		5878		
P		<0.001		

**Table 4. Smoking & Drinking Survey: Logistic regression annotated output – odds of consuming at least one can of CED a week**

	Covariate	Odds Ratio	Lower 95% CI	Upper 95% CI
Year	Year 7 ( <i>baseline</i> )	1.000	1.000	1.000
	Year 8	1.717	1.344	2.192
	Year 9	1.965	1.571	2.459
	Year 10	2.070	1.644	2.605
	Year 11	1.964	1.563	2.469
Gender	Boys ( <i>baseline</i> )	1.000	1.000	1.000
	Girls	0.528	0.446	0.624
Region	North East ( <i>baseline</i> )	1.000	1.000	1.000
	North West	0.763	0.533	1.093
	Yorkshire & Humber	0.835	0.610	1.143
	East Midlands	0.736	0.508	1.065
	West Midlands	0.751	0.550	1.025
	East of England	0.641	0.457	0.900
	London	0.474	0.328	0.686
	South East	0.371	0.257	0.535
	South West	0.443	0.318	0.617
FSM	Not eligible for FSM ( <i>baseline</i> )	1.000	1.000	1.000
	FSM (Free School Meals)	1.323	1.088	1.610
Truant	Not truant/excluded ( <i>baseline</i> )	1.000	1.000	1.000
	Truanted/excluded	3.032	2.566	3.583
Smoker	Doesn't smoke ( <i>baseline</i> )	1.000	1.000	1.000
	Current smoker	2.641	1.918	3.638
Alcohol	No alcohol in past week ( <i>baseline</i> )	1.000	1.000	1.000
	Alcohol in past week	2.081	1.597	2.712
Unweighted N=5,834				

**Table 5. Smoking & Drinking Survey: Frequency of Caffeinated Energy Drink use by Ethnicity**

		White	Mixed	Asian	Black	Other	Total
Never	Weighted %	30.8	26.0	30.4	24.2	32.3	30.3
	Unweighted N	1436.0	64.0	139.0	57.0	18.0	1714.0
Not in past week	Weighted %	37.6	44.9	41.4	43.6	41.4	38.6
	Unweighted N	1764.0	106.0	188.0	89.0	23.0	2170.0
Less than a can	Weighted %	7.5	8.0	6.9	6.8	2.9	7.4
	Unweighted N	359.0	19.0	33.0	13.0	2.0	426.0
One can or more	Weighted %	24.1	21.2	21.2	25.4	23.4	23.8
	Unweighted N	1197.0	58.0	96.0	55.0	14.0	1420.0
Total	%	100.0	100.0	100.0	100.0	100.0	100.0
	Unweighted N	4756.0	247.0	456.0	214.0	57.0	5730.0
	Weighted N	4654.4	269.8	506.4	244.7	64.7	5739.9
Observations		5730					
P		0.340					

**Table 6. HBSC 2013/14: Frequency of experiencing selected adverse physical symptoms by CED consumption**

Experience of physical health outcome		Headaches			Stomach ache			Sleep difficulties		
		Less than weekly or no CED	Weekly CED consumption	Total	Less than weekly or no CED	Weekly CED consumption	Total	Less than weekly or no CED	Weekly CED consumption	Total
About every day	% n	4.8 309.0	7.7 169.0	5.6 478.0	2.3 157.0	3.3 82.0	2.6 239.0	11.8 761.0	17.9 403.0	13.5 1164.0
More than once a week	% n	12.0 759.0	14.4 350.0	12.7 1109.0	6.1 404.0	10.3 250.0	7.3 654.0	11.3 727.0	14.0 315.0	12.1 1042.0
About every week	% n	12.3 819.0	14.5 345.0	12.9 1164.0	8.6 555.0	10.5 238.0	9.1 793.0	11.7 754.0	11.4 279.0	11.6 1033.0
About every month	% n	24.5 1617.0	22.9 555.0	24.1 2172.0	33.2 2166.0	30.4 727.0	32.4 2893.0	17.3 1111.0	14.6 346.0	16.5 1457.0
Rarely or never	% n	46.5 3047.0	40.4 938.0	44.7 3985.0	49.8 3252.0	45.5 1055.0	48.6 4307.0	48.0 3168.0	42.1 1008.0	46.3 4176.0
Total	% n	100.0 6551.0	100.0 2357.0	100.0 8908.0	100.0 6534.0	100.0 2352.0	100.0 8886.0	100.0 6521.0	100.0 2351.0	100.0 8872.0
Observations		8908			8886			8872		
P		0.0000665			0.00000379			0.000000140		

**Table 7. HBSC 2013/14: Frequency of experiencing selected adverse mental health indicators by CED consumption**

Experience of mental health indicator		Low mood			Irritability		
		Less than weekly or no CED	Weekly CED consumption	Total	Less than weekly or no CED	Weekly CED consumption	Total
About every day	%	5.7	9.0	6.6	6.5	14.4	8.7
	n	361.0	202.0	563.0	400.0	326.0	726.0
More than once a week	%	9.2	11.3	9.8	11.5	16.4	12.9
	n	570.0	248.0	818.0	752.0	378.0	1130.0
About every week	%	10.0	10.4	10.1	14.2	15.3	14.5
	n	667.0	252.0	919.0	927.0	375.0	1302.0
About every month	%	19.9	19.9	19.9	24.3	20.7	23.2
	n	1264.0	479.0	1743.0	1589.0	482.0	2071.0
Rarely or never	%	55.2	49.4	53.5	43.6	33.3	40.7
	n	3662.0	1165.0	4827.0	2864.0	793.0	3657.0
Total	%	100.0	100.0	100.0	100.0	100.0	100.0
	n	6524.0	2346.0	8870.0	6532.0	2354.0	8886.0
Observations		8870			8886		
P		0.0000582			9.00e-13		

**Table 8. Smoking & Drinking Survey: Ever tried alcohol/smoking**

	Tried alcohol			Tried smoking		
	Less than a can a week or none	Weekly CED consumption	Total	Less than a can a week or none	Weekly CED consumption	Total
Never tried smoking or alcohol	71.1 3157.0	40.9 574.0	64.1 3731.0	89.6 3982.0	60.3 871.0	82.8 4853.0
Tried smoking or alcohol	28.9 1222.0	59.1 829.0	35.9 2051.0	10.4 448.0	39.7 560.0	17.2 1008.0
Total	100.0 4379.0	100.0 1403.0	100.0 5782.0	100.0 4430.0	100.0 1431.0	100.0 5861.0
Observations	5782			5861		
P	2.03e-38			8.90e-40		

**Table 9. Smoking & Drinking Survey: Frequency of Caffeinated Energy Drink use and Truancy/Exclusion (weighted column percentages and unweighted numbers)**

		No self-reported truancy/exclusion	Self-reported truancy/exclusion	Total
Never drink CED	Weighted %	34.4	9.1	30.3
	Unweighted N	1695.0	82.0	1777.0
Not in past week	Weighted %	39.8	32.9	38.6
	Unweighted N	1942.0	290.0	2232.0
Less than a can	Weighted %	7.3	8.4	7.4
	Unweighted N	363.0	80.0	443.0
One can or more	Weighted %	18.5	49.6	23.6
	Unweighted N	965.0	491.0	1456.0
Total	%	100.0	100.0	100.0
	Unweighted N	4965.0	943.0	5908.0
	Weighted N	4957.7	958.2	5915.8
Observations		5908		
P		<0.001		



Table 10: Characteristics of Latent Classes

Indicator	Class 1. Low psychological wellbeing	Class 2. High overall wellbeing	Class 3. Low educational wellbeing	Class 4. Low physical wellbeing	Class 5. Overall low wellbeing
High irritability	0.6573	0.083095	0.274775	0.376834	0.891296
Sleep difficulties	0.538183	0.127695	0.207435	0.538359	0.871775
Nervousness	0.615317	0.088042	0.032447	0.376788	0.86252
Dizziness	0.178066	0.026657	0.075396	0.413395	0.707369
Experience of Headaches	0.244619	0.071752	0.180905	0.735036	0.84878
Experience of Stomach aches	0.127576	0.022605	0.047883	0.437921	0.673524
Low mood	0.519551	0.015575	0.015091	0.242559	0.917237
Low life satisfaction	0.126226	0.010538	0.065964	0.009591	0.341628
School dislike	0.368151	0.071455	0.621453	0.210043	0.573324
Pressure of school work	0.571089	0.222751	0.41592	0.407456	0.676186
Low self-rated achievement	0.324202	0.119422	0.633349	0.159166	0.403711

**Table 11: Multinomial logistic regression predicting class membership – baseline Class 2. High overall wellbeing**

	RRR	95% CI		RRR	95% CI		RRR	95% CI		RRR	95% CI	
	Class 1. Low psychological wellbeing			Class 3. Low educational wellbeing			Class 4. Low physical wellbeing			Class 5. Overall low wellbeing		
Year Group (base: Year 7)												
Year 8	1.28572	1.002977	1.64817	1.452124	0.875115	2.409584	0.986307	0.791519	1.229029	1.409331	0.965243	2.057735
Year 9	1.416154	1.128039	1.777856	1.491797	0.844542	2.635107	0.994302	0.801465	1.233537	1.800065	1.325619	2.444317
Year 10	2.020809	1.576427	2.590457	2.411984	1.402504	4.148057	0.997234	0.751511	1.323303	2.630055	1.861807	3.71531
Year 11	2.064269	1.517007	2.808957	2.361716	1.405729	3.967837	0.93607	0.73362	1.194388	2.144747	1.473416	3.121956
CED consumption (base: Never/rarely)												
Less than 1 per week	0.965036	0.797677	1.167508	1.344917	0.95852	1.887078	1.10835	0.888725	1.38225	1.290336	1.053289	1.580731
1-4 days a week	1.294605	1.021821	1.640211	2.485422	1.811118	3.410778	1.483725	1.131736	1.94519	1.885862	1.461385	2.433634
5+ days	1.91105	1.420172	2.571599	4.881275	3.554216	6.703826	2.348545	1.625291	3.393648	4.170123	2.832193	6.140092
Gender (base: male)												
Female	1.585933	1.355324	1.85578	0.969258	0.733271	1.281193	2.311939	1.961229	2.725365	4.697456	3.815118	5.783857
Drank Alcohol (base: Never tried)												
Tried	1.615047	1.323237	1.97121	1.717131	1.234934	2.387609	1.930918	1.557508	2.393852	2.79476	2.256018	3.462156
Smoking (base: Never tried)												
Tried	2.194551	1.560746	3.085737	2.435214	1.605855	3.692901	1.548455	1.09376	2.192174	3.562749	2.589511	4.901768
Rurality (base: not rural)												
Rural	1.041792	0.792721	1.36912	1.217607	0.767494	1.931697	0.973454	0.768529	1.233021	1.115661	0.806361	1.543601
Family advantage score (base: high or average)												
Low family affluence	1.042671	0.774395	1.403888	1.352246	0.841548	2.172864	1.40543	1.002947	1.969428	1.333363	1.031025	1.724357
Constant	0.133172	0.106169	0.167042	0.034743	0.023869	0.05057	0.107602	0.083459	0.13873	0.021136	0.014685	0.030422

RRR=relative risk ratio, CI=confidence interval