

Supplemental file

Table S1: Details of search

Databases

- Medline (OVID)
- Cochrane Library
- Scopus
- PsycInfo (OVID)
- ProQuest (Central)- ASSIA
- Web of Science- Social sciences and emerging sources citation indexes
- Social Policy and Practice (OVID)

Inclusion criteria/search terms

Participants	0-15 years	child* OR youth* OR adolescen* OR young people OR young person* OR schoolchild* OR boy* OR girl* OR teen* OR school child* NOT adult*
Exposure (intervention)	Exposure to advertising of HFSS/unhealthy food advertisement	advert* OR market* OR commercial* OR promot* OR Instagram* OR youtube* OR facebook* OR pack * OR label*, OR sticker* OR bag* OR box* OR tin* OR jar* OR carton* OR sleeve*, OR advergam* OR tag* OR lid* OR container*
Exposure (celebrities/influencers)	Exposure to advertising of HFSS/unhealthy food advertisement using celebrities/influencers	celebrit* OR celebrity endors* OR endors* OR influenc* OR social media influenc* OR social influenc*
Exposure (food)	Intervention vs. no intervention Comparison of HFSS food advertisement with celebrities/influencer and non-food advertisement control OR HFSS food advertisement with celebrity/influencer compared to HFSS food advertisement without celebrity/influencer Could also include a healthy food comparison group with OR without celebrity/influencer.	food* OR beverage* OR soda* OR cola* OR fizzy adj drink* OR carbonated adj beverage* OR carbonated adj drink* OR soft adj beverage* OR soft adj drink* OR high salt* OR high fat* OR high sugar* OR snack* OR sweet* OR meal* OR HFSS OR snack* OR sweet* NOT alcohol*
Outcome measure	Any of these: Energy intake Ad libitum consumption of food Dietary behaviour Preference of food Purchase intention	intake* OR consumption* OR choice OR eating behavio* OR dietary intake OR body mass index OR BMI OR body composition OR adipos* OR body fat OR obes* OR overweight OR energy consumption OR energy intake OR judgement* OR preference* OR liking OR favor* OR attitude
Study designs	Experimental; intervention (with or without a control group)	
Other		

Geography	All
Languages	All
Time	2009-2021

Table S2: Search history

Medline (OVID)

1 exp adolescent/ or exp child/ or exp infant/

2 (child* or youth* or adolescen* young people or Young person* or boy* or girl* or teen* or Infant* or preschool* or toddler* or minor* or Babies or Baby).ti,ab,id.

3 1 or 2

4 Marketing/ or Advertising as topic/ or Product packaging/ or Food packaging/ or Food labelling/ or Advertisement/ or Social marketing/ or social media/

5 ((advert* adj2 food) or (advert* adj2 supermarket) or (advert* adj2 buy*) or (market* adj2 food) or (market* adj2 supermarket) or (market* adj2 buy*) or (promot* adj2 food) or (promot* adj2 supermarket) or (promot* adj2 buy*) or (promot* adj2 food) or (promot* adj2 supermarket) or (promot* adj2 buy*) or commercials or "TV commercial*" or "Television commercial*" or "radio commercial*" or "media commercial*" or digital adver* or digital market* or Mobile app* or Mobile application* or advergam* or Facebook or Instagram or Twitter or Snapchat or Youtube or Weibo or Wechat or Youku).ti,ab,id.

6 4 or 5

7 Food/ or Beverages/ or Carbonated beverages/

8 (food* or beverage* or Cola or Colas or Soda or sodas or (fizzy adj2 drink*) or (carbonated adj2 drink*) or (soft adj drink*) or high salt* or high fat* or high sugar* or snack* or sweet* or Meal* or HFSS).ti,ab,id.

9 7 or 8

10 exp Famous Persons/ or exp Athletes/

11 (celebrit* or endors* or influencer* or ((professional or elit* or famous or public or renown* or well-known or acclaim* or eminent or prominent or illustrious or recogniz* or reput* or influential or wealth* or power*) adj1 (person* or people or figure* or leader or athlete* or player or bodybuilder or sport* or basketball or football or hockey or baseball or soccer or Olympian or singer* or songwriter* or musician* or band or group or rapper* or artist* or actor* or actress or star or Hollywood or Bollywood or Nollywood or dancer or writer or author or comedian or performer or model* or supermodel* or chef or philanthropist or politic* or president or minister or king or queen or prince* or monarch))) .ti,ab,id.

12 10 or 11

13 Eating/ or Snacks/ or Drinking/ or Food Preferences/ or Feeding Behavior/ or Diet, High-Fat/ or Diet/ or Diet, Western/ or energy intake/

14 (intake* or calori* or consumption* or food choice* or eating behavio* or snacking behavio* or preference* or favour* or favor* or purchas* or buy* or spend* or pester* or request* or liking).ti,ab,id.

15 13 or 14

16 3 and 6 and 9 and 12 and 15

17 16

18 limit 17 to yr="2009 -Current"

Social Policy and Practice

1 (child* or youth* or adolescen* young people or Young person* or boy* or girl* or teen* or Infant* or preschool* or toddler* or minor* or Babies or Baby).ab,de,hw,nt,ti.

2 (advert* or (market* adj2 food) or (market* adj2 supermarket) or (market* adj2 buy*) or (promot* adj2 food) or (promot* adj2 supermarket) or (promot* adj2 buy*) or (promot* adj2 food) or (promot* adj2 supermarket) or (promot* adj2 buy*) or commercials or "TV commercial*" or "Television commercial*" or "radio commercial*" or "media commercial*" or digital adver* or digital market* or Mobile app* or Mobile application* or advergam* or Facebook or Instagram or Twitter or Snapchat or Youtube or Weibo or Wechat or Youku).ab,de,hw,nt,ti.

3 (food* or beverage* or Cola or Colas or Soda or sodas or (fizzy adj2 drink*) or (carbonated adj2 drink*) or (soft adj drink*) or high salt* or high fat* or high sugar* or snack* or sweet* or Meal* or HFSS).ab,de,hw,nt,ti.

4 (celebrit* or endors* or influencer* or ((professional or elit* or famous or public or renown* or well-known or acclaim* or eminent or prominent or illustrious or recogniz* or reput* or influential or wealth* or power*) adj1 (person* or people or figure* or leader or athlete* or player or bodybuilder or sport* or basketball or football or hockey or baseball or soccer or Olympian or singer* or songwriter* or musician* or band or group or rapper* or artist* or actor* or actress or star or Hollywood or Bollywood or Nollywood or dancer or writer or author or comedian or performer or model* or supermodel* or chef or philanthropist or politic* or president or minister or king or queen or prince* or monarch))) .ab,de,hw,nt,ti.

5 (intake* or calori* or consumption* or food choice* or eating behavio* or snacking behavio* or preference* or favour* or favor* or purchas* or buy* or spend* or pester* or request* or liking).ab,de,hw,nt,ti.

6 1 and 2 and 3 and 4 and 5

Web of Science

#1 TS= (child* OR youth* OR adolescen* young people OR Young person* OR boy* OR girl* OR teen* OR Infant* OR preschool* OR toddler* OR minor* OR Babies OR Baby) Indexes=SSCI, ESCI

#2 TS=(advert* or (market* adj2 food) or (market* adj2 supermarket) or (market* adj2 buy*) or (promot* adj2 food) or (promot* adj2 supermarket) or (promot* adj2 buy*) or (promot* adj2 food) or (promot* adj2 supermarket) or (promot* adj2 buy*) or commercials or "TV commercial*" or "Television commercial*" or "radio commercial*" or "media commercial*" or digital adver* or digital market* or Mobile app* or Mobile application* or advergam* or Facebook or Instagram or Twitter or Snapchat or Youtube or Weibo or Wechat or Youku)

Indexes=SSCI, ESCI

#3 TS= (food* or beverage* or Cola or Colas or Soda or sodas or (fizzy adj2 drink*) or (carbonated adj2 drink*) or (soft adj drink*) or high salt* or high fat* or high sugar* or snack* or sweet* or Meal* or HFSS) Indexes=SSCI, ESCI

#4 TS=(celebrit* or endors* or influencer* or ((professional or elit* or famous or public or renown* or well-known or acclaim* or eminent or prominent or illustrious or recogniz* or reput* or influential or wealth* or power*) adj1 (person* or people or figure* or leader or athlete* or player or bodybuilder or sport* or basketball or football or hockey or baseball or soccer or Olympian or singer* or songwriter* or musician* or band or group or rapper* or artist* or actor* or actress or star or Hollywood or Bollywood or Nollywood or dancer or writer or author or comedian or performer or model* or supermodel* or chef or philanthropist or politic* or president or minister or king or queen or prince* or monarch) Indexes=SSCI, ESCI

#5 TS= (intake* or calori* or consumption* or food choice* or eating behavio* or snacking behavio* or preference* or favour* or favor* or purchas* or buy* or spend* or pester* or request* or liking) Indexes=SSCI, ESCI

#6 (((#5) AND #4) AND #3) AND #2) AND #1 Indexes=SSCI, ESCI

SCOPUS

1 TITLE-ABS-KEY (child* OR youth* OR adolescen* OR "young people" OR "young person*" OR boy* OR girl* OR teen* OR infant* OR preschool* OR toddler* OR minor* OR babies OR baby)

2 TITLE-ABS-KEY (advert* OR (market* W/2 food) OR (market* W/2 supermarket) OR (market* W/2 buy*) OR (promot* W/2 food) OR (promot* W/2 supermarket) OR (promot* W/2 buy*) OR commercials OR "TV commercial*" OR "Television commercial*" OR "radio commercial*" OR "media commercial*" OR (digital W/2 adver*) OR (digital W/2 market*) OR (mobile W/2 app*) OR (mobile W/2 application*) OR advergam OR facebook OR instagram OR twitter OR snapchat OR youtube OR weibo OR wechat OR youku)

3 TITLE-ABS-KEY (food* OR beverage* OR cola OR colas OR soda OR sodas OR (fizzy W/2 drink*) OR (carbonated W/2 drink*) OR (soft W/2 drink*) OR "high salt*" OR "high fat*" OR "high sugar*" OR snack* OR sweet* OR meal* OR hfss)

4 TITLE-ABS-KEY (celebrit* or endors* or influencer* or ((professional or elit* or famous or public or renown* or well-known or acclaim* or eminent or prominent or illustrious or recogniz* or reput* or influential or wealth* or power*) W/1 (person* or people or figure* or leader or athlete* or player or bodybuilder or sport* or basketball or football or hockey or baseball or soccer or Olympian or singer* or songwriter* or musician* or band or group or rapper* or artist* or actor* or actress or star or Hollywood or Bollywood or Nollywood or dancer or writer or author or comedian or performer or model* or supermodel* or chef or philanthropist or politic* or president or minister or king or queen or prince* or monarch)))

5 TITLE-ABS-KEY (intake* OR calori* OR consumption* OR "food choice*" OR "eating behavio*" OR "snacking behavio*" OR preference* OR liking OR favor* OR favour* OR purchas* OR buy* OR spend* OR request* OR pester*)

6 (TITLE-ABS-KEY ((child* OR youth* OR adolescen* OR "young people" OR "young person*" OR boy* OR girl* OR teen* OR infant* OR preschool* OR toddler* OR minor* OR babies OR baby))) AND (TITLE-ABS-KEY ((advert* OR (market* W/2 food) OR (market* W/2 supermarket) OR (market* W/2 buy*) OR (promot* W/2 food) OR (promot* W/2 supermarket) OR (promot* W/2 buy*) OR commercials OR "TV commercial*" OR "Television commercial*" OR "radio commercial*" OR "media commercial*" OR (digital W/2 adver*) OR (digital W/2 market*) OR (mobile W/2 app*) OR (mobile W/2 application* OR advergam OR facebook OR instagram OR twitter OR snapchat OR youtube OR weibo OR wechat OR youku))) AND (TITLE-ABS-KEY ((food* OR beverage* OR cola OR colas OR soda OR sodas OR (fizzy W/2 drink*) OR (carbonated W/2 drink*) OR (soft W/2 drink*) OR "high salt*" OR "high fat*" OR "high sugar*" OR snack* OR sweet* OR meal* OR hfss))) AND (TITLE-ABS-KEY ((intake* OR calori* OR consumption* OR "food choice*" OR "eating behavio*" OR "snacking behavio*" OR preference* OR liking OR favor* OR favour* OR purchas* OR buy* OR spend* OR request* OR pester*))) AND (TITLE-ABS-KEY ((celebrit* or endors* or influencer* or ((professional or elit* or

famous or public or renown* or well-known or acclaim* or eminent or prominent or illustrious or recogniz* or reput* or influential or wealth* or power*) W/1 (person* or people or figure* or leader or athlete* or player or bodybuilder or sport* or basketball or football or hockey or baseball or soccer or Olympian or singer* or songwriter* or musician* or band or group or rapper* or artist* or actor* or actress or star or Hollywood or Bollywood or Nollywood or dancer or writer or author or comedian or performer or model* or supermodel* or chef or philanthropist or politic* or president or minister or king or queen or prince* or monarch)))

PsycInfo

1 ("100" or "120" or "140" or "160" or "180" or "200").ag.

2 (child* OR youth* OR adolescen* young people OR Young person* OR boy* OR girl* OR teen* OR Infant* OR preschool* OR toddler* OR minor* OR Babies OR Baby).ti,ab,id.

3 1 or 2

4 exp Marketing/ or exp Advertising/ or exp digital marketing/ or exp social marketing/ or exp television advertising/ or commercials/ or exp media exposure/ or exp social media/

5 ((advert* or (market* adj2 food) or (market* adj2 supermarket) or (market* adj2 buy*) or (promot* adj2 food) or (promot* adj2 supermarket) or (promot* adj2 buy*) or commercials or "TV commercial*" or "Television commercial*" or "radio commercial*" or "media commercial*" or digital adver* or digital market* or mobile app* or mobile application* or advergam* or facebook or instagram or twitter or snapchat or youtube or weibo or yechat or youku).ti,ab,id.

6 4 or 5

7 Food/ or Fast food/ or exp "Beverages (Nonalcoholic)"/

8 (food* or beverage* or cola or colas or soda or sodas or (fizzy adj2 drink*) or (carbonated adj2 drink*) or (soft adj drink*) or high salt* or high fat* or high sugar* or snack or sweet* or meal or HFSS).ti,ab,id.

9 7 or 8

10 exp food intake/ or exp food preferences/ or exp "Rumination (Eating)"/ or exp eating behavior/ or exp consumer behavior/ or exp brand preferences/

11 (intake* or calori* or consumption* or food choice* or eating behavio* or snacking behavio* or preference* or "food preferences" or favour* or favor* or purchas* or "food purchas*" or buy* or spend* or pester* or request* or liking).ti,ab,id.

12 10 or 11

13 exp Famous Persons/ or exp Athletes/

14 (celebrit* or endors* or influencer* or ((professional or elit* or famous or public or renown* or well-known or acclaim* or eminent or prominent or illustrious or recogniz* or reput* or influential or wealth* or power*) adj1 (person* or people or figure* or leader or athlete* or player or bodybuilder or sport* or basketball or football or hockey or baseball or soccer or Olympian or singer* or songwriter* or musician* or band or group or rapper* or artist* or actor* or actress or star or Hollywood or Bollywood or Nollywood or dancer or writer or author or comedian or performer or model* or supermodel* or chef or philanthropist or politic* or president or minister or king or queen or prince* or monarch))).ti,ab,id.

15 13 or 14

16 3 and 6 and 9 and 12 and 15

17 limit 16 to yr="2019 -Current"

Cochrane

ID Search

#1 MeSH descriptor: [Child] explode all trees

#2 MeSH descriptor: [Infant] explode all trees

#3 MeSH descriptor: [Adolescent] explode all trees

#4 (child* or youth* or adolescen* or "young people" or "young person*" or boy* or girl* or teen* or infant* or preschool* or toddler* or minor* or babies or baby).ti,ab,id.

#5 MeSH descriptor: [Marketing] explode all trees

#6 MeSH descriptor: [Advertising as Topic] explode all trees

#7 MeSH descriptor: [Product Packaging] explode all trees

#8 MeSH descriptor: [Food Packaging] explode all trees

#9 MeSH descriptor: [Food Labeling] explode all trees

#10 MeSH descriptor: [Advertisement] explode all trees

#11 MeSH descriptor: [Social Marketing] explode all trees

#12 (advert* or (market* adj2 food) or (market* adj2 supermarket) or (market* adj2 buy*) or (promot* adj2 food) or (promot* adj2 supermarket) or (promot* adj2 buy*) or commercials or "TV commercial*" or "Television commercial*" or "radio commercial*" or "media commercial*" or digital adver* or digital market* or mobile app* or mobile application* or advergam* or facebook or instagram or twitter or snapchat or youtube or weibo or yechat or youku).ti,ab,id.

#13 MeSH descriptor: [Food] explode all trees

#14 MeSH descriptor: [Beverages] explode all trees

#15 MeSH descriptor: [Carbonated Beverages] explode all trees

#16 (food* or beverage* or cola or colas or soda or sodas or (fizzy adj2 drink*) or (carbonated adj2 drink*) or (soft adj drink*) or high salt* or high fat* or high sugar* or snack or sweet* or meal or HFSS).ti,ab,id.

#17 MeSH descriptor: [Famous Persons] explode all trees

#18 (((celebrit* or endors* or influencer* or ((professional or elit* or famous or public or renown* or well-known or acclaim* or eminent or prominent or illustrious or recogniz* or reput* or influential or wealth* or power*) adj1 (person* or people or figure* or leader or athlete* or player or bodybuilder or sport* or basketball or football or hockey or baseball or soccer or Olympian or singer* or songwriter* or musician* or band or group or rapper* or artist* or actor* or actress or star or Hollywood or Bollywood or Nollywood or dancer or writer or author or comedian or performer or model* or supermodel* or chef or philanthropist or politic* or president or minister or king or queen or prince* or monarch)))))).ti,ab,id.

#19 MeSH descriptor: [Eating] explode all trees

#20 MeSH descriptor: [Feeding Behavior] explode all trees

#21 MeSH descriptor: [Snacks] explode all trees

#22 MeSH descriptor: [Drinking] explode all trees

#23 MeSH descriptor: [Food Preferences] explode all trees

#24 MeSH descriptor: [Diet] explode all trees

#25 MeSH descriptor: [Diet, High-Fat] explode all trees

#26 MeSH descriptor: [Diet, Western] explode all trees

#27 MeSH descriptor: [Energy Intake] explode all trees

#28 (intake* or calor* or consumption* or food choice* or eating behavio* or snacking behavio* or preference* or favour* or favor* or purchas* or buy* or spend* or pester* or request* or liking).ti,ab,id

#29 #1 OR #2 OR #3 OR #4

#30 #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12

#31 #13 OR #14 OR #15 OR #16

#32 #17 OR #18

#33 #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28

#34 #29 AND #30 AND #31 AND #32 AND #33 with Cochrane Library publication date Between Jan 2009 and Dec 2019, in Cochrane Reviews, Cochrane Protocols, Trials, Clinical Answers, Editorials, Special collections

Proquest ASSIA

1 MAINSUBJECT.EXACT.EXPLODE("child") OR MAINSUBJECT.EXACT.EXPLODE("adolescent") OR

MAINSUBJECT.EXACT.EXPLODE("infant")

2 TI,AB(child* OR youth* OR adolescen* young people OR Young person* OR boy* OR girl* OR teen* OR Infant* OR preschool* OR toddler* OR minor* OR Babies OR Baby)

3 1 OR 2

4 MAINSUBJECT.EXACT.EXPLODE("Advertising") OR MAINSUBJECT.EXACT.EXPLODE("Advertisements") OR

MAINSUBJECT.EXACT.EXPLODE("Marketing") OR MAINSUBJECT.EXACT.EXPLODE("Packaging")

5 TI,AB(advert* or (market* adj2 food) or (market* adj2 supermarket) or (market* adj2 buy*) or (promot* adj2 food) or (promot* adj2 supermarket) or (promot* adj2 buy*) or (promot* adj2 food) or (promot* adj2 supermarket) or (promot* adj2 buy*) or commercials or "TV commercial*" or "Television commercial*" or "radio commercial*" or "media commercial*" or digital adver* or digital market* or Mobile app* or Mobile application* or advergam* or Facebook or Instagram or Twitter or Snapchat or Youtube or Weibo or Wechat or Youku)

6 4 OR 5

7 MAINSUBJECT.EXACT("Drinks") OR MAINSUBJECT.EXACT.EXPLODE("Food")

8 TI,AB(food* or beverage* or Cola or Colas or Soda or sodas or (fizzy adj2 drink*) or (carbonated adj2 drink*) or (soft adj drink*) or high salt* or high fat* or high sugar* or snack* or sweet* or Meal* or HFSS)

9 7 OR 8

10 MAINSUBJECT.EXACT("Eating behaviour") OR MAINSUBJECT.EXACT "Food consumption")

11 TI,AB(intake* or kalori* or consumption* or food choice* or eating behavio* or snacking behavio* or preference* or favour* or favor* or purchas* or buy* or spend* or pester* or request* or liking)

12 10 OR 11

13 TI,AB(celebrit* or endors* or influencer* or ((professional or elit* or famous or public or renown* or well-known or acclaim* or eminent or prominent or illustrious or recogniz* or reput* or influential or wealth* or power*) adj1 (person* or people or figure* or leader or athlete* or player or bodybuilder or sport* or basketball or football or hockey or baseball or soccer or Olympian or singer* or songwriter* or musician* or band or group or rapper* or artist* or actor* or actress or star or Hollywood or Bollywood or Nollywood or dancer or writer or author or comedian or performer or model* or supermodel* or chef or philanthropist or politic* or president or minister or king or queen or prince* or monarch)))

14 3 and 6 and 9 and 12 and 13

Table S3: Rationale for meta-analysis inclusion and data processing

Boyland 2013

Intervention = Branded crisps commercial with celebrity endorser (Walker's ad)

Comparison = Non-food commercial (control)

Excluded conditions = TV endorser in non-food context (Match of the Day) and savoury food commercial (not included)

Outcome = mean ad libitum consumption (kcal) of endorsed and non-endorsed snack, both were crisps (Walkers ready salted), but were labelled and verbally informed "Walker's" and "supermarket brand", time ns.

Conversions = Converted from g to kcal g using published Walkers nutritional info. <https://www.walkers.co.uk/crisps-range/walkers-crisps/ready-salted>

Coates 2019

Intervention = Influencer food marketing with disclosure + influencer food marketing with no disclosure

Comparison = Influencer non-food marketing with no disclosure (control)

Outcome = mean ad libitum intake (kcal) of endorsed and non-endorsed snack, both were chocolate biscuits (McVitie's digestives), but were labelled and verbally informed "McVitie's" and "Tesco's", 5 minutes.

Coates 2019

Intervention = Influencer unhealthy food marketing (chocolate cookies)

Comparison = Influencer non-food marketing (control)

Excluded condition = Influencer healthy food marketing (banana)

Intake = mean ad libitum intake (kcal) of unhealthy snacks (jelly candy and chocolate buttons), 10 minutes.

Excluded outcome = mean ad libitum intake of healthy snacks (carrot batons and seedless white grapes).

Figure S1: Trim and fill analysis

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. metatrim_ES_seES, egger
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Note: default data input format (theta, se_theta) assumed.

Meta-analysis

	Pooled	95% CI		Asymptotic		No. of
Method	Est	Lower	Upper	z_value	p_value	studies
Fixed	45.720	25.293	66.146	4.387	0.000	3
Random	56.351	8.500	104.201	2.308	0.021	

Test for heterogeneity: Q= 9.762 on 2 degrees of freedom (p= 0.008)
Moment-based estimate of between studies variance = 1396.957

Trimming estimator: Linear

Meta-analysis type: Fixed-effects model

iteration	estimate	Tn	# to trim	diff
1	45.720	4	1	6
2	37.252	5	2	2
3	14.405	5	2	1
4	14.405	5	2	0

Filled

Meta-analysis

	Pooled	95% CI		Asymptotic		No. of
Method	Est	Lower	Upper	z_value	p_value	studies
Fixed	14.405	-2.319	31.129	1.688	0.091	5
Random	14.405	-38.632	67.442	0.532	0.594	

Test for heterogeneity: Q= 37.581 on 4 degrees of freedom (p= 0.000)
Moment-based estimate of between studies variance = 3218.284

Figure S2: Bias assessment for experimental studies

