An objective assessment of children's exposure to brand marketing in New Zealand (Kids'Cam): a cross-sectional study

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Summary

Background Marketing promotes values of consumerism and overconsumption, and negatively affects children's wellbeing and psychological development. The threat marketing poses to planetary health is just being realised. However, little is known about children's exposure to marketing at an aggregate level. Using an objective method of wearable cameras, we aimed to determine the nature and extent of children's exposure to marketing.

Methods Kids'Cam was a cross-sectional study of children aged 11–13 years in New Zealand, from which we randomly selected a sample of 90 children. Children wore cameras from when they woke up until they went to sleep for four consecutive days (Thursday–Sunday) that captured images at an angle of 136° every 7 s for exposure to marketing. Marketing brands were categorised into three groups: core food and social marketing messages, harmful commodities (eg, non-core food, alcohol, and gambling), or other. Exposure rates by marketing medium, setting, and product category were calculated using negative binomial regression models.

Findings From June 21, 2014, to June 30, 2015, we recruited 168 children, and randomly selected data from 90 children for the present study. Children in this study were exposed to a mean of 554 brands per 10 h day (95% CI 491–625), nearly a brand a minute, through multiple mediums (predominantly brand labels [36% of exposures] and product packaging [22%]) and mostly in schools (43%) and at home (30%). Food and beverages (20% of exposures) were the dominant product category. The most pervasive marketing brands typically sold a range of products across more than one product category (eg, children were exposed to Nike on average 20 exposures per day). Children were exposed to more than twice as many harmful commodities (mean 76 per 10 h day [95% CI 55–105]) as core food and social marketing messages (32 [26–39]) per day.

Interpretation We found that children are repeatedly exposed to marketing through multiple mediums and across all settings, and our findings suggests that marketing privileges particular messages, for example, marketing of harmful commodities. Given the key role marketing plays in establishing and supporting consumption norms, and perpetuating the normalisation of overconsumption which contributes to environmental degradation, these findings suggest an urgent need to reduce marketing to promote planetary health.

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Introduction

Transdisciplinary research is urgently needed to address planetary health.[1] One of the major threats to planetary health is overconsumption, as recognised in the UN's Sustainable Development Goal number 12.[2] Patterns of overconsumption are established and reinforced by the commercial imperatives of business, and are represented by the public form of their appeal: marketing. This Article draws together marketing, epidemiology, social science, and public health expertise to consider the pervasiveness of marketing to children as a driving force of present and future overconsumption, and its threat to planetary health.

Marketing is a more powerful force in the lives of children today than ever before.[3] Internationally, concern is mounting that the commercialisation of childhood is beginning earlier and becoming more pervasive[4] and should be restricted through regulation.[5] The research literature offers an extensive understanding of the negative effect that marketing has on children's social and psychological development, including the link between marketing, materialistic attitudes and outcomes such as lower self-esteem, poor subjective wellbeing, and depression;[3,6] however, the threat that marketing poses to planetary health, by driving overconsumption, is only just being realised.[1] The WHO–UNICEF–*Lancet* Commission has identified exploitative advertising and marketing as an important threat to children, identifying fast food, sugar-sweetened beverages, alcohol, tobacco, e-cigarettes, and gambling as key products children are harmed by.[7] However, recent correspondence draws attention to the wider harms of marketing to children, including how marketing strategies in general (regardless of product class) shape children's health and wellbeing, and calling for further research to focus not only on "whether the

Research in context

Evidence before this study

We searched PubMed and Google Scholar for articles published between Jan 1, 1960, and Dec 31, 2018, using the key terms: "children" AND "advertising" OR "brand" OR "marketing". We used search terms in English but did not apply any language restrictions. We screened papers by title and abstract to identify full-text reports relevant to our aims. Papers were considered relevant if they reported on the nature and extent of children's exposure to marketing, or the effect of marketing on children. The literature offers an expansive understanding of the negative effect of marketing on children's social and psychological development. However, this literature is based on studies that focus on a single medium or product category. To our knowledge, there have been no academic studies since the 1970s that have reported total marketing exposure across various mediums and product categories, for either children or adults. Moreover, previous studies have largely used self-report, reporting by adults, or third-party observation.

Added value of this study

To our knowledge, these results present the first objective assessment of children's overall marketing exposure. Wearable cameras provided unprecedented access to children's marketing exposure throughout their day across the settings they inhabit.

Implications of all the available evidence

This research shows that children in New Zealand live in a highly commercialised world, and that they are exposed to a brand nearly every minute. Given the key role marketing plays in establishing and supporting consumption norms, and perpetuating the normalisation of overconsumption, there is an urgent need to reduce the level of marketing overall to promote planetary health.

product being marketed is healthy or unhealthy in a physical sense, but [also on] how marketing encourages forms of consumption that are potentially harmful for the whole child, the planet, and children's futures."[8]

Marketing prompts children's immediate desires and informs their brand preferences.[6] However, marketing also shapes and influences children's broader consumption values, including their attitudes towards materialism.[9–11] Thus, marketing provides a pervasive medium not only for explicitly promoting specific products but also for implicitly promoting the values of consumerism and overconsumption[12] that have broader and more wide-ranging social, cultural, and planetary health effects. The purpose of marketing is to promote and sell products, generally by associating them with idealised and aspirational values and socially attractive lifestyles.[13] Appealing images of family life, love, friendship, and pleasure presented in marketing copy convey the impression that a good, successful, and happy life can be secured through the consumption of material goods and services.[12] Given that commercial society is largely and systematically dependent on the insatiability of needs, one of marketing's roles is to foster consumers' desires, and to encourage and reinforce beliefs in the positive individual and social outcomes of continued consumption. Regardless of the particular products being promoted, this wider pro-consumption message has implications for children's socialisation and their wellbeing. For example, the assumption that the achievement of success and happiness is dependent on, and represented by, the acquisition of material possessions privileges a pattern of behaviour and a cycle of consumption underpinned by consumerist values and legitimised by social expectations. The normalisation of such values and their consequential behaviours are inimical to social wellbeing and planetary health.

To our knowledge, there have been no studies since the 1970s that have reported total marketing exposure across mediums and product categories, either for children or adults. This 1970s research estimated adult exposure using techniques such as predictive algorithms and estimates based on reported media engagement and ranged from 76 to 560 exposures per day.[14] Literature detailing the nature and extent of children's exposure to marketing is based on studies that focus on a single medium or product category.[14] Further, previous studies have largely used self-report, reporting by adults, or third-party observation.[14] In more recent years, the scope and scale of marketing to children has increased substantially,[15] and researchers across the globe have noted increasing commercial pressures on children.[16,17] Recent analysis of data from wearable cameras in the Kids'Cam study has enabled objective analysis of children's daily exposure to marketing in individual product categories (eg, food, alcohol, and gambling).[18–21] In this Article, we aimed to report on the nature and extent of children's exposure to marketing for all brands and mediums throughout the day in all settings to understand more about its ubiquity in children's lives. Specifically, the research objectives were to quantify total marketing exposure, including exposure by setting and medium; to examine the nature of that exposure, including in relation to harmful commodities, social marketing, core food, and other messages, and lastly, to examine differences in exposure by sex, ethnicity, and socioeconomic deprivation.

Methods

Study design

Kids'Cam was a cross-sectional study that used automated wearable camera devices to explore the everyday experiences of children and the world in which they live.[18] A total of 168 children aged 11–13 years were

	Participant number (n=90)
Sex	
Female	46 (51%)
Male	44 (49%)
Ethnicity	
New Zealand European	30 (33%)
Māori	30 (33%)
Pacific	30 (33%)
Household deprivation	
Low	27 (30%)
Moderate	32 (36%)
High	31 (34%)

Data are n (%). Household deprivation was defined using NZiDep: a New Zealand five-point index of socioeconomic deprivation for individuals, 25 which were grouped into low (no deprivation characteristics reported), moderate (two or three deprivation characteristics reported), and high (four or more deprivation characteristics reported).

Table 1: **Sociodemographic characteristics of the sample**

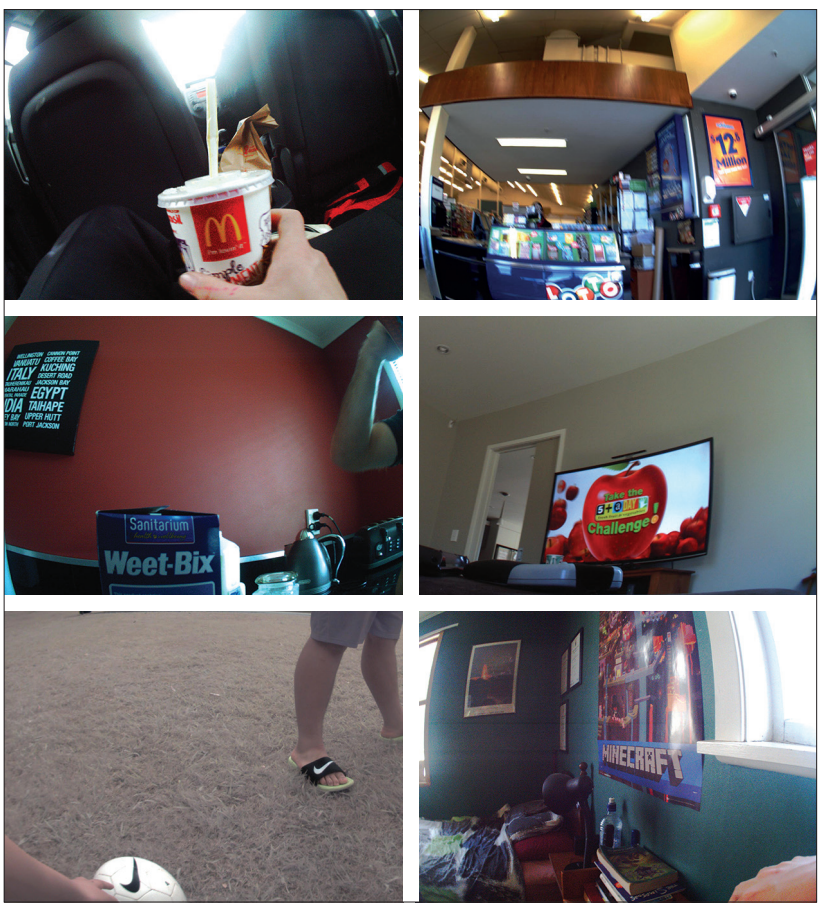

Figure 1: **Image examples of children's exposure to marketing**
(A) Harmful commodity: McDonald's food marketing. (B) Harmful commodity: Lotto gambling marketing. (C) Core food: Weet-bix food marketing. (D) Social marketing: five or more fruit or vegetables a day social marketing message. (E) Other: Nike sports equipment and clothing. (F) Other: Minecraft gaming poster.

randomly selected from 16 schools in the Wellington region of New Zealand (schools randomly selected with probability proportional to size of school). Each child was provided with a wearable camera (Autographer; OMG Life, Yarnton, UK). The camera captured a 136° image ahead of the wearer every 7 s. Children were asked to wear the devices from waking up to going to bed for 4 days consecutively: Thursday–Sunday. Data were collected over a 12 month period from June 21, 2014, to June 30, 2015. Ethical approval was obtained from the University of Otago Ethics Committee (Health; 13/220). Written assent was obtained from participating children, and formal consent obtained from children's parents or guardians and school principals. Full details of the Kids'Cam methods and sampling, including intercoder reliability and sample size determination are published elsewhere.[18,19]

For this study, due to the time-intensive nature of analysing all marketing images (as identified by the feasibility study[14]) the decision was made to analyse images from Thursdays and Saturdays of a random subsample of 90 participants stratified by sex, ethnicity, and deprivation. Thursday and Saturday were specifically chosen to capture both weekday and weekend marketing exposures. Thursday was perceived to be more representative of a normal weekday than Friday.

Image content analysis

Images were coded using manual content analysis by an experienced coder (RG) in 2018. Marketing exposures were based on the WHO classification for marketing, and defined as "any form of commercial communication or message that is designed to, or has the effect of, increasing recognition, appeal and/or consumption of particular products and services. This includes anything that acts to advertise or otherwise promote a product or service".[22] Coding was based on a four-tier framework, including the marketing brand name, setting, marketing medium, and product category (appendix pp 1–6).

See **Online** for appendix

For marketing to be included, at least 50% of the marketing content (eg, brand) must have been in clear view in the photographs. A marketing exposure was considered finished when three consecutive images (21 s) passed without the presence of the brand or its associated marketing.

To gain more detail on the nature of marketing, following coding, marketing exposures were categorised into one of three health-related categories: harmful commodity, social marketing and core food, and other. The harmful commodity category included all alcohol-related logos, including alcohol products and alcohol outlets, all tobacco and gambling logos, and non-core food.[23] The social marketing and core food category included social marketing messages and core food (appendix pp 1–6). Social marketing messages typically promote healthy behaviour (eg, smoke free and antigambling campaigns). Definitions for core and non-core foods and beverages were based on the WHO Regional Office for Europe Nutrient Profile Model,[24] and

previous Kids'Cam research. Non-core foods and beverages included those not recommended for marketing to children, including confectionery and sugary drinks.[24] The other category included all other product categories (eg, electronics and technology, clothing, and media brands). The full list of coding protocol definitions can be found in the appendix (pp 1–6).

Data analysis

All statistical analyses were done in Stata 15. Mean daily exposure rates to commercial marketing by brand, setting, marketing medium, and product category were estimated using negative binomial regression models, represented by the count of individual exposures divided by the exposure duration. Exposure duration was estimated by multiplying the number of images captured by each participant's camera by the median capture rate (7 s), with one day specified as 10 h of images. All analyses accounted for the differential probability of selection into the study, using Stata's svy commands and associated weighting options (including clustering of responses by school). Additional descriptive analyses summarised the number of unique brand exposures and mean duration of marketing exposures. Differences in rates of exposure to commercial marketing by sex, ethnicity, and socioeconomic status were explored using multivariable negative binomial regression models. For the sociodemographic comparisons, a measure in New Zealand of individual household deprivation (NZiDep) was used. An individual's NZiDep score is based on a series of questions that relate to eight deprivation characteristics.[25] NZiDep is a five-point index, with index scores ranging from one (no deprivation characteristics reported) to five (five or more deprivation characteristics reported). NZiDep scores were grouped into low (score 1), moderate (scores 2, 3), and high (scores 4, 5) deprivation categories.

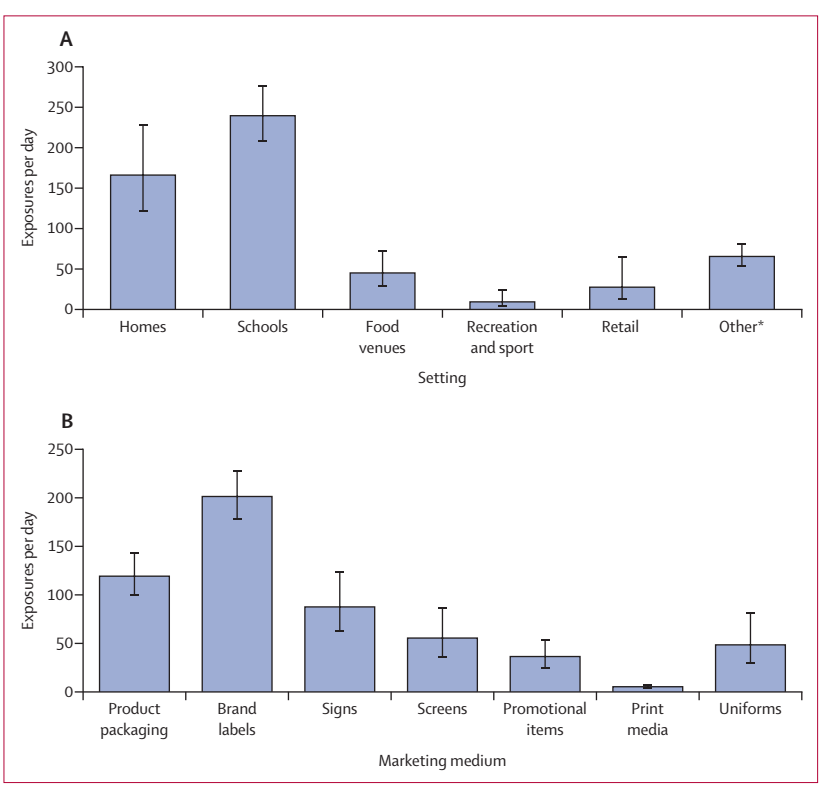

Figure 2: **Mean exposure (95% CI) to marketing per 10 h day by setting and marketing medium**
*Streets, community venues, private transport, public transport facilities, and public transport vehicles.

Results

Data were collected between June 21, 2014, and June 30, 2015, from which we selected a random subsample of 90 participants (table 1). The participants' cameras captured a mean of 4374 images (SD 2247) in the study period, representing a mean recording of 8·5 h per child (SD 4·4). Recording hours were significantly higher on Thursday (mean 5·9 h [SD 2·7]) than on Saturday (2·6 [2·0]). Image coding identified 43 697 marketing exposures over the study period, 22 216 (51%) of which were repeat exposures to the same brand (ie, logos that were encountered by the same participant more than once on the same day). Children were exposed to a total of 3571 unique brand names (eg, Nike). Nearly half (20 190; 46%) of marketing exposures lasted for just one image (ie, less than 7 s), and 39 461 (90%) of exposures lasted ten images or less (≤70 s). A small proportion of exposures (479; 1%) lasted longer than 50 images (6 min). Longer durations of exposure typically occurred when the participant was sitting in a fixed position, for example, playing or working on a computer, sitting at desks at school, or watching television (appendix p 6).

After conversions to daily (10 h) rates, participants had a mean of 554 (95% CI 491–625) marketing exposures per day, or almost one brand a minute (figure 1; appendix pp 7–8).

Children were exposed to marketing most often in schools (240 exposures per day; 43%) and at home (166; 30%; figure 2). Marketing was mostly seen on either brand labels (201 exposures per day; 36%), product packaging (119; 22%), followed by signs (88; 16%), and screens (55; 10%). Food and beverages was the most encountered product category (111; 20%), followed by clothing (67; 12%), and electronics and technology (52; 9%; table 2).

Nike (20 exposures per day), Adidas (16), and Samsung (seven) were the most common brands (table 3). Heavily encountered brands typically sold a range of products across more than one product category. For example, Nike and Adidas exposures included branding on clothing and sports equipment.

Participants were exposed to more than twice as many harmful commodity brands per 10 h day (mean 76 [95% CI 55–105]) as social marketing and core food brands (32 [26–39]). Harmful commodity marketing included a mean of 68 exposures per day to non-core food, six exposures to alcohol, and two to gambling. Exposure to tobacco marketing was rare (less than

	Mean exposures per day (95% CI)	Percentage of total exposures
Food and beverages	111 (88–140)	20·1%
Clothing	67 (48–94)	12·1%
Education	52 (31–86)	9·4%
Electronics and technology	52 (41–65)	9·4%
Retail	42 (27–66)	7·6%
Computer applications and websites	30 (17–53)	5·4%
Media brands	27 (22–33)	4·8%
Stationery	26 (19–34)	4·6%
Automotive	23 (19–28)	4·1%
Fashion accessories	17 (10–28)	3·0%
Sports teams	15 (10–22)	2·8%
Games	14 (8–22)	2·5%
Health and beauty	10 (7–14)	1·8%
Sports equipment	9 (7–13)	1·7%
Organisations and clubs	9 (6–14)	1·6%
Household goods	8 (5–12)	1·4%
Social marketing messages	7 (4–10)	1·2%
Home appliances	6 (4–10)	1·1%
Alcohol	6 (4–9)	1·0%
Public service providers	5 (4–6)	0·9%
Hardware	4 (2–9)	0·8%
Telecommunications	3 (1–6)	0·5%
Gambling	2 (1–3)	0·4%
Music	2 (1–4)	0·4%
Toys	2 (1–4)	0·4%
Festival and event	2 (1–5)	0·3%
Miscellaneous	2 (1–3)	0·3%
Medicines	1 (0–4)	0·2%
Celebrity	0 (0–1)	0·1%
Home furnishing	0 (0–1)	0·1%
Jewellery	0 (0–1)	0·1%
Pet related	1 (0–1)	0·1%
Tobacco	0 (0–0)	0·1%

Table 2: **Mean rate of exposure to marketing brands per 10 h per day by product category**

	Rate (95% CI)	Percentage of total	Product categories
Nike	20 (14–30)	3·7%	Clothing, fashion accessories, and sports equipment
Adidas	16 (12–22)	2·9%	Clothing, fashion accessories, and sports equipment
Samsung	7 (5–10)	1·2%	Electronics and technology, and home appliances
Puma	7 (4, 12)	1·2%	Clothing, fashion accessories, and sports equipment
Google Chrome	7 (4–12)	1·2%	Computer applications and websites
Windows	7 (4, 11)	1·2%	Computer applications and websites, and electronics and technology
Coca-Cola	6 (4–10)	1·1%	Food and beverages
Toyota	6 (4–8)	1·1%	Automotive
Impact	5 (3–9)	0·9%	Stationery
Acer	5 (2–9)	0·9%	Electronics and technology

Table 3: **Brand names with the highest exposure rates per 10 h per day**

	Total brands	Social marketing and core food brands	Harmful commodity brands	Other brands
Sex				
Female	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Male	1·01 (0·82–1·24)	0·98 (0·63–1·54)	1·07 (0·65–1·78)	1·00 (0·80–1·23)
Ethnicity				
New Zealand European	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Māori	0·99 (0·78–1·27)	0·73 (0·51–1·04)	0·71 (0·42–1·22)	1·08 (0·88–1·33)
Pacific	1·03 (0·78–1·36)	0·98 (0·63–1·54)	0·96 (0·51–1·82)	1·06 (0·84–1·33)
Household deprivation				
Low	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Moderate	1·00 (0·75–1·35)	0·64 (0·37–1·11)	1·40 (0·84–2·34)	0·97 (0·73–1·30)
High	1·12 (0·89–1·41)	1·31 (0·85–2·01)	1·87 (1·03–3·39)	1·00 (0·78–1·28)

Data are rate ratios (95% CI).

Table 4: **Rate ratios from negative binomial regression, accounting for total, healthy, unhealthy, and other brand exposures, from model accounting for sex, ethnicity, and household deprivation**

one exposure per day on product packaging only). Social marketing and core food brand marketing included 26 exposures a day to core food and seven exposures a day to social marketing messages, the most common of which was smoke-free marketing. Most (80%) participants' marketing exposures were in the other marketing category with a mean of 445 exposures per day.

Children from the highest deprivation households were exposed to significantly more harmful commodity brands than children from lowest deprivation households (rate ratio 1·87 [95% CI 1·03–3·39]). There were no significant differences in total marketing exposures, other exposures, or social marketing and core food exposures by sex, ethnicity, or NZiDep (with mutual adjusted for sociodemographic variables; table 4).

Discussion

Most marketing exposures occurred in school, at home, and in-store, most commonly on brand labels, product packaging, and signage. This research suggests that children live in a highly commercialised world, one that exposes them to a brand nearly every minute.

Children's high marketing exposure in school is of concern. Research literature suggests that marketing to children in schools presents serious threats to children's education and to their psychological and physical wellbeing.[5] Regardless of the nature of that marketing, ethically it can be argued that marketing in schools is morally unjustified because children in schools are a captive audience and one that is vulnerable to the persuasive appeals of marketing, especially when they are endorsed in a context of implicit institutional authority.[26] The nature of these exposures and their effect on children in school is an area for future research.

The findings also suggest marketing privileges commercial messages and sidelines the voice of alternative social marketing and not-for-profit messages.[16] Our

analysis identifies dominant product categories (food and beverages), repetitive exposure to key brands (Nike, Adidas, and Samsung), and the dominance of marketing harmful products. A subanalysis found that participants were exposed to more than twice as many harmful commodity brands per day than healthy brands, including non-core foods, alcohol, and gambling.

Children from the most deprived households were exposed to significantly more harmful commodity brands than those from the least deprived households. This finding is concerning given the high rates of obesity, alcohol, and gambling harm in socioeconomically deprived neighbourhoods,[27] and suggests that marketing messages might accentuate inequities and place further pressure on individuals who are already disadvantaged.

To our knowledge, these results present the first objective assessment of children's overall marketing exposure. Wearable cameras provided unprecedented access to children's brand exposure throughout their day across the settings they inhabit.

The study has some limitations. First, the children might not be looking in the direction of the camera. However, given the extent of marketing, it is also possible that they were exposed to additional unrecorded marketing. Second, exposure is likely to be underestimated owing to the study's conservative coding rule that 50% or more of the content should be visible. Third, marketing on screen was under-reported owing to the still photography and poor screen capture due to poor lighting.[27] Children's exposure to digital marketing is increasing and brings unique concerns for their exposure to harmful commodities and their ability to critically understand digital marketing techniques.[17] Addressing the limitations of the current method to fully understand the nature and extent of screen exposure is an important area of research that will be addressed in a new pilot study utilising software to record screen exposure.[28] Finally, due to the sample size some analyses (eg, comparisons of exposure rates by sociodemographic group) might have had suboptimal power to detect differences between groups and should be interpreted with caution.

This study produced innovative research that provides evidence of the ubiquity of marketing and raises concern about its role in promoting products directly harmful to public health, and patterns of overconsumption which increasingly threaten planetary health. Although the small sample size limits generalisability, use of this method in other jurisdictions and across age groups is warranted to better understand the global reach and nature of marketing.

Given the key role marketing plays in establishing and supporting consumption norms, and normalising overconsumption, these findings suggest an urgent need to reduce the level of marketing overall. This research suggests that there is a need for specific policy in relation to marketing in schools and in public places to reduce the harms related to overall exposure. Further, there is a need for marketing bans on harmful commodities, similar to the ban on tobacco marketing in New Zealand. The low exposure to tobacco marketing found in this study demonstrates the value of such a ban. It should be noted that since these data were collected, New Zealand introduced a ban on tobacco marketing on product packaging (the key medium of the limited exposure in this study).

The UN has called on member states to reduce the level of commercial marketing; to identify spaces that should be free of marketing, such as schools, and, to ensure a diversity of messages.[16] This study offers the first objective data at an aggregate level on which to inform these policy discussions. The cities of São Paulo (Brazil) and Grenoble (France) have set precedents by restricting all marketing in public spaces[29,30] and Quebec has restricted all child-targeted commercial advertising to children younger than age 13 years since 1980.[31] However, the growth of online marketing is an ever increasing challenge that must also be understood and responded to.[17,28]

In conclusion, this study found that children are constantly exposed to marketing through multiple mediums and across all settings, including messages predominantly promoting unhealthy relative to healthy commodities. Documenting the nature and extent of marketing exposure is a key step to understand and break the cycle of overconsumption that threatens the health of the planet.[2] Although this is a small study from New Zealand, given the global nature of marketing, it is likely to be of relevance to other high-income nations. As current and continued increases in consumption are unsustainable, policies are needed to reduce marketing and promote sustainable and healthy consumption practices to improve planetary health.

Contributors
LW and RA designed the study. LS and MS contributed to the design of, and data collection for, the Kids'Cam study. RG undertook the data coding and analysis for this study; LS and LW verified the underlying data. All authors contributed to data interpretation and writing.

Declaration of interests
We declare no competing interests.

Data sharing
Image data used in this study were collected under a data sharing agreement and cannot be made available to others. Deidentified data and codes for statistical analysis can be made available on request by contacting the corresponding author.

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References

1 Whitmee S, Haines A, Beyrer C, et al. Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–*Lancet* Commission on planetary health. *Lancet* 2015; **386:** 1973–2028.

2 United Nations. Sustainable development knowledge platform: Sustainable Development Goal 12 ensure sustainable consumption, 2017. https://sustainabledevelopment.un.org/sdg12 (accessed Dec 5, 2019).

3 Bailey R. Letting children be children. Report of an independent Review of the commercialisation and sexualisation of childhood. The Stationery Office, 2011. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/175418/Bailey_Review.pdf (accessed Jan 4, 2021).

4 Blades M, Caroline O, Fran B, et al. Advertising to children: new directions, new media. London: Palgrave Macmillan, 2014.

5 Molnar A, Faith B, Ken ML, et al. Schoolhouse commercialism leaves policymakers behind—the sixteenth annual report on schoolhouse commercializing trends: 2012–2013. Boulder, CO: National Education Policy Center, 2014.

6 Nairn A, Ormrod J, Bottomley P. Watching, wanting and wellbeing: exploring the links—a study of 9 to 13 year-olds. London: National Consumer Council, 2007.

7 Clark H, Coll-Seck AM, Banerjee A, et al. A future for the world's children? A WHO–UNICEF–*Lancet* Commission. *Lancet* 2020; **395:** 605–58.

8 Powell D. Harmful marketing to children. *Lancet* 2020; **396:** 1734–35.

9 Valkenburg PM, Peter J. Comm research—views from Europe. Five challenges for the future of media-effects research. *Int J Commun* 2013; **7:** 2013.

10 Opree SJ. Consumed by consumer culture? Advertising's impact on children's materialism and life satisfaction. PhD thesis, Amsterdam School of Communication Research, 2014.

11 Francisco Dávila J, Casabayó M. Influences in children's materialism: a conceptual framework. *Young Consumers* 2013; **14:** 297–311.

12 Smart B. Consumer society: critical issues and environmental consequences. London: SAGE Publications, 2010.

13 Keller KL, Lehmann DR. Brands and branding: research findings and future priorities. *Mark Sci* 2006; **25:** 740–59.

14 Watkins L, Aitken R, Gage R, et al. Capturing the commercial world of children: the feasibility of wearable cameras to assess marketing exposure. *J Consum Aff* 2018; **53:** 1395–420.

15 Common Sense Media. Advertising to children and teens: current practices. New York, NY: Common Sense Media, 2014.

16 UN General Assembly. Report of the special rapporteur in field of cultural rights. United Nations, 2014.

17 Clarke B, Svanaes S. Digital marketing and advertising to children: a literature review. London: Advertising Education Forum, 2012.

18 Signal LN, Smith MB, Barr M, et al. Kids'Cam: an objective methodology to study the world in which children live. *Am J Prev Med* 2017; **53:** e89–95.

19 Signal LN, Stanley J, Smith M, et al. Children's everyday exposure to food marketing: an objective analysis using wearable cameras. *Int J Behav Nutr Phys Act* 2017; **14:** 137.

20 Chambers T, Stanley J, Signal L, et al. Quantifying the nature and extent of children's real-time exposure to alcohol marketing in their everyday lives using wearable cameras: children's exposure via a range of media in a range of key places. *Alcohol Alcohol* 2018; **53:** 626–33.

21 Smith M, Chambers T, Abbott M, et al. High stakes: children's exposure to gambling and gambling marketing using wearable cameras. *Int J Ment Health Addict* 2020; **18:** 1025–47.

22 WHO. A framework for implementing the set of recommendations on the marketing of foods and non-alcoholic beverages to children. Geneva: World Health Organization, 2012.

23 Knai C, Petticrew M, Capewell S, et al. The case for developing a cohesive systems approach to research across unhealthy commodity industries. *BMJ Global Health* 2021; **6:** e003543.

24 WHO Regional Office for Europe. WHO Regional Office for Europe Nutrient Profile Model. Copenhagen: World Health Organization Regional Office for Europe, 2015.

25 Salmond C, Crampton P, King P, et al. NZiDep: a New Zealand index of socioeconomic deprivation for individuals. *Social Sci Med* 2006; **62:** 1474–85.

26 Abbarno GJM. Huckstering in the classroom: limits to corporate social responsibility. *J Bus Ethics* 2001; **32:** 179–89.

27 Ministry of Health. Annual update of key results 2018/18: New Zealand health survey. Wellington: Ministry of Health, 2019.

28 Vaipuna T, Allison L, Bhasin A, et al. An objective methodology capturing online commodity marketing and other harms. *Health Promot Int* 2020; **35:** 1312–20.

29 Hopkins S. French city becomes the first in Europe to ban street advertising...and replaces all posters with trees and signs for community groups. *The Daily Mail* (London), Nov 24, 2014.

30 Mahdawi A. Can cities kick ads? Inside the global movement to ban urban billboards. *The Guardian* (London), Aug 12, 2015.

31 Quebec Office de la Protection du Consommateur. Advertising directed at children. https://www.opc.gouv.qc.ca/en/consumer/topic/illegal-practice/advertising-children (accessed Dec 5, 2019).