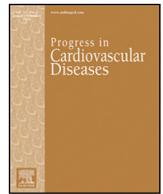




Contents lists available at ScienceDirect

Progress in Cardiovascular Diseases

journal homepage: www.onlinepcd.com



Outcomes of Healthy Eating Ad Campaigns: A Systematic Review ★

Eulàlia P. Abril ^{a,*}, Paula R. Dempsey ^b

^a Department of Communication, University of Illinois at Chicago, 1152B BSB (MC132), 1007 W Harrison St, Chicago, IL 60607, United States of America

^b Assistant Professor and Head Librarian, Richard J. Daley Library, University of Illinois at Chicago, 801 S Morgan St, Chicago, IL 60607, United States of America



ARTICLE INFO

Article history:
28 December 2018
28 December 2018

Keywords:
Healthy-eating ads
Social marketing
Obesity
Effectiveness
Systematic review

ABSTRACT

Social marketing campaigns seeking to promote healthy eating hold promise in precision messaging and behavior change related to a key component of healthy living medicine. A systematic review that examines the behaviors promoted against their success is lacking. Of interest is the consideration of stop or go behaviors, such as not eating fast food or increasing the consumption of fruits and vegetables, respectively. We systematically searched five databases for peer-reviewed quantitative articles examining healthy eating campaigns that included at least one ad. We found evidence that campaigns with both stop and go outcomes (such as swapping) and outcomes that were not clarifying whether they were stop or go (such as calling a coach) tended to be more successful than campaigns with simple stop or go outcomes. Further, campaigns that were longer than six months seemed consistently successful. However, with 14 included studies, it is clear that further research is needed.

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Abbreviations and acronyms: AEJMC, Association for Education in Journalism and Mass Communication; CSCA, Central States Communication Association; CVD, Cardiovascular disease; F&V, Fruits and vegetables; ICA, International Communication Association; NCA, National Communication Association; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses; RCT, Randomized Controlled Trial; T2D, Type 2 Diabetes; TV, Television; UK, United Kingdom; USA, United States of America.

★ Statement of conflict of interest: See page 43.

* Address reprint requests to Eulàlia P. Abril, Associate Professor, Department of Communication, University of Illinois at Chicago, 1152B BSB (MC132), 1007 W Harrison St, Chicago, IL 60607, United States of America.

E-mail addresses: eulalia@uic.edu (E.P. Abril), dempsey@uic.edu (P.R. Dempsey).

Social marketing campaigns for better health have had success in reducing smoking prevalence,¹ drinking and driving,² and several other public health outcomes (see Wakefield, Loken, and Hornik)³ including healthy eating (e.g., Cismaru and Lavack⁴; Dixon, Scully, Cotter, Maloney, and Wakefield⁵). Healthy eating comprises both intake of healthy foods (e.g., fresh fruits and vegetables, whole grains, lean protein) and low intake of unhealthy foods (e.g., fast food). However, while there are systematic assessments (in the form of systematic reviews) as to the effectiveness of smoking-prevention ad campaigns (see for instance Niederdeppe, Kuang, Crock, and Skelton),⁶ little is known about the effectiveness of social marketing campaigns as they

pertain to healthy eating behaviors—with one notable exception.⁷ However, the study by Kite et al.⁷ was more focused on analyzing the extent to which obesity-prevention mass media campaigns adhered to best practices, and the authors mixed different types of campaigns (food, beverages, and exercise mass media campaigns) and methodologies (quantitative and qualitative). But it is unclear from their review – and from the literature – whether ad campaigns are more effective in promoting the consumption of healthy foods or preventing that of unhealthy foods. This has relevance in the context of precision in healthy living medicine, using focused and uniquely tailored messaging campaigns to improve dietary patterns in those at highest risk for consuming unhealthy foods.

Shedding light on this lacuna is important because inadequate healthy eating leads to obesity, a major problem in the United States of America (USA), with two thirds of the population afflicted,⁸ and a major risk factor for cardiovascular disease (CVD), stroke, and type-2 diabetes (T2D).⁹ Moreover, this issue is important from a resource allocation perspective; determining the most effective mass media campaign approaches can have remarkable potential in making a positive impact.^{4,5}

The primary aim of the current paper is to conduct a systematic review of quantitative studies analyzing healthy eating ad interventions (experimental and otherwise) to: 1) evaluate outcomes in terms of stop (unhealthy), go (healthy), or both stop and go outcomes; 2) examine the nature of these studies in terms of methodologies, populations, and intervention characteristics; and 3) identify research gaps that should be addressed and provide recommendations for ad campaigns to curb obesity and promote healthy living.

Methods

Data sources and search strategy

The search was conducted for studies published from January 1, 2000 (when research in this field began to emerge¹⁰) to October 19, 2018, in the following electronic databases: EBSCOhost platform: *Academic Search Complete, Business Source Premier, CINAHL Plus with Full Text, Communication & Mass Media Complete, Health Source: Nursing/Academic Edition*; EMBASE; ProQuest platform: *ABI/INFORM Global, PAIS Index, PsycINFO, Sociological Abstracts*; PubMed; and Scopus.

Search terms were kept as consistent as possible across each database platform. Keywords were searched in the title, abstract, and controlled vocabulary related to the following topics using the connectors AND and OR to combine the following search terms: 1) Social marketing (e.g., PSAs, public messaging); 2) ad or ads (e.g., commercial, advertisement); 3) food and its negative outcomes (e.g., obesity, hypertension); and 4) distal outcomes of the ad (e.g., purchasing fruits & vegetables, weight loss), which align with the Hierarchy of Effects Model.¹¹

Additionally, a call for unpublished studies and studies under review was sent to the Facebook groups of International Communication Association (ICA), National Communication Association (NCA), Association for Education in Journalism & Mass Communication, (AEJMC), and Central States Communication Association (CSCA)'s Health Communication Divisions on October 5, 2018, with no responses received. Additionally, the reference lists of included studies were examined for potentially relevant studies.

After executing the search strategies, we imported all references ($N = 1153$) into Zotero citation manager. Duplicates were removed ($N = 307$), first using the automatic function in Zotero and then by visually scanning the list. The remaining references were uploaded into the Rayyan QCRI systematic review tool (<https://rayyan.qcri.org/>), where the lead author screened references for inclusion.

Eligibility criteria and study selection process

Studies were considered eligible for inclusion if they met the following criteria: 1) the study used quantitative methods or mixed methods as long as the quantitative analysis could be isolated; 2) the independent variable included healthy eating ad(s) in any format (print,

audio, audiovisual); 3) the ad(s) included food-related themes; and 4) the dependent variable was a distal effect of (direct or indirect) or a relationship with the ad (causality was not necessary), that is, a behavior: e.g., food purchased, portion size eaten, nutrition value of food purchased, body mass index, but not exercise- or beverage-related outcomes. Reviews, editorials, opinions, announcements, and letters were excluded. Meeting abstracts were included only if the methods provided enough detail to assess the criteria listed above.

The lead author examined the title and abstract of each article in order to identify studies for inclusion. Next, the second author acquired the full text of studies that appeared eligible based on the first screening. The lead author made a final decision regarding inclusion or exclusion based on the criteria above upon reading the manuscripts in their entirety. Fig. 1 presents a flow diagram of included studies.

Assessment of risk of bias in included studies

Because we allowed any quantitative method to be included in our review, we did not go through the assessment of risk of bias in included studies. However, results are provided against the validity of the methods used in each of the included studies.

Data analysis and synthesis

Only actual social marketing campaigns that included at least one ad were considered. The analysis centers on the campaign as a whole as represented by the ad(s), not the specific content or characteristics of the ads,¹² though if some features were salient, they would be considered. Data analysis was conducted manually by the lead author synthesizing the results from each study in the fields shown in Table 1.

Literature search results

For the 846 unique articles identified in the database searches, we selected 67 for full-text inclusion review. The selection was based on examination of title and abstract for each of the 846 articles. After this examination, of the 67 articles reviewed, we excluded 53 for the reasons provided in Table 2.

The remaining 14 studies were included in the analysis, comprising the following campaigns: 1) *1% low-fat milk has perks!* (US); 2) *Change4Life Smart Swaps* (United Kingdom, UK); 3) *Choose Less, Weigh Less* (US); 4) *Five a Day* (UK); 5) *Get Healthy Information and Coaching Service* (Australia); 6) *Go for 2&5@* (Australia); 7) *Healthy Dining Program* (US); 8) *LiveLighter* (Australia); 9) *Maak je niet dik! (Don't get fat!)* (The Netherlands); 10) *Measure-Up* (Australia); and 11) *Piece of String* (Australia). The methodologies used in these studies included quasi-experiments (six); post-only (one), pre-post (two), and pre-during-post (one) surveys; and items used or sold in a pre-during-post fashion (five; one study¹³ had two methodologies: a quasi-experiment and computing items sold). Table 1 lists the results by article.

Main results and analysis

Overall, the studies had multiple outcomes (i.e., proximal, intermediate, and distal outcomes). As an illustration, many campaigns also measured awareness (proximal outcome) as well as knowledge, attitudes or intentions (intermediate outcomes; see Kite et al.).⁷ We counted 23 results, of which 16 were significant and in the desired direction. The studies were well distributed among stop, go, stop & go, and unclear outcomes. The unclear category was related to outcomes in which it was not clear whether consumers should stop or go since the campaign did not provide guidance in that respect. We did not exclude these studies from our analysis because their outcomes constitute distal outcomes and can lead to stop or go outcomes themselves. The discussion of results should be taken with caution given the small number of articles considered.

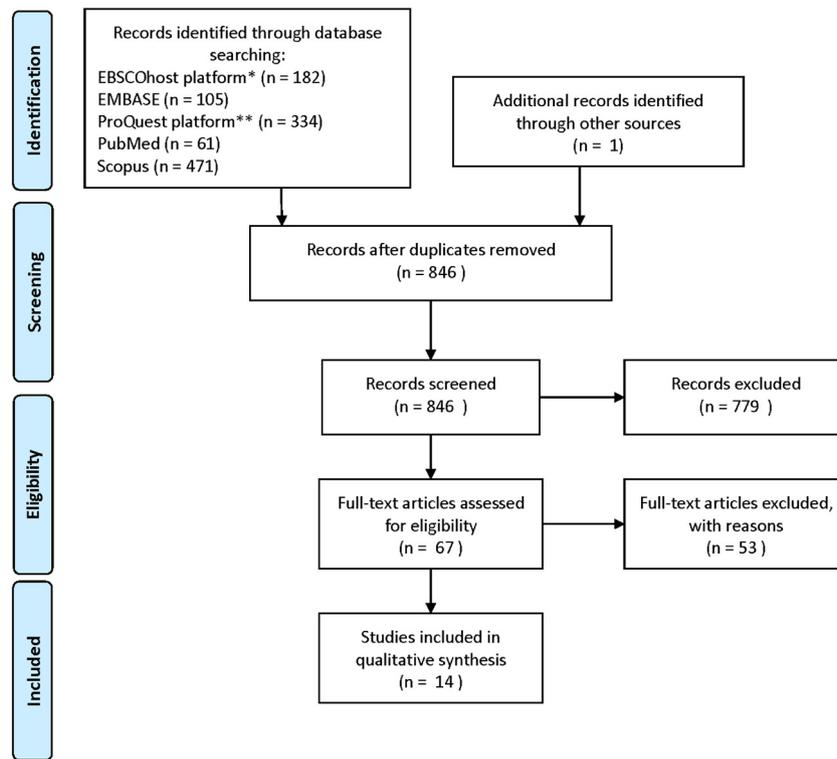


Fig. 1. Flow diagram of studies included through the review process according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Note: *EBSCOhost databases searched: Academic Search Complete, Business Source Premier, CINAHL Plus with Full Text, Communication & Mass Media Complete, Health Source: Nursing/Academic Edition. **ProQuest databases searched: ABI/INFORM Global, PAIS Index, PsycINFO, Sociological Abstracts.

Differences according to stop and go outcomes

The focus on stop or go behaviors is drawn from the idea that simple, clear messages are more persuasive than otherwise.^{14,15} In looking at each outcome category, stop and go outcomes had the least success compared to both the stop & go and unclear groups. Only 25% (1/4) of

the stop outcomes had success. For go outcomes, the success rate was 50% (2/4). Comparatively, success for both stop & go campaigns was 78% (7/9). Finally, for unclear outcomes, the success rate was 100% (6/6). The results run contrary to our original assumption that the more concrete and focused a campaign was (for instance, by either promoting stop or go outcomes), the more successful it would be. But

Table 1
Results by outcome, desired/hypothesized result, and stop-go objective.

	Article	Campaign	Campaign length (months)	Outcome sought	Self-reported	Observed
Stop	Gase, Barragan, Robles, Leighs, and Kuo, 2015 ²¹	Choose Less, Weigh Less (USA)	2	Diminish portion sizes to appropriate amount	0/2	
	Martin et al., 2018 ¹⁶	LiveLighter (Australia)	4	Decrease fast food consumption	1/1	
	Morley et al., 2016 ¹⁷	LiveLighter (Australia)	4	Decrease fast food consumption	0/1	
Go	Fitzgerald, Kannan, Sheldon, and Eagle, 2004 ²⁵	Healthy Dining Program (USA)	2	Increase healthy dining items menu sold over total		0/1
	Pollard et al., 2008 ²²	Go for 2&5® campaign (Australia)	36	Increase intake of F&V	1/2	
	Capacci and Mazzocchi, 2011 ²⁶	Five a Day (UK)	36	Increase consumption of F&V		1/1
Both stop & go	Wrieden and Levy, 2016 ¹⁸	Change4Life Smart Swaps (UK)	0.75	Swap fast food for healthy choices	2/2	
	Reger, Wootan, and Booth-Butterfield, 2000 ¹³	1% low-fat milk has perks! (USA)	1.5	Swap whole milk for 1% milk	1/1	0/2
	Finnell, John, and Thompson, 2017 ¹⁹	1% low-fat milk has perks! (USA)	3	Swap whole milk for 1% milk		2/2
	Zhang, Giabbanelli, Arah, and Zimmerman, 2014 ²⁷	Simulated campaign (USA)	36	Increase F&V, decrease fast food		2/2
Unclear	Morley, Wakefield, Dunlop, and Hill, 2009 ²⁰	Piece of String (Australia)	1.5	Take a measure of waist for weight loss action	1/1	
	O'Hara, Bauman, King, and Phongsavan, 2011 ²⁸	Get Healthy Information and Coaching Service (Australia)	3.75	Contact coach for support in weight loss		2/2
	Wammes, Oenema, and Brug, 2007 ²³	Maak je niet dik! (Don't get fat!) (Netherlands)	5.5	Behavioral action to prevent weight gain	1/1	
	King, Grunseit, O'Hara, and Bauman, 2013 ²⁴	Measure-Up (Australia)	6	Take a measure of waist for weight loss action	2/2	

Note: Information in this table pertains to food outcomes. The fractions to the right signify the number of desired over hypothesized results. Some campaigns had other outcomes (decrease soda consumption, increase exercise) but we are only reporting on food-related ones.

Table 2
Reasons for exclusion of full-text articles.

Reasons	Number of articles
Article not in English	1
No evaluation of outcomes or target outcomes, for instance, method was content analysis or the target outcome was related to beverages only	11
No campaign to which the ad(s) (uniquely) belong(s), for instance, ads from different campaigns were considered together and so without the ability to isolate each campaign uniquely	19
No social marketing present, for example, using commercial ads	8
No statistics provided, so either the methodology was qualitative or, even if quantitative, no statistics were used to present the results	14

perhaps the message of adding fruits and vegetables without concretizing how to introduce them in our diet, or of not eating without much alternative meets consumers with inaction. On the contrary, both stop and go campaigns offer specific examples of how to swap, for instance with 1% milk instead of any other milk. And despite the “unclear” label, those campaigns have very narrow, specific, and one-off outcomes as goals that even the most resistant consumer can do, such as measuring the waist or calling a coach to discuss weight loss. Subsequent sections assess other aspects of these studies that may shed some more light into their success rates.

Differences in terms of studies' features

Methodologies

When comparing the outcomes by types of studies, quasi-experiments^{13,16–20} had the highest successful rate (88% or 7/8) compared to surveys^{21–24} (57% or 4/7) or items used or sold^{13,25–28} (63% or 5/8). Quasi-experiments represent a more rigorous test of effects than surveys or items used/sold since there is more control. However, without being able to assess the quality of these particular methodologies, in and of itself or against each other, conclusions are challenging to assess. If anything, the more a study exerts control over its factors, the success of its campaign does not diminish, which speaks to the value of social marketing campaigns. It was perhaps surprising that there were no included studies with randomized controlled trials. Clearly, they are more challenging to implement than medical drug studies; perhaps their absence in assessing outcomes of healthy eating ad campaigns reflects the paucity of this kind of research and the need for further evaluation.

By type of outcome, self-reported outcomes had a success rate of 69% (9/13), which was similar to the success rate of observed outcomes, 70% (7/10; see Table 2). Typically, observed outcomes (for non-controversial health outcomes) have more validity and reliability compared to self-report.²⁹ In fact, Reger and colleagues¹³ work measures both self-reported and observed outcomes, and their results are significant when self-reported – more individuals reported drinking 1% milk in the intervention area than in the no intervention area – but not when measured in terms of 1% milk sold or its market share evaluated against the no intervention area. Thus, it lends support for the successful results of observed behavior; that is, most campaigns were successful in persuading audiences of healthy-eating behaviors.

In terms of populations studied, the studies primarily focused on adults^{16,18,21,22,24,26–28} or the general population,^{13,19,25} while only three^{17,20,23} assessed specific populations (e.g., older than 30 years and at risk for being overweight). The outcomes by population do not offer a clear pattern either, with a success rate of 79% (11/14) for adult, 50% (3/6) for general, and 66% (2/3) for specialized populations. One would expect more success for specialized populations because of the ability to have a more homogeneous sample, but, at the same time, for populations with a potentially higher incidence of obesity risk, there may also be more resistance to change.³⁰

Intervention characteristics

Almost all the campaigns in our studies used television (TV) ads, which are the most effective in delivering health messages to Western

audiences.³¹ Fitzgerald and colleagues²⁵ is the sole exception (i.e., without TV ads), and their study was not successful in producing any distal behavior, but lack of success was not unique to their study. Other than TV, the studies employed the gamut of traditional and new mass media, which also included a website, radio, print, and outdoor ads, although the outdoor format was less present. Some studies also had additional elements beyond mass media: social media,^{19,21} educational materials,^{21,22} call centers,^{20,23} public relations,²² and information at the point of sale.¹⁹ The inconsistent use of mass media and additional elements across the studies makes it difficult to assess which of these elements, if any, are a major factor in the success of the campaign, a limitation that must be noted.

Table 1 shows the studies in order of campaign length (in months), from shorter to longer, within each stop/go outcome. At first, it appears that campaign length bears little relation to campaign success. However, campaigns longer than six months are all successful in our review. This finding indicates there may be a threshold of exposure above which results are much more likely to be successful. The notion of threshold beyond which success for campaigns takes place has been found to happen at different points in time depending on ad length or audiences, for instance.³² However, this claim should be contrasted against gross rating points, which is related to target audience reached multiplied by the exposure frequency and is a better measure of exposure than length itself.³³

Finally, we considered success rates by the country in which the campaigns originated. In order of studies considered, Australia had a ratio of 78% (7/9) with six studies; the US, 50% (5/10) with five studies; the UK, 100% (3/3) with two studies, and the Netherlands, 100% (1/1) with one study. While the UK and Netherlands' studies constitute a number to consider, the striking difference between Australia and the US in terms of success rate is remarkable. Further research should consider the campaign ads that have run in recent years and evaluate them by country to fully conclude on country-specific effects, if any. In this sense, analysis should move toward ad content.

To close, one feature that calls for attention is the consideration of the degree to which campaigns were personalized. The results reveal that consumers may be more responsive to assessments of their own risk (such as measuring the waist or checking with a personal coach) than to general calls for behavior change. Coincidentally, the feature of personalization overlaps with the unclear group of studies considered (see Table 1). Personalization or personalized healthcare in these studies mimics precision medicine.³⁴ For instance, varying dimensions of waist measurement depending on the individual, which calls for more or less drastic measures to eat healthy.

The next wave of studies will have to weigh all these considerations and design methodologies capable of offering more definite conclusions. Special attention should be given to campaigns that may not have been studied within the referred literature and which may provide some needed additional cases to study.

While healthy eating is crucial, the emphasis on healthy beverages should not be diminished and neither should the importance of exercise—neither of which have not been considered here. Likewise, the prominence of the physical environment as well as the focus on cultural considerations and policy initiatives should be kept at the forefront to not exceedingly burden the individual.³⁵

Conclusions

The primary aim of this study was to systematically review quantitative studies assessing healthy eating ad interventions since unhealthy eating is a significant contributor to obesity, CVD, stroke, and T2D. We sought to find the most effective mechanism (stop or go outcomes) for social marketing campaigns. Our findings indicate that neither stop or go may be the best routes for healthy eating persuasion, and that including both stop and go or offering alternative ways to engage in healthy eating, for instance by realizing one's waist size, may lead to more successful outcomes. We also found evidence that campaigns longer than six months seemed more consistently successful. However, our findings should be interpreted with caution given the small number of articles included for analysis (i.e., 14). Future research should consider content analyzing these campaigns to offer more insight as to their persuasion as well as exploring how to effectively individualize campaigns as much as possible in order to incorporate a precision approach to healthy living ad campaigns.

Statement of conflict of interest

None of the authors have any conflicts of interests with regard to this publication.

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