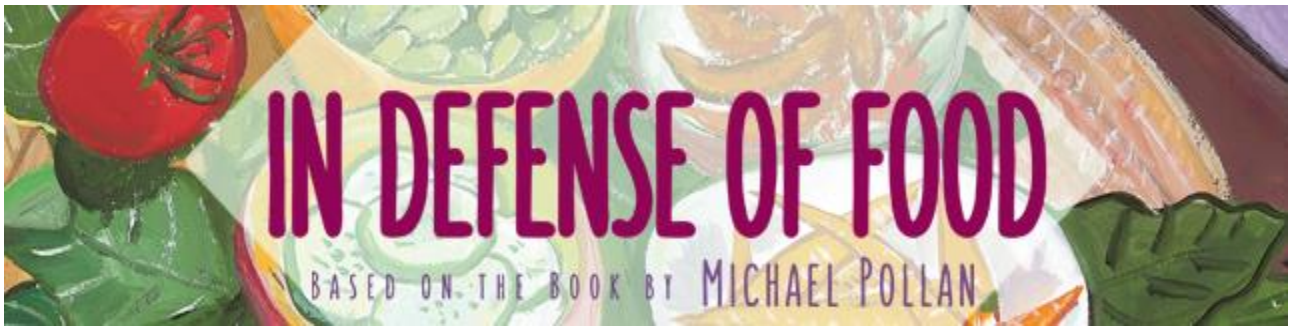

Summative Evaluation Report

(Study 1 of 3)

Viewers' engagement with and learning from the *In Defense of Food* film

January 2017

Knight Williams Inc.

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This material is based on work supported by the National Science Foundation under grant award No. DRL- 1224172. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

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Introduction

As part of the National Science Foundation (NSF) funding for the *In Defense of Food* project directed by Kikim Media, the independent evaluation firm Knight Williams Inc.[1] conducted a summative evaluation of the project's key deliverables, which included: a PBS television broadcast program, an outreach effort, and an educational curriculum. This report (Study 1 of 3) considers the film's overall appeal, clarity, learning value, and motivational impact among viewers matching the film's target audience, and focuses on the following six questions:

1) Did viewers find the film appealing, engaging, and comprehensible?

2) What were the most interesting things viewers thought they learned from the film, and how did they assess their knowledge of healthy eating and nutrition science after viewing?

3) Did the film increase viewers' knowledge of healthy eating, nutrition science, and deceptive food marketing practices?

4) Did the film increase viewers' motivation to engage in healthy eating?

5) Did the film increase viewers' interest in nutrition science?

6) Did the film increase viewers' ability to identify and analyze marketing messages about nutrition as well as their likelihood of doing so?

The evaluation team honed in on this set of questions by: reviewing the *In Defense of Food* project proposal submitted to the NSF; consulting with the producers about the project goals, deliverables, and project statements the team had originally submitted on the NSF Online Project Monitoring Systems (OPMS) upon funding; watching the film; reviewing the formative evaluation studies on the film; and reviewing the film script and other online resources available on the project website.

Background

In Defense of Food premiered on PBS on Wednesday, December 30, 2015. Following the premiere, Knight Williams Inc. conducted an in-depth evaluation of the immediate impacts of the film with adult viewers recruited to watch the 2-hour film. This report summarizes the findings from the evaluation as supported by the responses of the adult audience that viewed and completed in-depth evaluation forms during and immediately after viewing as compared to the responses gathered from a control group of participants randomly assigned to only complete questions relating to the film's content, as explained under Method.

[1] Knight Williams Inc. specializes in the research, development, and evaluation of media-based health and informal science education programs.

Method

Design

The evaluation team conducted a two-group posttest-only randomized study that examined recruited viewers' experience with *In Defense of Food*, as compared to a group of participants who didn't view the film but who completed the same set of demographic/background questions and a "quiz" on the main content presented in the film.[2] This group of non-viewers is hereafter called control participants.

In order to implement the two-group posttest randomized study design, the evaluation team randomly assigned screened evaluation participants to one of two groups, which comprised:

- A viewer group that viewed the film and immediately completed a post-viewing questionnaire.

- A control group that did not view the film but instead completed a questionnaire containing the same content questions designed to assess the project's informal science learning goals completed by the viewing group.

The evaluation then compared the results of these two groups to assess the immediate educational impact of the film.

Recruitment

The evaluation team recruited a planned sample of 140 adults from diverse regions of the U.S. The team aimed for a sample with equal gender representation and a range of ages from 18-75. The team's recruiting strategy also focused on obtaining a diverse group of participants, including: approximately 30% minorities, residents from diverse geographic regions, individuals that watched science and PBS programming occasionally to regularly, and participants who were not professional scientists, science teachers, or employed in a nutrition-related field.

Recruiting was conducted principally through evaluation associates located in the Northeast, North Central, South Atlantic, South Central, and Western regions of the U.S. The associates used diverse and regionally appropriate methods of announcing the evaluation opportunity to individuals fitting the target audience demographics, background, and media habits.

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[2] Although all participants completed a pre-viewing background and demographic questionnaire, administering a content-based pretest and posttest to the same group of participants in this case was neither a) practical given the challenges of maintaining participant cooperation, nor b) desirable given the specialized nature of the content addressed in the film and the potential for the pretest to sensitize viewers to the film's content and affect their posttest performance given the evaluation timeframe. Typically, the shortcomings with the separate-sample design involve its failure to control for history, maturation, mortality, and their interaction. However, in the case of this film treatment, where the viewing and control group respondents completed the evaluation activities over a matter of days, group changes of this nature are unlikely. The separate-sample design controls for the main and interactive effects of testing and was deemed in this case a useful and cost-effective strategy for evaluating the film.

As part of the recruiting process, participants were informed that: their participation in the evaluation was voluntary and they could quit at any time, their responses were confidential and would be reported in the aggregate, and that they would be randomly assigned to complete one of two different sets of activities, in one case an online survey activity about topics featured in a recent PBS program and in the other a survey and viewing of a PBS program. Honorariums were offered in each case to help ensure timely completion, and scaled to reflect the amount of time required to complete each activity.

Questionnaires

Screening/recruiting questions

The initial screening questions asked as part of the recruiting process included demographic and background questions related to participants':

- access to email and the internet, and availability to participate in the evaluation timeframe; [3]

- general demographic and background information including age, gender, ethnicity/race, level of education, occupation, engagement with healthy eating, engagement with nutrition science; and

- television viewing habits with respect to PBS and science programming as well as prior exposure to food-related documentaries including *In Defense of Food*. Those indicating prior exposure to the film were not included in the evaluation.

Questions common to viewing and control groups

The viewing and control group questions that form the basis of this evaluation report included:[4]

- a 25 point knowledge assessment addressing Questions 2, 3, and 6 listed on page 4, relating to the content covered in the film on healthy eating, nutrition science, and deceptive food marketing practices; and

- a set of interest and attitude questions addressing Questions 4 and 5 directed at assessing viewers' motivation to engage in healthy eating and their interest in nutrition science.

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[3] Potential evaluation participants were questioned related to their schedule availability and access to the internet and email. Although all recruited participants in this case did have access to each of these media, had they not, they wouldn't have been disqualified from participating but rather offered an alternative way of watching the film and completing the online survey.

[4] Survey completion time for questions common to both groups was estimated at 30 minutes. The viewing group had additional questions to complete about the series itself, with an estimated completion time of 15 minutes. Piloting of the instruments indicated these estimates were realistic and both groups were advised to complete the surveys in the estimated timeframes. As the questionnaires were completed as online forms, it was possible to track time of completion through timestamps taken at the beginning and end of the survey session. The timestamp information confirmed participants generally completed within the estimated timeframe.

The evaluation team searched for healthy eating and nutrition science knowledge, interest, and opinion survey items from nationally validated instruments, however because of the unique nature of the film's content, the team did not find appropriate instruments. The team instead devised new items and subsequently pilot tested these items for readability, length, clarity, and level of difficulty.

A reliability analysis was performed on two scaled items relating to the film's appeal and comprehensibility using Cronbach's alpha, the results of which are reported in the text. Although a common rule-of-thumb is that coefficient alpha should be .70 or higher (Nunnally & Bernstein, 1994) this convention has at times been called into question, with some suggesting a wider range of internal consistencies be considered (McCrae et al., 2011).[5]

Questions asked only of viewing group

In addition to the content questions completed by both viewers and control participants, viewers also completed questions that asked about the following aspects of the film related to Questions 1, 2, 4, 5, and 6, including:

- the film's' overall appeal with respect to overall likeability, storytelling engagement and cohesion, clarity, content interest, tone, and likelihood of recommending (Question 1);
- the film's overall comprehensibility with respect to pacing, density of information and science, and level of science explanations (Question 1);
- Viewers' personally salient learning from viewing as well as learning related to the series' content goals (Question 2); and
- Viewers' interest in nutrition science as a result of viewing and their expectations of applying information learned about food-related marketing and of making changes in their future food purchases (Questions 4, 5, 6).

Data analysis and reporting

Statistical analyses were conducted on all quantitative data generated from the evaluation. To explore for possible significant differences between the viewing and control groups, Welch's t-tests, Chi-Square, and Mann-Whitney tests were applied as appropriate. Subgroup differences within the viewing group were analyzed using Welch's t test and Welch's ANOVA along with Games-Howell post hoc test as appropriate on the two scaled items relating to overall appeal and comprehensibility. Demographic and background variables used in the subgroup analyses included: gender, age, education, and perceived level of engagement with healthy eating. Given the relatively small number of participants in the racial/ethnic groups represented, results related to this demographic factor were not explored. Statistically significant findings

[5] Nunnally, JC.; Bernstein, I. (1994). Psychometric theory. 3rd ed. McGraw-Hill; New York.
McCrae, R. R.; Kurtz, J. E.; Yamagata, S.; & Terracciano, A. (2010). Internal consistency, retest reliability, and their implications for personality scale validity. Personality and social psychology review.

(hereafter referred to as "significant") at $p \leq .05$ are reported in the text. All statistical tests were two-tailed unless otherwise indicated. Interquartile range (IQR) is provided in reporting of non-parametric tests.

To help determine whether a significant difference is a difference of practical concern, effect sizes were also computed and reported in the text where appropriate, following Cohen's interpretation (Cohen, 1992).[6] [7] As noted by Tahlheimer and Cook (2002*), "Whereas statistical tests of significance tell us the likelihood that experimental results differ from chance expectations, effect-size measurements tell us the relative magnitude of the experiment treatment. They tell us the size of the experimental effect."* [8] Effect sizes are important to report, particularly when sample sizes are sufficiently large, as it is possible to produce statistically significant differences between groups when the size of the effect is in fact very small. The effect size helps us to interpret whether the difference observed is a difference of practical significance, in other words, a difference that matters. At the same time, while Cohen's accepted values are used to help gauge the effect sizes computed for the knowledge questions, these values should also be interpreted along with a comparison of the actual difference in raw scores in the context of the topic addressed.

Content analyses were performed on the qualitative data generated in the open-ended questions. The qualitative analysis was both deductive, drawing on the film's objectives, and inductive, by looking for overall themes, keywords, and key phrases. Responses from the viewing and control groups were coded by two independent coders and any differences that emerged in coding were resolved with the assistance of a third coder. The analyses on the content learning questions were coded as randomly ordered responses.

Response rate

Of the 140 participants recruited for the evaluation, a total of 128 participants, including 62 viewers and 66 control participants, completed the evaluation in the available timeframe. [9]

Missing data

The initial dataset included 128 participants; 62 in the viewer group and 66 in the control group. No questionnaires were removed from the dataset for missing values.

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[6] Cohen, J. (1992). A Power Primer. *Psychological Bulletin*, 112 (1), pps. 155-159.
[7] Following Cohen's (1992) interpretation, for t-tests $d = .2$ indicates a small effect, .5 a medium effect, and .8 a large effect. For non-parametric tests, $r = .10$ indicates a small effect, .3 a medium effect, and .50 a large effect.
[8] Thalheimer, W. and Cook, S. (2002). How to calculate effect sizes from published research: A simplified methodology, *Work-Learning Research*, p. 2.
[9] The evaluation anticipated an attrition rate of approximately 10%; In this case the attrition was slightly lower.

Sample information

A total of 128 adults from 22 different states completed the evaluation.[10] The table to the right summarizes the demographic and background information for the final group of 62 viewers and 66 control participants.

Group comparability

The evaluation gathered demographic and background information to determine whether the two independent samples (viewers vs. control participants) should be evaluated as having come from the same population. Chi-square analyses indicated that the two groups did not differ significantly with respect to the measured variables of: gender, race/ethnicity, level of education, occupation, perceived knowledge and engagement with developing a healthier diet and nutrition science, and frequency of viewing PBS programming and viewing science programming.

Description of viewing group

The viewing group of the sample included:

- Slightly more males (55%) than females (45%).
- A wide range of ages, spanning 18-67 years, with a mean age of 42.
- A racial distribution comprising 68% White, 8% Asian, 14% African-American, 2% Native American or Alaskan Native, and 2% Multiracial. Less than one-tenth of the participants (6%) were of Hispanic Origin.

Sample information (N=128)

Demographic/ background factor	Categories	Control (n=66)	Viewer (n=62)
Gender	Female	45%	45%
	Male	55%	55%
Age Group	Age range	(20-77)	(18-67)
	Mean	43	42
	18-31	32%	36%
	32-49	36%	31%
	50-77	32%	34%
Racial/ethnic background	African-American/Black	9%	14%
	Asian	6%	8%
	Native American	2%	2%
	Hispanic	6%	6%
	White	70%	68%
	Multiracial	7%	2%
Occupational status	Employed	77%	74%
	Homemaker	2%	5%
	Retired	11%	7%
	Unemployed	0%	2%
	Student	11%	13%
Highest level of education	Less than high school	0%	5%
	High school degree	5%	3%
	Some college	14%	23%
	College degree	35%	37%
	Some graduate school	3%	7%
	Graduate degree	44%	26%
Engagement with developing healthier diet	Not engaged	2%	2%
	Little engaged	9%	3%
	Moderately engaged	21%	15%
	Very engaged	41%	40%
	Extremely engaged	20%	40%
Engagement with nutrition science	Not engaged	2%	2%
	Little engaged	15%	18%
	Moderately engaged	47%	24%
	Very engaged	29%	34%
	Extremely engaged	8%	23%
Perceived knowledge of developing healthier diet	No knowledge	2%	0%
	Slightly knowledgeable	11%	8%
	Moderately knowledgeable	46%	32%
	Very knowledgeable	32%	42%
	Extremely knowledgeable	11%	18%
Perceived knowledge of nutrition science	No knowledge	9%	10%
	Slightly knowledgeable	26%	23%
	Moderately knowledgeable	47%	40%
	Very knowledgeable	18%	19%
	Extremely knowledgeable	0%	8%
Frequency of watching science programs	Daily/weekly	34%	31%
	Monthly/less than	64%	69%
	Never	0%	0%
Frequency of watching PBS programs	Daily or weekly	33%	32%
	Monthly/less than	67%	68%
	Never	5%	5%

[10] The 22 states included: AZ, CA, CO, FL, IL, MA, MD, MI, MT, MO, NC, NM, NJ, NY, OH, OR, PA, TN, TX, VA, WA, and WI. A total of 38% of the participants were from West Coast states, 35% were from North Central and Northeastern states, and 27% were from South Central and South Atlantic states.

- A majority (74%) of participants who indicated that they were employed, while smaller groups identified as students (13%), retired (7%), homemakers (5%), or said they were unemployed (2%).
- A combination of high school through graduate level educated respondents, including: 8% with a high school education or less, 60% with some college education or a college degree, and 33% with some graduate school education or a graduate degree.
- A majority (80%) of participants who indicated they were very or extremely engaged with developing a healthier diet with relatively few indicating they were moderately engaged (15%) or were only a little or not at all engaged (5%).
- A combination of participants who indicated they were very or extremely engaged with nutrition science (57%), moderately engaged (24%) or only a little or not at all engaged (20%).
- A majority of participants reporting they were at least moderately knowledgeable about developing a healthier diet, including 8% who felt slightly knowledgeable, 32% who felt moderately knowledgeable, and 60% who felt very or extremely knowledgeable.
- A majority of participants reporting they were at least moderately knowledgeable about nutrition science, including 33% who had no knowledge or felt slightly knowledgeable, 40% who felt moderately knowledgeable, and 27% who felt very or extremely knowledgeable.
- A majority (69%) of participants reporting they watched science programs monthly or less than monthly, with about a third (31%) saying they did so daily or weekly.
- A majority (68%) of participants reporting they watching PBS programs monthly or less than monthly, with about a third (32%) saying they did so daily or weekly.

Findings

Study 1 presents findings on the overall appeal, clarity, comprehensibility, learning value, and motivational impact of *In Defense of Food* as determined by the recruited viewers' and, in some instances, control participants' responses on the questionnaires completed for the evaluation. Findings are presented according to the six questions listed below, following the goals of the project:

Question 1: Did viewers find the film appealing, engaging, and comprehensible?

Question 2: What were the most interesting things viewers thought they learned from the film, and how did they assess their knowledge of healthy eating and nutrition science after viewing?

Question 3: Did the film increase viewers' knowledge of healthy eating, nutrition science, and deceptive food marketing practices?

Question 4: Did the film increase viewers' motivation to engage in healthy eating?

Question 5: Did the film increase viewers' interest in nutrition science?

Question 6: Did the film increase viewers' ability to identify and analyze marketing messages about nutrition as well as their likelihood of doing so?

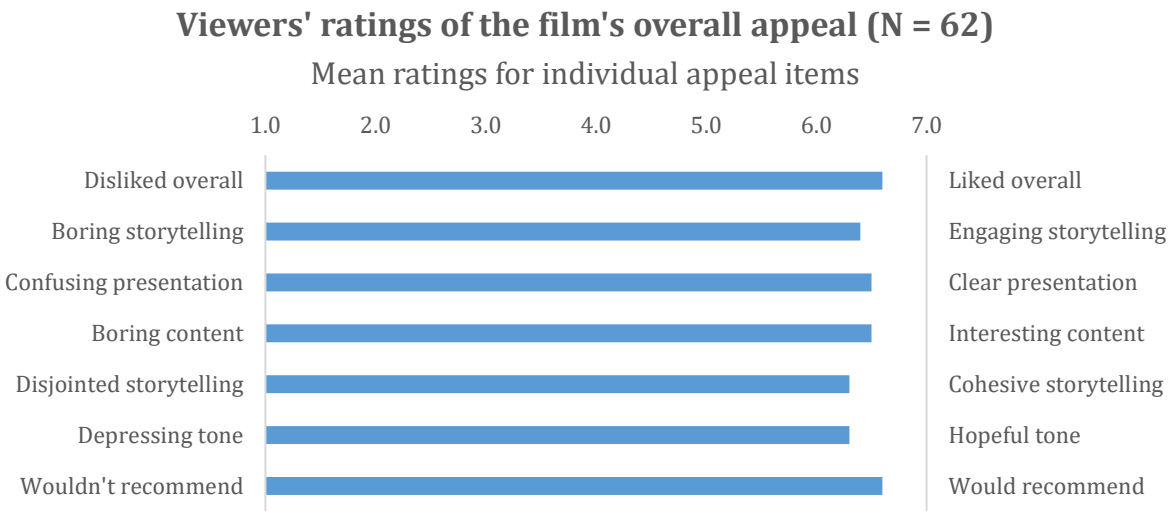
Question 1: Did viewers find the film appealing, engaging, and comprehensible?

To assess how appealing viewers found *In Defense of Food*, they were asked to rate the film with respect to overall likeability, storytelling engagement and cohesion, clarity, content interest, tone, and likelihood of recommending. They were also asked to describe in their own words what they liked and didn't like about the film. Finally, to assess how comprehensible viewers found *In Defense of Food*, they were asked to rate the film for pace, information and science density, and level of scientific explanations. These findings are presented below in 1.1 through 1.4.

1.1 Extent to which viewers found the film appealing

Viewers were asked to rate aspects of the film's appeal, including the extent to which they liked the film, found the storytelling engaging or boring, found the presentation clear or confusing, found the content interesting or boring, found the storytelling cohesive or disjointed, found the tone hopeful or depressing, and expected they would recommend the film to others. In each case, they used a scale from 1.0 (rated the lowest) to 7.0 (rated the highest).[11] Based on these seven indicators of appeal, the overall mean rating shows that viewers generally found the film very appealing (scale mean M = 6.5, SD = .60).

The chart below shows the means for each individual appeal item assessed. Though they shared a range of ratings in each case, in general viewers indicated that they: liked the film (M = 6.55, SD = .59), found the storytelling both engaging (M = 6.4, SD = .75) and cohesive (M = 6.3, SD = .98), thought the presentation was clear (M = 6.50, SD = .67), felt the tone was hopeful (M = 6.3, SD = .81), and expected they would recommend the film (M = 6.6, SD = .70).



[11] In the current evaluation, Cronbach's alpha for the seven-item scale is: α = .89, 95% CI [.85, .93]. This scale has been used previously by the authors in studies of science based film and television documentaries.

With respect to subgroup differences, a Welsh's t-test revealed that females rated the film's overall appeal significantly higher than did males, although in this case the means for both groups exceeded 6.0 (Females $M = 6.7$, $SD = .45$ vs. Males $M = 6.2$, $SD = .64$).[12] The effect size in this case was medium.

In addition, a Welch's ANOVA test determined that there was a significant difference between age groups for the film's overall appeal.[13] A Games-Howell post hoc test revealed that the viewing group's oldest participants (50 years and older) rated the film's overall appeal significantly higher than did participants in the youngest (18-31) and middle age (32-49) brackets (50 years and older age bracket: $M = 6.8$, $SD = .29$; 18-31 age bracket: $M = 6.3$, $SD = .58$; 32-49 age bracket: $M = 6.2$, $SD = .29$).[14] Note that in each case, however, the means exceeded 6.0, No other subgroup differences were found with respect to age, education level, healthy eating engagement, or nutrition science engagement.

When invited to elaborate on their ratings, some of the attendees provided additional feedback, as follows:

Liked or disliked overall

- *I'm going to watch this movie many more times just to keep myself motivated and refresh it in my conscience.*
- *This is a great film for anyone to watch to spread health awareness.*
- *Looks like I just want a gold star but I really loved this rendition of the horrid escalation of diabetes, heart disease and cancers, along with childhood obesity that has taken such a toll on our society being replaced with an encouraging simplicity that we can possible change the wave*

Engaging or boring storytelling

- *The topic is really relevant and important. Could it have been more exciting and engaging? Probably. But great material.*
- *Nothing major to complain about, had me engaged the whole time.*
- *I enjoyed this film much more than I was expecting to - I enjoyed the storytelling.*
- *It was a good and engaging film.*

Clear or confusing presentation

- *It all felt very clear to me.*
- *The presentations were at a level that most would understand.*
- *It was not a 100% clear, in the sense that many things were left in the air or not treated at all (e.g. what type of meat is healthier, how much is "not too much meat", etc.) I understand this might have been to avoid making the documentary too technical, but still... that is why I gave a 5 to clarity of presentation.*

Interesting or boring content

- *I really enjoyed it, packed with tons of good information. A good start to making healthier choices.*
- *The film was very informative and confirmed my thoughts about some of the hype heard about food content and healthiness.*

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[12] $t(58.6) = 3.22$, $p < .002$, $d = .56$, 95% CI [.168, .721]

[13] $F(2, 33) = 10.69$, $p < .001$,

[14] Mean increase from youngest to oldest = 0.52, 95% CI [0.17, 0.86], $p = .002$; Mean increase from middle age bracket to oldest = 0.59, 95% CI [0.17, 1.02], $p = .006$.

- *Nutrition is very important to me. I found this very interesting and the research to back up the content.*

Cohesive or disjointed storytelling

- *The storytelling could have been better organized around the authors overall recommendations for making healthy choices. These should have been acts in this play but seemed more like afterthoughts.*
- *Related to question 14 - almost too much information or too many stories being introduced and circled back upon. I might have enjoyed if some parts of the story were a little more linear.*
- *I thought that the storytelling was crystal clear.*

Hopeful or depressing tone

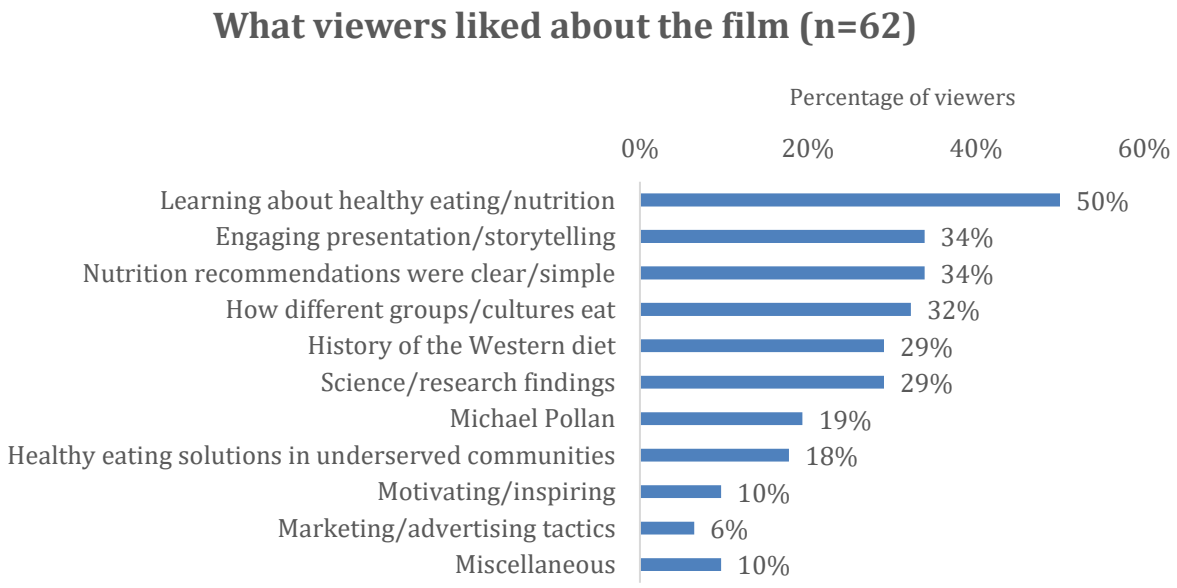
- *The film was hopeful when it could be, but with so much bad news, there is no way it could score 7.*
- *The tone has to be somewhat depressing to make the point of the seriousness of the current state of our food in the US, but the show itself wasn't depressing. It was informative and presented clear ways to make a positive change.*
- *The subject shows a depressing history, but there is hope to make informed choices for the future.*

Would or would not recommend to others

- *Would definitely recommend to others, especially if they are interested in learning about healthy ways to eat.*
- *I have already discussed the video to my wife and have plans to change our meat and carb heavy diets. The video really is eye opening and very thought provoking especially with a toddler to raise. It seems easy enough to make changes (little or dramatic) in our diets to lessen the chances our chances of suffering heart disease, cancer or obesity.*
- *As stated above, I truly enjoyed the findings of this film and would recommend this to friends and family to view as well. Honestly compelling content!*
- *I think everyone should watch it, and understand why Americans have generally become so unhealthy.*

1.2 What viewers liked about the film

As shown in the chart below, when viewers were asked to describe what they liked about the film, half (50%) pointed to learning about healthy eating and nutrition. About a third each liked the *engaging* presentation/storytelling (34%), the *clear* and *simple* nutrition recommendations (34%), and/or the examples of how different groups or cultures eat (32%). More than a quarter each liked the film's focus on the history of the Western diet (29%) and/or the focus on science/research findings (29%). About one-fifth each liked Michael Pollan (19%) and/or the focus on healthy eating solutions in underserved communities (18%). A tenth (10%) found the film motivating or inspiring, while a slightly smaller group (6%) liked the focus on marketing/advertising tactics. Finally, one-tenth (10%) commented on miscellaneous things they liked about the film.



Examples of viewer comments in each area are provided below.

Learning about healthy eating/nutrition (50%)

- *I appreciate how nutrition science has zeroed in on what really matters.*
- *I like the span of what was covered about nutrition in the allotted time. The film was about a few aspects of eating healthy rather than just one or two.*
- *I liked the general reflective nature of the film in reference to general positive nutrition and how it can be shaped into one's life. I can now see the destructive nature of processed foods, and can see the benefits of eating foods FROM plants, not made IN plants (i.e. processed foods).*
- *The biggest tip I am going to use is to use smaller plates.*
- *It did not take a PhD to determine how to eat healthy. Many good ideas were given on how to follow these simple steps.*
- *The video did a great job in simplifying the problem eating processed food and its harm to the body.*
- *It went along with the book; which was very informative*

Engaging presentation/storytelling (34%)

- *It does not insult our intelligence. It was interesting and kept me engaged.*

- *I enjoyed the narration and visuals that accompanied the video clips. The music was appropriate and the storytelling felt fitting and informational.*
- *The film gave great examples and always put a human face to a stance or issue.*
- *I also thought the video production/quality was modern and appropriate.*
- *It had a nice balance of information, examples, and explanation. It was well-produced (visuals, sound, etc.).*
- *I liked the pace of it, as well as the clarity. It was produced at a clip that respects the potential audience.*

Nutrition recommendations were clear/simple (34%)
- *I liked how they explained in simple terms just how easy it is to make healthy eating choices.*
- *I enjoyed how the information presented was clear and accessible. I understood the concepts that were being presented, and I was able to connect as to how they would be applicable in daily life.*
- *Very interesting topic, simplified what healthy eating should be...*
- *I liked that it had a recommendation that it kept coming back to. It presented a problem, went into depth about the causes of the problem, and provided a way to 'fix' the problem.*
- *The idea that eating healthy is simple if you eat mostly plants, less meat, and smaller portions is great - simplifies the whole thing for me.*

How different groups/cultures eat (32%)
- *I liked seeing real examples of other cultures living healthy lives by NOT worrying about what nutrients are in their foods, and just eating the foods that are around them in nature.*
- *The way the history of food evolved over time as well as showing different eating habits of different people (countries, tribes).*
- *It was good to see the difference among the Western diet vs. other cultural diets and its impact on health.*
- *…visiting the various communities i.e. Seventh Day Adventists.*
- *I enjoyed seeing the different societies and how different their diets were (French vs. indigenous African).*
- *Great broad range about different cultures and how they have evolved into their diets*

History of the Western diet (29%)
- *I really enjoyed the segments on our history of food trends/beliefs and how we were wrong and wondering about what we believe now that will be proven incorrect in the future.*
- *I liked that it had a good narrative which covered history to social implications of food and the food industry.*
- *The historical information, like the story of the Kellogg's and the way that nutrition was taken out of and put back into bread. The flawed research into the function of fat in our diets.*
- *I liked seeing the history of the Western diet and learning about how and why food producers use deceptive marketing to make us think that their foods are healthy.*

Science/research findings (29%)
- *I liked whenever there were scientific explanations (i.e. fiber in the intestines, omega-2 vs omega-6, etc.).*
- *I liked learning about some of the specifics about how the food affects systems in the body (e.g., feeding the bacteria to create necessary compound or the "musical chairs" of omega-3s and omega-6s).*
- *I like that the film explained why we are biologically programed to seek out sugar, salt and fat.*
- *I liked the fiber study, how the Cornell nutrition educators tweaked the environmental factors…*
- *I liked hearing about the history of food in the U.S. and how science has contributed to all of it.*
- *I also liked when the film tied together the history of nutrition science and American history.*

- *I enjoyed the brief history on the evils of fat and its subsequent retraction two decades later, leading to higher incidences of heart disease than its initial objective to combat heart disease. It just shows that some conclusions are made without enough scientific evidence.*

Michael Pollan (19%)

- *I really enjoy Michael Pollan. He's a fabulous speaker…*
- *The fact that it is based upon MP's book, and narrated by him, gives it definitive credibility. I have read two of his works previously and find him to be incredibly well researched and articulate.*
- *I liked the narrator, he was likable, believable.*
- *I really liked the main guy, he seems to be a credible source of information. I also liked how the documentary was intertwined with his lectures.*
- *The host (and author) seemed to genuinely care about the topic.*

Healthy eating solutions in underserved communities (18%)

- *I liked seeing the examples of people and organizations trying to help children, especially living in urban environments or as minorities, gain access to healthy foods and to educate them against what I see to be predatory advertising practices of many large food and beverage corporations that produce cheap, processed food.*
- *The effort of Steve Ritz in the Bronx to include everyone, good or bad, in learning how to grow healthy food.*
- *… the teacher that teaches inner-city kids that have dropped out or kicked out of school. He teaches them not only how to cook but how to make something out of nothing. Just because you live in an area with mostly fast and cheap food, doesn't mean you can't still eat healthy.*
- *I also liked how they examined low-income communities and people of color and focused on the good AND the bad.*
- *Also the young people and how they are participating in changing attitudes and experiences around getting and eating healthy food.*

Motivating/inspiring (10%)

- *Its message was empowering.*
- *The film was a great motivator. I already knew most of it but seeing it again refreshed my thinking.*
- *I thought the information was to the point, effective and the stories were very inspiring*
- *I wrote some notes and changed some of my eating habits*

Marketing/advertising tactics (6%)

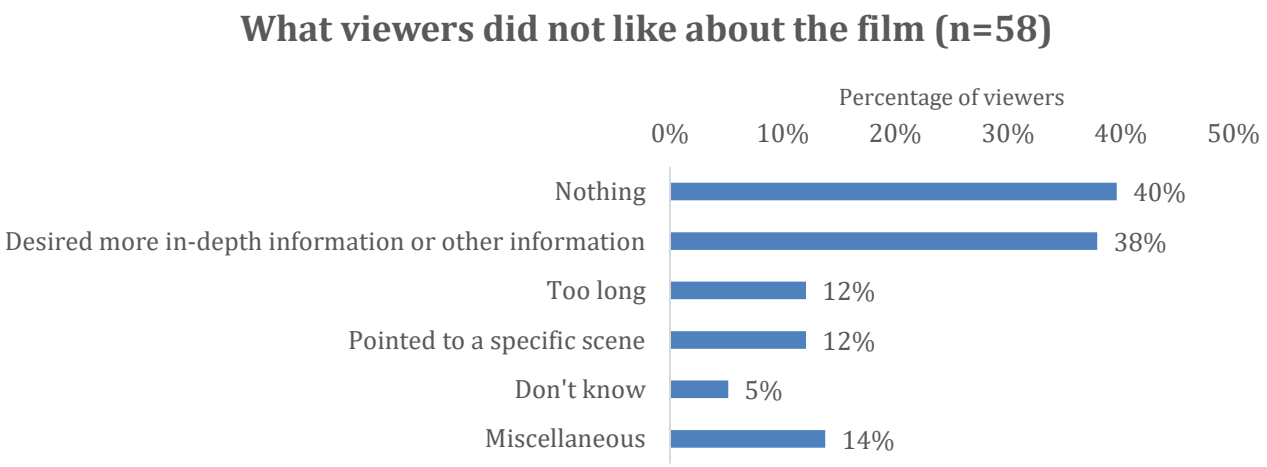
- *And you also shown the marketing ploys used to get you to think that their foods where the proper things to eat.*
- *I think the explanations behind food marketing were very eye opening.*
- *I liked…learning about how and why food producers use deceptive marketing to make us think that their foods are healthy.*

Miscellaneous (10%)

- *The food looked appetizing*
- *… the firm belief that it isn't all about nutrition but in combination with exercise that can balance. The 92-year-old woman that can and does still walk 4 miles per day, may have more to do with her ability than vegetarian alone.*
- *The interviews were interesting and the people were knowledgeable and likeable.*
- *I did not think I would enjoy it but I was pleasantly surprised considering I am from the meat and potato generation.*

1.3 What viewers did not like about the film

As shown in the chart below, when viewers were asked to describe what they did not like about the film, two-fifths (40%) of those who shared a response said there was nothing they disliked, while a slightly smaller group (38%) indicated that they desired more in-depth information or wanted information on a variety of other topics. More than a tenth each found the film too long (12%) and/or pointed to an issue with a specific scene (12%). Less than a tenth said they didn't know (5%), and more than a tenth (14%) shared miscellaneous responses.



Examples of viewer comments in each area are provided below.

Nothing (40%)

- *I can't think of anything I didn't like, I'm going to recommend it to everybody.*
- *I liked the film overall.*
- *Nothing major comes to mind that decreased the quality of the film.*
- *It's hard to think of anything I didn't like about the film. Felt Like I learned a lot!*

Desired more in-depth information or other information (38%)

- *Would like to see more about how to read the labels on foods*
- *Could use more diet choices for different body types.*
- *I think the program could have given more examples of how they can eat healthy such as items in your general grocery store. What meals can you create at an affordable price that contains that are healthy?*
- *They did not touch on how personal economics play into one's ability to eat healthy. They explained how processed foods can be made very cheaply, but did not explore that fact that processed foods are sometimes the only option for low income families.*
- *I would have loved to have seen more on the tribe represented. Do they cook? What type of housing do they use? I have many questions as to why their food choices are what they are ...*
- *While it doesn't actually hurt the film, perhaps a bit more elaboration on the existence of crop subsidies by the US government. I realize that a multi-part film could be produced just on that subject, the film seems to mention it almost casually in passing. It is, I believe, a huge part of the problem. If these subsidies did not exist, our system would be food very different.*

Too long (12%)

- *It was too long, too many unnecessary scientific facts that didn't enhance or broaden the knowledge of why or why not to eat foods*
- *It was a tad long. I think it could have been about 10 -15 mins shorter and I would have had a feeling of "that was really good and went by fast"... the content was interesting, but I actually noticed the time at the hour to 1:05 mark....*
- *It was full of great information but it was long.*
- *It was overall very interesting, if I had to pick one thing, I'd say it was a tad long :)!*

Pointed to a specific scene (12%)

- *I would have loved to have seen more on the tribe represented. Do they cook? What type of housing do they use? I have many questions as to why their food choices are what they are ...*
- *... we didn't need to see scenes such as Pollan driving*
- *I thought it was a little condescending to its audience at times (i.e. it explained the process of carbohydrates breaking down into glucose twice).*
- *I felt the discussion about French eating habits didn't support the seven simple words presented in the video. It seemed a bit of a tangent and it wasn't supported by much data/research. The argument seemed to be that they eat longer than us per day and they are slightly less fat than we are, so we should eat like them. The other information in the video seemed to support the suggest eating habits much more directly.*
- *I would like to have seen more data about the kid from Boston (regarding ill health) rather than merely say the kid was overweight. There are reasons for children being overweight but remain healthy. High cholesterol levels, high blood pressure, medications, etc.*
- *I didn't care for the inner-city garden segment and the segment on the young overweight boy. I just didn't find it as appealing as the rest of the film, although I see the relevance.*

Don't know (5%)

- *I don't know.*

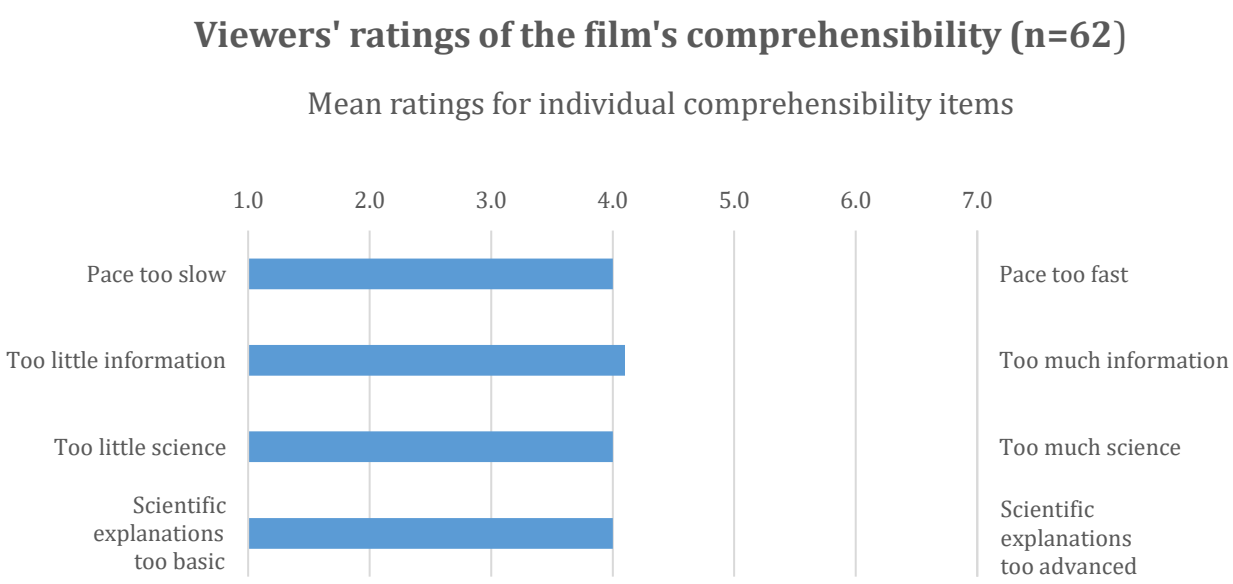
Miscellaneous (14%)

- *I felt at times the film was too similar to the many other films out there on this subject. I felt it needed to present the topics in a new and exciting way.*
- *I did not like learning the facts that the government subsidizes and allows these "food like substances" to be heavily used in our foods. I did not like learning that food lobbyists have such an influence on our food policies.*
- *I suppose I did not like learning that childhood obesity is such a big problem, it is very concerning. I hope our gvt gets involved and also does something about the deceptive practices of nutritionism.*
- *I thought it was a little condescending to its audience at times*
- *Very rarely it seemed as though the interviews with kids were somewhat staged.*
- *There is nothing I expressly disliked about the film. It reinforced a lot of things that I already tend to believe, so in a sense it was preaching to the choir, so to speak. I would be curious to see how other people--especially people who may regularly consume more processed foods or who have health problems, would react to the information presented in the film...and I also wonder if the content alone would be convincing enough to sway them.*

1.4 Extent to which viewers found the film comprehensible

After watching *In Defense of Food*, viewers were asked to rate aspects of the film's comprehensibility with respect to pacing, the amount of information and science provided, and the level of scientific explanations presented. In each case they used a scale of 1.0 (rated the lowest) to 7.0 (rated the highest), with 4.0 being "just right." [15] Based on these four indicators of comprehensibility, the overall scale mean shows that viewers generally found the film to be "just right" in this regard (scale mean $M = 4.0$, $SD = .60$).

The chart below shows a comparison of the mean ratings for each individual item. Though they shared a range of ratings in each case, in general viewers indicated that the film's pace was about right ($M = 4.0$, $SD = .69$), that it featured about the right amount of information ($M = 4.1$, $SD = .69$) and science ($M = 4.0$, $SD = .83$) and that the level of scientific explanations was at about the right level ($M = 4.0$, $SD = .80$).



With respect to subgroup differences, none were found among the measured variables of gender, age, education, engagement with nutrition science, and engagement with healthy eating.

When invited to elaborate on their ratings, some of the viewers provided additional feedback, as follows:

Pace too slow or too fact

- *I thought it was paced perfectly*
- *Found the pace and information to be good*

Too little or too much information

- *The content was great. Not too much, not too little.*

[15] In the current evaluation, Cronbach's alpha for this four-item scale is: $\alpha = .80$, 95% CI [.70, .87]. This scale has been used previously by the authors in studies of science based film and television documentaries.

- *Again, I found all of the information incredibly accessible. During times when I was locked in and engaged, I really felt like I was learning something important.*
- *Struck a good balance of information presented in an easily absorbed style.*
- *I would have liked more information about the value of the meal as a whole.*
- *Felt a little summative/reductive at times. Could see this being a two-part/series.*

Too little or too much science

- *I could have done with more science--I find recent findings, especially about how the body responds to processed foods, fascinating.*
- *I personally would enjoy a bit more scientific breakdowns but I enjoyed the ones that were there.*
- *My bias is towards more science, I'm sure some would rather have heard less.*
- *I think this was a great introduction to food science, and now that I've seen it I wish there was more science.*
- *I thought they did a good job of balancing the practice information with the science behind it.*
- *Only area was that it was slightly scientific however it is a film viewed on PBS so that is in line with that genre.*

Scientific explanations too basic or too advanced

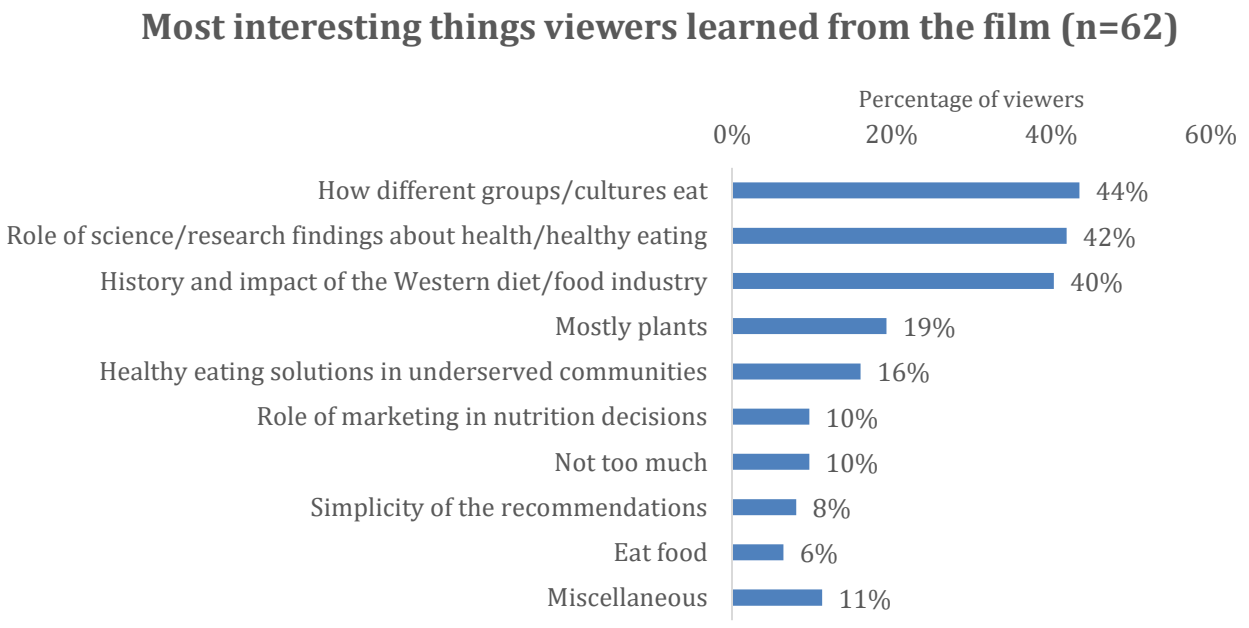
- *For the length of the program I would expect more scientific depth.*
- *The scientific explanations were actually just enough to fuel the interest when too much would have fogged up my little brain cell, as my nutrition scientist friends have been known to do. My eyes glaze over and my ears shut down with too much of that which is way above my level of comprehension. This film was so well put together that I want to watch it again and share it when it is appropriate to do so*
- *The scientific information seemed about right. Basic enough to understand, and not too prevalent in the film.*
- *Some of the terms used in the program were very advanced. Some of the time, I feel like it was made more for people in the science field.*
- *Again, liked the film, but not being a scientist and science not being the draw to the film, it was a little too scientific.*

Question 2: What were the most interesting things viewers thought they learned from the film, and how did they assess their knowledge of healthy eating and nutrition science after viewing?

Viewers were asked to share the most interesting things they learned from the film. Additionally, viewers and control participants were asked for their level of agreement with a series of statements about healthy eating and a series of statements about the accomplishments and limitations of nutrition science. These findings are presented below in 2.1 through 2.3.

2.1 Most interesting things viewers thought they learned from the film

As shown in the chart below, when asked about the most interesting things they learned from the film, the largest groups of viewers, about two-fifths each, pointed to something they learned about how different groups or cultures eat (44%), the role of science/research findings about health or healthy eating (42%), and/or the history and impact of the Western diet/food industry (40%). More than a tenth (16%) cited something they learned about healthy eating solutions in underserved communities, while smaller groups pointed to the role of marketing in nutrition decisions (10%), the simplicity of the film's recommendations (8%), or commented on miscellaneous topics (11%). Finally, between one-twentieth and one-fifth pointed to one of the three main recommendations in the film: eat food (6%), not too much (10%), mostly plants (19%), with nearly a third (31%) of viewers citing at least one of the three recommendations.



Examples of responses shared by viewers are provided below.

How different groups/cultures eat (44%)

- *The other cultures and how they eat.*
- *I liked the way it presented healthy lifestyles of multiple groups - each group was different and yet all came back to being mostly plant based, real food.*
- *If you have to climb a tree for a sugar fix, you will think twice about it!*
- *One of the most interesting things I learned from the film was the 7th Day Adventist community in Loma Linda. It was fascinating to learn that the average age at the retirement home is 93!!*
- *…how the French culture is able to eat what they want but maintain their health by eating smaller portions & eating slower*
- *That you can eat like the French and be much healthier ….*

Role of science/research findings about health and healthy eating (42%)

- *Role of gut bacteria (I am always interested in the role of gut bacteria)!*
- *The importance of fiber*
- *Eating meat is good for you if only occasionally eaten.*
- *…did not know how harmful margarine had become, before the trend returned to butter.*
- *The studies of the sequence with which food is presented in school cafeteria and buffet style restaurant is interesting... I had never really thought of it, but it makes sense.*
- *I was interested in learning a bit more about the way the body uses fats. It's not necessarily essential to my understanding of food in general, but it was an interesting fact in regard to the discussion of historical attitudes toward fat in the human diet.*
- *The most interesting thing was the difference between nutritional science and nutritionism. Especially how the two influenced the American public.*

History and impacts of the Western diet/food industry (40%)

- *It was an eye-opening video. The majority of the food most Americans eat is highly processed due to its availability and price. Westerners have gotten away from the foods previous generations have consumed because of food industry's marketing ploys. It has convinced the consumers to eat their highly processed items, leading us to believe it has health benefits when, in fact, it is causing our bodies great harm.*
- *One of the most interesting things I learned is how the eating in America evolved. They showed a lot of older advertisements and commercials from many years ago and that very interesting.*
- *The differences in how we eat now vs. in the past…*
- *The most interesting thing was the difference between nutritional science and nutritionism. Especially how the two influenced the American public.*
- *The evolution of flour and food industry's obsession with it was very interesting.*
- *Did not have a clue of John Kellogg's role in the fat free, vegetarian trend that resulted in Corn flakes.*
- *How the western culture diet leads to so much disease and illness.*

Mostly plants (19%)

- *… all came back to being mostly plant based, real food.*
- *Eating a Plant-based diet is very healthy! more fruits and vegetables will make a noticeable improvement in your health*
- *Learning about…the number of servings of vegetables we should and do consume*
- *The phrase "eat food, not too much, mostly plants" is probably what will stick with me the most.*

Healthy eating solutions in underserved communities (16%)

- *I liked seeing the community efforts in California to reduce childhood diabetes, which I didn't know about.*

- *Also encouraging that young people are learning to eat what they grow and actually enjoy it.*
- *…the youth organizations for lower income people who only chose fast food;*
- *It was great to see the hydroponics set up in the low-income community as a way to introduce fresh vegetables to a population that need it most.*
- *Inner-city gardening*

Role of marketing in nutrition decisions (10%)

- *… the marketing that processed food companies do.*
- *How the majority of the American population is misled by marketing and advertising to think that they are choosing "healthy" foods, yet these foods are making them sick...maybe not the most interesting, but the most frustrating.*
- *Westerners have gotten away from the foods previous generations have consumed because of food industry's marketing ploys.*
- *… that many of the health claims on packaged food is a gimmick*

Not too much (10%)

- *… the biggest thing from this movie that I am going to use is smaller plates.*
- *…eating smaller portions*

Simplicity of the recommendations (8%)

- *How simple it is to eat healthy*
- *How easy it can be to convey the simplicity of eating well and eating right.*
- *Some basic changes to a diet can make a huge difference in health.*

Eat food (6%)

- *It is important for my well-being to eat non-processed foods.*
- *…all came back to being mostly plant based, real food.*
- *Going back to the basics of eating actual food vs edible food like substances*

Miscellaneous (11%)

- *The lack of value in most nutritional science.*
- *It is possible with time that our outdated biological programing could catch up to our current environment.*
  Food is good and bad. One must make a concerted effort to eat right.
- *How environmental factors contribute to your eating decisions*
- *…how to be a better food shopper*
- *That change is possible. I will visit the local farmer's market more for a source of healthy food choices.*

2.2 Viewers' assessment of their knowledge about healthy eating, compared to control participants

Viewers and control participants were asked for their level of agreement with a series of statements about healthy eating on a scale from 1.0 (*strongly disagree*) to 7.0 (*strongly agree*), with 4.0 being *not sure*. The table below shows the median ratings and IRQ for each statement, with the viewer medians highlighted in **bold**.[16]

Viewers' (n=62) and control participants' (n=66) median ratings of statements about healthy eating							
	Strongly disagree 1.0	**Disagree 2.0**	**Slightly disagree 3.0**	**Not sure 4.0**	**Slightly agree 5.0**	**Agree 6.0**	**Strongly agree 7.0**
A wide variety of diets can be healthy if they contain the types of whole foods our species has evolved to eat.						6.0 (*IQR*=1) **6.0 (*IQR*=2)**	
I have a good understanding of how to eat healthy.					5.0 (*IQR*=1)	**6.0 (*IQR*=1)**	
Figuring out how to eat healthy is confusing.			**2.5 (*IQR*=3)**	3.0 (*IQR*=3)			
I need to know about the biology of nutrients in order to eat a healthy diet.		**2.0 (*IQR*=3)**		3.0 (*IQR*=1)			

Viewers and control participants generally *agreed* with the statement *A wide variety of diets can be healthy if they contain the types of whole foods our species have evolved to eat* (*Mdn* = 6.0). A Mann-Whitney test demonstrated that viewers had a significantly higher level of agreement with this statement than did control participants, although the effect size was small.[17] Meanwhile, both groups tended to *slightly disagree*-to-*disagree* with the statement *Figuring out how to eat healthy is confusing* and Mann-Whitney tests demonstrated that there was no significant difference between the groups for this item (*Mdn* = 2.5 vs. 3.0). Finally, viewers tended to have a higher level of agreement with the statement *I have a good understanding of how to eat healthy* (*Mdn* = 6.0 vs. 5.0) and a lower level of agreement with the statement *I need to know about the biology of nutrients in order to eat a healthy diet* (*Mdn* = 2.0 vs. 3.0). In these two instances Mann-Whitney tests demonstrated that the differences were significant and the effect sizes were medium and small, respectively.[18]

[16] Individual median ratings as opposed to overall mean scores are provided in this section as the statements do not comprise a scale but are rather a list of distinct goals developed for the film.

[17] The results of the Mann-Whitney test and the effect size are as follow for this statement: *A wide variety of diets can be healthy if they contain the types of whole foods our species have evolved to eat;* (U = 1483.0, $p < .005$, $r = .25$*).*

[18] The results of the Mann-Whitney test and the effect sizes are as follows for these statements: *I have a good understanding of how to eat healthy* (U = 1279.5, $p < .001$, $r = .35$); *I need to know about the biology of nutrients in order to eat a healthy diet* (U = 1489.0, $p < .007$, $r = .24$).

2.3 Viewers' assessment of their knowledge about the accomplishments and limitations of nutrition science, compared to control participants

Viewers and control participants were asked for their level of agreement with a series of statements about the accomplishments and limitations of nutrition science on a scale from 1.0 (*strongly disagree*) to 7.0 (*strongly agree*), with 4.0 being not sure. The table below shows the median ratings and IRQ for each statement, with the viewer medians highlighted in **bold**.[19]

Viewers' (n=62) and control participants' (n=66) median ratings of statements about the accomplishments and limitations of nutrition science							
	Strongly disagree 1.0	**Disagree 2.0**	**Slightly disagree 3.0**	**Not sure 4.0**	**Slightly agree 5.0**	**Agree 6.0**	**Strongly agree 7.0**
I understand what nutrition researchers do and the kinds of methods they use.				4.0 (*IQR*=2)	**5.0 (*IQR*=1)**		
I can give examples of how nutrition science has contributed to our understanding of what constitutes a healthy diet.				4.0 (*IQR*=1)		**6.0 (*IQR*=1)**	
I can give examples of how nutrition science has produced findings about healthy eating that have subsequently been shown to be wrong.				4.0 (*IQR*=2)		**6.0 (*IQR*=1)**	
I have an understanding of how nutrition science has changed our food system within the U.S.					5.0 (*IQR*=1)	**6.0 (*IQR*=1)**	

Viewers tended to rate each statement higher than did control participants. The medians for each statement are as follows, with viewer medians listed before control participants: *I understand what nutrition researchers do and the kinds of methods they use* (*Mdn* = 5.0 vs. 4.0); *I can give examples of how nutrition science has contributed to our understanding of what constitutes a healthy diet* (*Mdn* = 6.0 vs. 4.0); *I can give examples of how nutrition science has produced findings about healthy eating that have subsequently been shown to be wrong* (*Mdn* = 6.0 vs. 4.0); and *I have an understanding of how nutrition science has changed our food system within the U.S.* (*Mdn* = 6.0 vs. 5.0). Mann-Whitney tests demonstrated that these differences were statistically significant in each case and the effect sizes were large.[20]

[19] Individual median ratings as opposed to overall mean scores are provided in this section as the statements do not comprise a scale but are rather a list of distinct learning goals developed for the film.

[20] The results of the Mann-Whitney test and the effect sizes are as follows for each statement*: I understand what nutrition researchers do and the kinds of methods they use* (U = 981.5, p < .001, r = .46*); I can give examples of how nutrition science has contributed to our understanding of what constitutes a healthy diet* (U = 1011.5, p < .001, r = .45); *I can give examples of how nutrition science has produced findings about healthy eating that have subsequently been shown to be wro*ng (U = 766.5, p < .001, r = .56); and *I have an understanding of how nutrition science has changed our food system within the U.S* (U = 721.5, p < .001, r = .58).

Question 3: Did the film increase viewers' knowledge of healthy eating, nutrition science, and deceptive food marketing practices?

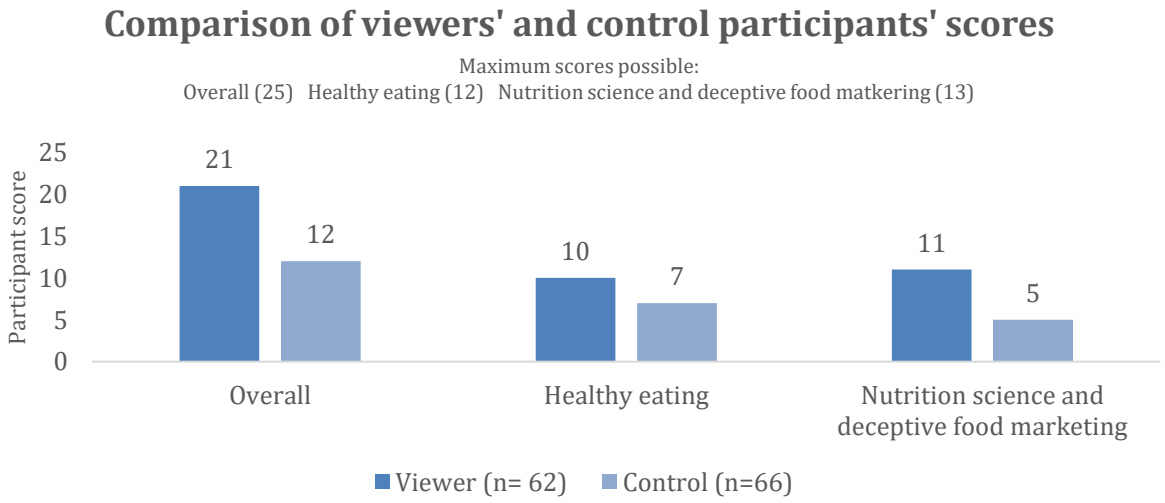
To evaluate the impact of *In Defense of Food* on viewers' knowledge of content covered in the film, both viewers and control participants were asked to complete a 25 point assessment consisting of true/false, fill in the blank, and short answer questions. Each question set was assigned a point value based on the relative importance the series placed on the content addressed and the project's informal science learning goals as prioritized for a general audience. The findings are summarized in 2 sections as follows:

3.1 Viewers' knowledge of nutrition and healthy eating, compared to control participants

3.2 Viewers' knowledge of nutrition science and deceptive food marketing practices, compared to control participants

Overall findings

A Welsh's t-test showed that viewers scored significantly higher on the content assessment than did control participants, and the effect size was large.[21] As shown in the chart below, out of a total possible score of 25, viewers averaged 21 points, while control participants averaged 12.



In addition to this higher overall score, viewers also significantly outperformed control participants on each of the two science content areas assessed. For the question set relating to *viewers' knowledge of healthy eating,* out of a total possible score of 12, viewers averaged 10 points while control participants averaged 7.[22] For the question set relating to *viewers' knowledge of nutrition science and deceptive food marketing*, out of a total possible score of 13, viewers averaged 11 points while control participants averaged 5.[23] The effect sizes in all instances were large effects.

[21] $t(119) = 14.83$, $p < .001$, $d = 2.61$, 95% CI [8.21, 10.76]
[22] $t(90) = 12.11$, $p < .001$, $d = 2.12$, 95% CI [2.94,4.09]
[23] $t(126) = 13.15$ $p < .001$, $d = 2.32$, 95% CI [5.07, 6.87]

3.1 Viewers' knowledge of nutrition and healthy eating, compared to control participants

To assess viewers' knowledge of nutrition and healthy eating, compared to control participants, both groups were asked to: complete a series of true/false questions about nutrition-related facts addressed in the film; describe the Western diet and what it typically includes; describe the Western's diets links to health problems and diseases; and describe what we can learn about healthy eating from different groups' diets or eating practices. As noted on the previous page, the evaluation found that out of a total possible score of 12, viewers averaged 10 points while control participants averaged 7 and the effect size was large.

In addition, both groups were asked a question that was not scored with the above question set but was included to generate qualitative information reflective of what viewers gleaned from the film about how to approach healthy eating. In this case, participants were asked what they would tell a friend who asked them to suggest a few basic guidelines for healthy eating.

The findings for each individual question set are presented below in 3.1a through 3.1e.

3.1a Viewers' knowledge of nutrition-related facts, compared to control participants

To assess viewer learning about nutrition-related facts addressed in *In Defense of Food*, viewers and control participants were asked to answer six true/false questions.[24] The table below shows the percentage of viewers and control participants that correctly answered each question.

Percentage of correct answers to true/false questions		
Control (n=66)	**True/false questions**	**Viewer (n=62)**
53%	A deficiency of omega-3 fatty acids increases risk of heart disease death (T)	94%
17%	Processed foods make up about 30% of the Western diet (F)	48%
80%	In general, Americans consume about one-thousand percent more sugar per day than 200 years ago (T)	94%
77%	The smaller the serving plate the more food people tend to serve themselves (F)	92%
94%	The rate of childhood obesity in America has more than doubled over the last thirty years (T)	97%
21%	Human milk contains material that babies can't digest (T)	21%

More than nine-tenths (94%) of viewers compared to about half (53%) of control participants correctly answered true to the statement *A deficiency of omega-3 fatty acids increases risk of*

[24] Each T/F question earned a total possible score of 1.

heart disease death. Nearly half (48%) of viewers compared to about one-sixth (17%) of control participants correctly answered false to the statement *Processed foods make up about 30% of the Western diet*. More than nine-tenths (94%) of viewers compared to four-fifths (80%) of control participants correctly answered true to the statement *In general, Americans consume about one-thousand percent more sugar per day than 200 years ago*. More than nine-tenths (92%) of viewers compared to three-quarters (77%) of control participants correctly answered false to the statement *The smaller the serving plate the more food people tend to serve themselves*. More than nine-tenths (97%) of viewers compared to about nine-tenths (94%) of control participants correctly answered true to the statement *The rate of childhood obesity in America has more than doubled over the last thirty years*. Finally, about one-fifth each of viewers and control participants (21% each) correctly answered true to the statement *Human milk contains material that babies can't digest.*

3.1b Viewers' knowledge of the Western diet, compared to control participants

To assess viewer learning about the Western diet, viewers and control participants were asked the question: *Briefly describe the Western diet and what it typically includes*. The table below shows the percentage of viewers and control participants that answered the question with incorrect, partial, and full explanations, with responses scored from 0-2 respectively. The table also includes examples of responses that were coded under each category.

Participants' knowledge of the Western diet		
Control (n=66)		**Viewer (n=62)**
26%	Incorrect or no explanation (0 points) Examples: *1) I don't know; 2) Whatever there is time for; 3) Protein.*	0%
52%	Partial explanation (1 point) Examples: *1) Red meat and white bread 2) Lots of prepackaged or fast food meals with not much in the way of fresh fruits or vegetables; 3) I am not certain, but "western" diet means to me: red meat, tubers, grains, high in fats.*	8%
23%	Full explanation (2 points) Examples: *1) The Western diet is usually made up of corn, wheat, dairy and meat; very little fruits and vegetables, includes lots of meat, white flour, vegetable oils and sugar. And very little fruit; 2) The basic Western diet is heavy in meat. It includes a lot of refined white flour, refined sugars in soda, and high amounts of dairy. It also is high in vegetable oils and omega 6 fatty acids; 3) The Western Diet includes processed food much includes high sugar or sodium, that comes in packages. High in fats, sugars, and salts. Also includes a lot of meat and vegetable oils. Does not have much fruits, whole grains, and vegetables.*	92%

More than nine-tenth (92%) of viewers compared to less than one-quarter (23%) of control participants provided full explanations. Meanwhile the few remaining viewers (8%) provided partial explanations, and the remaining three-quarters of control participants provided either partial (52%) or incorrect or no explanations (26%).

3.1c Viewers' knowledge of the Western diet's links to disease, compared to control participants

To assess viewer learning about the Western diet's links to disease, viewers and control participants were asked the question: *Are you aware of any major health problems or diseases that are related to eating a Western diet?* Those who answered *Yes* were asked: *What diseases or health problems do you think are related to eating a Western diet? List at least three that come to mind.*

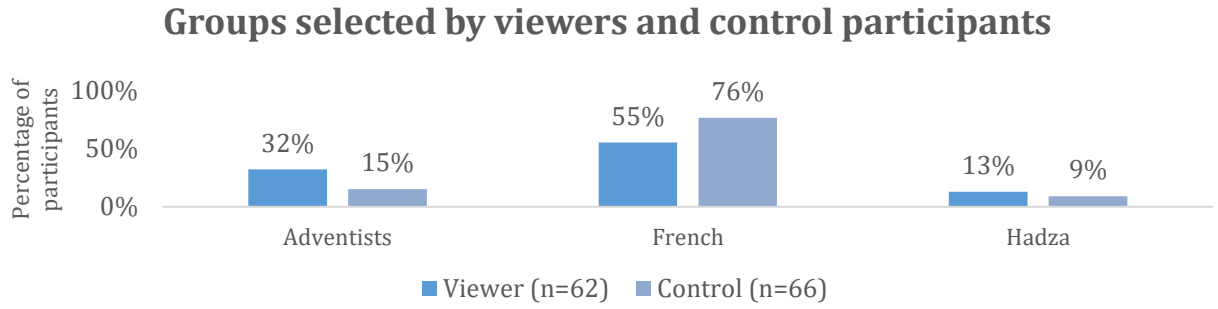
The table below shows the percentages of viewers and control participants who selected *Yes* and answered the question with incorrect, partial, and full explanations, with responses scored from 0-2 respectively. Those who answered *No* to the above question were scored 0 points. The table also includes examples of responses that were coded under each category.

Participants' knowledge of the Western diet's link to disease		
Control (n=66)		**Viewer (n=62)**
24%	Incorrect or no explanation (0 points) Examples: *1) Don't know; 2) Good food; 3) Haven't heard of Western diet*	0%
21%	Partial explanation (1 point) Examples: *1) Obesity; 2) Heart disease; 3) Cardiovascular, stroke*	6%
55%	Full explanation (2 points) Examples: *1) Health issues that are caused by Western diets are diabetes, cancer, strokes, and heart attacks; 2) Diabetes, high blood pressure, heart disease, stroke, and certain types of cancers; 3) Heart disease, diabetes, and cancer are related to the western diet.*	94%

As the table shows, more than nine-tenths (94%) of viewers compared to just over half (55%) of control participants provided full explanations (94%). Meanwhile, the few remaining viewers (6%) provided partial explanations and the remaining control participants, not quite half of the group, provided either partial (21%) or incorrect or no explanations (24%).

3.1d Viewers' knowledge of what can be learned from the diets or eating habits of healthy populations, compared to control participants

To assess viewer learning about what we can learn about healthy eating from different groups' diets or eating practices, viewers and control participants were asked the question: *Choose one of the three groups below and describe what we can learn about healthy eating from their diet or eating practices: a) The French, b) The Hadza tribe in Tanzania, and c) The Seventh Day Adventists.* After selecting one of these groups participants were then prompted with the question: *What can we learn about healthy eating from their diet or eating practices?* The chart below shows the three group options and the percent of participants from the control and viewing groups that chose each group. Participants in both groups most often selected the French (55% viewer vs. 76% control) followed by the Seventh Day Adventists (32% viewer vs. 15% control), and the Hadza tribe in Tanzania (13% viewer vs. 9% control).

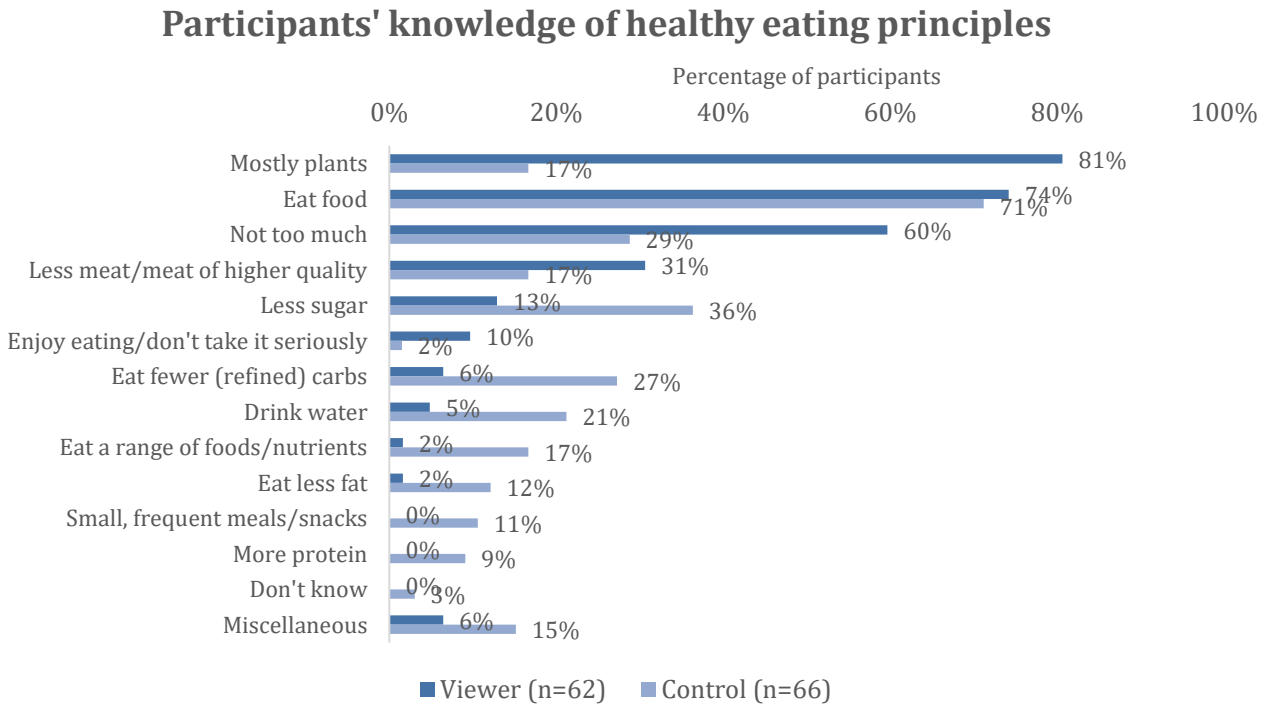


The table below shows the percentage of viewers and control participants that answered the question with incorrect, partial, and full explanations, with responses scored from 0-2 respectively. The table also includes examples of responses coded under each category. As the table shows, more than nine-tenths (95%) of viewers compared to one-third (33%) of control participants provided full explanations. Meanwhile the few remaining viewers (5%) provided partial explanations and the remaining two-thirds of control participants provided either partial (38%) or incorrect or no explanations (29%).

Participants' knowledge of what can be learned from the diets or eating habits of healthy populations		
Control (n=66)		**Viewer (n=62)**
29%	Incorrect or no explanation (0 points) Examples: *1) I don't know much about any of these groups; 2) I have 0 info on these diets (French) They drink wine!*	0%
38%	Partial explanation (1 point) Examples: *1) Hadza: Eating more natural; 2) French: They eat slowly; French: Smaller portions*	5%
33%	Full explanation (2 points) Examples: *1) Seventh Day Adventists: They eat a plant based diet, only a few eat any meat at all. They live to be quite elderly and are in good shape. Their religion encourages healthy living, no smoking or drinking and no junk food.; 2) French: Their diet is high in meat, cheese, wine, rich foods. However the French habitually eat at the same time daily, in groups, have multiple courses and eat smaller portions. The French savor their meals; 3) Hadza: It may be hard to apply the eating practices of the Hadza tribe in everyday life as their food intake can be sporadic. They may have meat on a day that they are able to hunt a large animal, and other days they may just have plants. However, we can learn that the processed foods of today aren't making anyone healthier. These people in the Hadza tribe aren't freaking out about whether or not what they're eating has gluten or MSG. They eat natural foods, and as a result live healthy lives*	95%

3.1e Viewers' knowledge of basic principles of healthy eating, compared to control participants

Finally, both groups were asked a question that was not scored with the question set addressed in 3.1 a-d, but was included to generate qualitative information reflective of what viewers gleaned from the film about how to approach healthy eating. In this case, participants were asked what they would tell a friend who asked them to suggest a few basic guidelines for healthy eating. As shown in the chart below, the largest groups of viewers pointed to the three main recommendations from the film: eat food (74%), not too much (60%), mostly plants (81%), with more than two-fifths (42%) of viewers citing all three suggestions (as in, "*Basically what Michael Pollan said: Eat food, not too much, mostly plants. Food means real food, close to how it's found in nature, not something out of a box.").* Other suggestions for their friends were shared by smaller groups of viewers, as follows: eat less meat or meat of a higher quality (31%), eat less sugar (13%), enjoy the ritual of eating and don't take it too seriously (10%), eat fewer (refined) carbohydrates (6%), drink water (5%), eat a range of foods or nutrients (2%), and eat less fat (2%). Less than a tenth (6%) of viewers shared miscellaneous responses.



Among control participants, nearly three-quarters (71%) suggested eating food, while more than a quarter (29%) recommended moderation/not too much and less than one-fifth (17%) pointed to the value of eating mostly plants. A small group (5%) mentioned all three recommendations. At the same time, about a third (36%) of control participants thought they would suggest their hypothetical friend eat less sugar, and more than a quarter (27%) pointed to reducing (refined) carbohydrates. About a fifth (21%) mentioned drinking water, and more than a tenth each shared the following recommendations: eat less meat or meat or a higher quality (17%), eat a range of foods/nutrients (17%), eat less fat (12%), or eat small and frequent meals (11%). Less than a tenth each suggested eating more protein (9%), enjoying eating/trying not to take it too seriously (2%), or said they didn't know (3%). Finally, more than one-tenth (15%) of control participants shared miscellaneous responses.

Examples of comments shared by viewers and control participants are shared in the table below.

Responses shared by viewers and control participants when asked what suggestions they would give a friend interested in healthy eating,

Viewer (n=62)	Control (n=66)
Mostly plants (81%) • *Eat plants* • *Eat mostly plants* • *Eat more green vegetables* • *More fruits and vegetables* ***Eat food (74%)*** • *Natural foods* • *Eat very little processed food.* • *Eat real food* ***Not too much (60%)*** • *Small portions* • *Eat less volume* • *Don't eat too much* ***Eat less meat/better meat (31%)*** • *Less red meat* • *Eat meat once a week* • *…use meat only for flavoring or special occasions.* • *…eat food of better substance such as natural red cattle* ***Eat less sugar (13%)*** • *Avoid processed sugars* • *Sugar in moderation* • *I would advise lowering sugar* ***Enjoy eating/don't take it too seriously (10%)*** • *Enjoy eating, take your time like the French* • *Take time to eat* • *…eat habitually (same times of the day), and break the rules sometimes.* • *Have fun* ***Eat fewer (refined) carbohydrates (6%)*** • *Carbohydrates are important, make sure you eat them, but eat complex carbs instead of empty carbs.* • *I would advise lowering…simple carbohydrates as much as possible.* • *… less food made from white flour…* ***Drink water (5%)*** • *Drink plenty of water* • *Make water your drink of choice* ***Eat a range of foods/nutrients (2%)*** • *Follow the food pyramid as a starter.* ***Eat less fat (2%)*** • *…fats moderately…* ***Miscellaneous (6%)*** • *Beware of nutritionism* • *Try to cut out dairy as much as possible* • *I would first inquire as to the "why" they wanted to eat healthy (weight loss, feeling badly, etc.)* • *The ratio of protein and vegetables should be higher than grains and fruits.*	***Eat food (71%)*** • *Stay away from processed foods…* • *Eat real food found in nature* • *Buy (and eat) fresh fruit and veggies, less preprocessed food.* • *Eat Mediterranean. Low fat, less meat, more grains, vegetables, olive oil* ***Eat less sugar (36%)*** • *Limit…sugars (candy and other sweets)* • *I would suggest cutting out any sodas or foods/beverages with a lot of sugar* • *Refrain from sugar* • *Eat fruit for dessert rather than refined sugar.* ***Not too much (29%)*** • *Not too much* • *Moderate your intake of food* • *Don't overeat* ***Eat fewer (refined) carbohydrates (27%)*** • *Low carb* • *Stay away from carbs as much as possible.* • *Light on breads and pastas.* ***Drink water (21%)*** • *Drink plenty of water* • *ONLY DRINK WATER!* • *I would also suggest hydration with water and to limit the consumption of sofas and even juices.* ***Mostly plants (17%)*** • *Plant based.* • *Mostly vegetables.* ***Eat less meat/better meat (17%)*** • *…meat that is ideally grass fed and no hormones.* • *One meal with red meat per week is good.* ***Eat less fat (12%)*** • *Avoid trans fat* • *Control your intake of fats & oils - try to have good oils like olive, coconut and fish* ***Small, frequent meals/snacks (11%)*** • *Eat several times a day, i.e., snack. Not just one huge meal.* • *Watch your portion sizes and try to eat 5-6 smaller meals throughout the day (3 'meals' and 2-3 snacks).* ***Eat more protein (9%)*** • *High protein* • *Make sure to eat plenty of protein…* ***Enjoy eating/don't take too seriously (2%)*** • *Most of all, me mindful of eating, even on days when eating unhealthy or too much food… try to be conscious and to make ever-better decisions, rather than striving for perfection.* ***Miscellaneous (15%)*** • *The 5-2-1-0 plan--5 servings of fruits and veggies a day, no more than 2 hrs in front of a screen, one hour of physical activity, and no sugary drinks.* • *Use good cookware - NO Teflon or aluminum pans* • *Eliminate food with allergens*

3.2 Viewers' knowledge of nutrition science and deceptive food marketing practices, compared to control participants

To assess viewers' knowledge of nutrition science, compared to control participants, both groups were asked to define nutrition science and nutritionism and to describe how they differ from one another. Additionally, viewers and control participants were asked to comment on how nutrition science research has impacted Americans' views of specific nutrients (vitamins, fat, and fiber) and the use of these nutrients in processed food. To assess viewers' learning about deceptive food marketing, viewers and control participants were asked to identify deceptive marketing practices that U.S food manufactures use (or have used) to encourage Americans to buy processed food.

As noted on page 27, the evaluation found that out of a total possible score of 13, viewers averaged 11 points while control participants averaged 5 and the effect size was large.[25] The findings for each individual question set are presented below in 3.2a through 3.2c.

3.2a Viewers' knowledge of nutrition science and how it differs from nutritionism, compared to control participants

To assess viewers' learning about nutrition science and nutritionism, viewers and control participants were asked a three-part question that asked them to fill in the blank, as follows: (a) *Nutrition science is* _____, (b) *Nutritionism is* _____, and (c) *The main difference is* _____.

The table on the next page shows the percentage of viewers and control participants that answered each part of the question with incorrect, partial, and full explanations, with responses scored from 0-2 respectively. The table also includes examples of responses coded under each category.

As the table shows, for all three parts (a-c), more than nine-tenths of viewers provided partial or full explanations (93%, 90%, and 91% respectively); meanwhile three-quarters (71%) of control participants provide partial or full explanations for Part a on nutrition science compared to just over one-tenth for Part b on nutritionism (14%) and Part c on the difference between the nutrition science and nutritionism (12%).

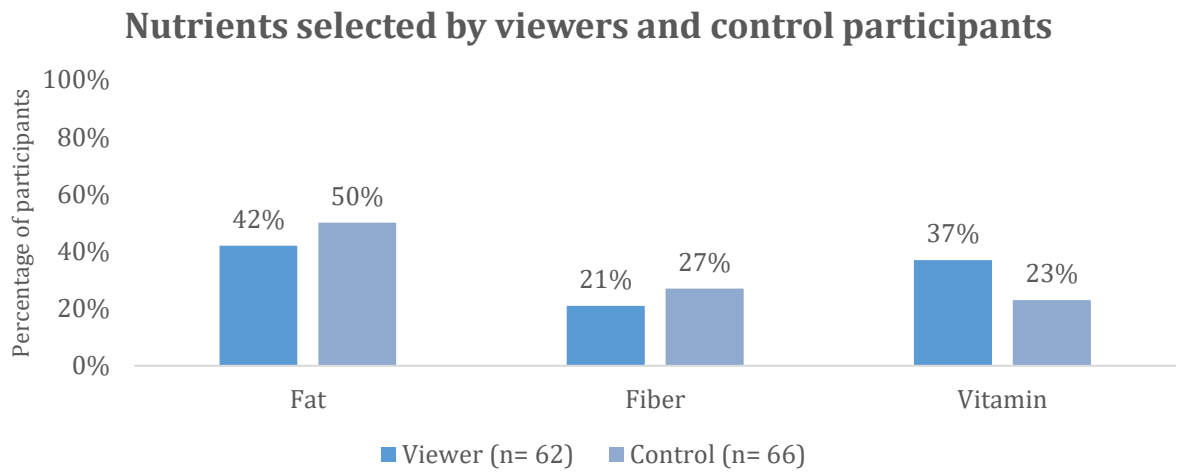
[25] Note that beyond this scored question set, participants were also asked supplemental questions about their interests and expected behaviors relating to nutrition science and food marketing, as presented under Question 6.

Participants' knowledge of nutrition science, nutritionism, and the difference between the two		
Control (n=66)	**Part a: Nutrition science is…**	**Viewer (n=62)**
29%	Incorrect or no explanation (0 points) Examples: *1) Not sure; 2) The study of nutrition?; 3) Balanced healthy eating*	7%
21%	Partial explanation (1 point) Examples: *1) The study of nutrients in the laboratory; 2) The actual nutrition that a food contains; 3) Actual science of food properties*	14%
50%	Full explanation (2 points) Examples: *1) The science that studies the how the basic components of food like vitamins, fats carbohydrates etc. affects humans when they are consumed; 2)* the study of nutrition and the pros and cons to each type of nutrient in different types of food on the body; *Nutrition science focuses on how food effects our health and how our body uses food to function properly. 3) Nutrition science is the study of how the human body processes foods and the role that specific compounds and elements found in these foods play a role in maintaining normal bodily functions.*	79%
	Part b: Nutritionism is…	
86%	Incorrect or no description (0 points) Examples: *1) I have no clue; b) A lifestyle in which a person works to keep a healthy diet; c) Dieting?*	10%
12%	Partial description (1 point) Examples: *1) single nutrition focus; 2) An ideology founded in marketing; 3) a concept more of an idea about nutrition*	21%
2%	Full description (2 points) Examples: *1) Nutritionism focuses on individual nutrients as being what is most valuable in a specific food. It is what creates trends or labels that say a nutrient is good or bad and can therefore be used by marketers to help promote their products; 2) Nutritionism is an alleged paradigm that assumes that it is the scientifically identified nutrients in foods that determine the value of individual food stuffs in the diet. In other words, it is the idea that the nutritional value of a food is the sum of all its individual nutrients, vitamins, and other components; 3Nutritionism is an ideology that stems from the science but creates obsession over specific nutrients, at time demonizing, at times glorifying, often to sell a product or to influence decision.*	69%
	Part c: The main difference is…	
88%	Incorrect or no description (0 points) Examples*: I'm not certain.; 2) One is knowing and one is living it; 3) Fact vs. common knowledge*	10%
9%	Partial description (1 point) Examples: *1) single nutrition focus; 2) An ideology founded in marketing; 3) a concept more of an idea about nutrition*	31%
3%	Full description (2 points) Examples: *1) The main difference is that nutrition science studies the effects of diet and activity on the human body and nutritionism is a social construct that advocates for an attitude toward food by separating it from its constituent parts--i.e. vitamins, minerals, etc. This is why it is so easy for nutritionism to be co-opted by advertising and industry; 2) Nutritionism tends to be trendy and isolates specific nutrients by labeling them as good or bad, rather than looking at the larger picture and the overall impact of a specific type or group of foods and how they impact our overall health; 3) Nutrition science is an open book type of study that helps you learn about and discover all types of nutrients found within foods, whereas nutritionism only focus on very specific nutrients and is often heavily persuaded by culture and current trends*	60%

3.2b Viewers' knowledge of nutrition science research, compared to control participants

To assess viewer learning about nutrition science research as presented in the film, viewers and control participants were asked the question: *Choose one of the three nutrients below and answer the following questions about how nutrition science research has impacted Americans' view of the nutrient and its use in our processed food: a) Vitamins, b) Fat, c) Fiber*. After selecting one of these nutrients participants were then prompted with the following two questions: *a) How has research on this nutrient contributed to the American public seeing it as healthy and/or unhealthy? b) Give an example of how this research has influenced use of the nutrient in our processed food.*

The chart below shows the three group options and the percent of participants from the control and viewing groups that chose each group. Participants in both groups most often selected fat (42% viewer vs. 50% control), followed by vitamins (37% viewer vs. 23% control) and fiber (21% viewer vs. 27% control).



The table on the following page shows the percentage of viewers and control participants that answered the question with incorrect, partial, and full explanations, with responses scored from 0-2 respectively. The table also includes examples of responses that were coded under each category.

Part a: For Part a relating to how research on the nutrient has contributed to the American public seeing it as healthy or unhealthy, nine-tenths (89%) of viewers compared to two-fifths (39%) of control participants provided full explanations. Meanwhile the relatively few remaining viewers provided partial (5%) or incorrect (7%) explanations, while the remaining three-fifths of control participants provided either partial (33%) or incorrect or no explanations (27%).

Part b: For Part b relating to an example of how research on the nutrient has influenced its use in processed food, here again, nine-tenths (94%) of viewers compared to less than two-thirds (58%) of control participants provided full explanations. Meanwhile, the few remaining

viewers provided incorrect (7%) explanations, and the remaining two-fifths of control participants provided either partial (11%) or incorrect or no explanations (32%).

Participants' knowledge of nutrition science research		
Control (n=66)	**Part a: How has research on this nutrient contributed to the American public seeing it as healthy and/or unhealthy?**	**Viewer (n=62)**
27%	Incorrect or no explanation (0 points) Examples: *1) No idea; 2) Fiber: Healthy- common knowledge to eat a diet high in fiber; 3) I don't know*	7%
33%	Partial explanation (1 point) Examples: *1) Fiber: Research once made the American public believe that fiber was not a healthy nutrient;2) Fat: Too much fat in your diet can cause many health problems such as heart disease and high cholesterol. There are good fats (avocados) and bad fats. 3) Vitamins: Many Americans take a daily multivitamin to ensure they're getting vitamins and minerals they might not be getting from their daily diet*	5%
39%	Full explanation (2 points) Examples: *1) Fat: The research over the years has linked fatty foods to the rise in obesity and health related issues in American and has contributed to the public's view of fat as a bad nutrient found in foods and one to avoid. The public has come to believe that eating foods with little to no fat contact will contribute to a healthier lifestyle and less risk of diseases like diabetes and obesity; 2) Vitamins: Research on specific vitamins has ended up as a manufacturer's marketing dream, i.e., put the added vitamin on the package combined with articles/advertising and the consumer thinks that it is good for their health; however, this is nutritionism (single nutrient focus) and does not address the health of the whole body; 3) Fat: Based on a perverted version of epidemiological study results, the American public began to see the reduction of fat in foods in and of itself as an indicator of the foods healthy-ness. Rather than suggesting that we reduce certain foods in our diet, the government's dietary guidelines suggested that we needed to reduce FAT in our diet. Thus painting FAT as the "bad guy" in our foods.*	89%
Part b: Give an example of how this research has influenced use of the nutrient in our processed food.		
32%	Incorrect or no description (0 points) Examples: *1) I'm not really sure; 2) I don't know; 3) Vitamins: Trans fat*	7%
11%	Partial description (1 point) Examples: *1) I'm not entirely sure, but I think you see less marketing of fat-free food as a selling point in processed foods. It seems to be more about low carb, low-sugar, and gluten-free; 2) Packaging is advertising what kinds of fat are or aren't in there (trans, saturated, etc.); 3) Fiber: Increased fortification?*	0%
58%	Full description (2 points) Examples: *1) Vitamins started to become added to almost all processed foods. Breads were fortified with vitamins and packaged with advertising that deemed them "healthy". Most processed products today are still fortified with vitamins, even milk; 2) Fat: Fat was taken out of foods to promote it as being more healthy for us. Low, no and reduced fat ice cream, cookies, frozen dinners, etc. And we were encouraged to switch from butter to margarine.; 3) Vitamins: After seeing them used to cure these deficiencies there was a push to add them to every processed food and became a widely successful marketing gimmick for that industry. In reality, the problem could have been mostly solved by returning to less processed foods.*	94%

3.2c Viewers' ability to identify deceptive marketing messages, compared to control participants

To assess viewers' learning about deceptive food marketing messages, viewers and control participants were asked the question: *Are you aware of any deceptive marketing practices that U.S food manufactures use (or have used) to encourage Americans to buy processed "food-like" substances in place of real food?* Those who checked *Yes* were then prompted with the request: *Please list at least three such deceptive marketing practices but no more than five.*

The table below shows the percentage of viewers and control participants that answered the question with 0 to 3 or more practices, respectively. Those who responded *No* to the above question were assigned a 0 score. The table also includes examples of a response coded under each category.

Participants' knowledge of deceptive food marketing practices		
Control (n=66)		**Viewer (n=62)**
47%	Incorrect or no practice listed (0 points)	11%
15%	1 practice (1 point) Example: *Sunny Delight/Capri Sun, and all of the other ""juice"" drinks that have little, if any, juice and loads of processed sugar.*	3%
17%	2 practices listed (2 points) Example: *Adding vitamins to processed foods and marketing them as healthy; using pastoral images and "nature" in packaging (i.e. Nature Valley granola bars) to make them seem more natural and less processed.*	13%
21%	3 or more practices listed (3 points) Example: *1. Packaging that states something is cholesterol free, when it never had cholesterol to begin with. 2. The example of Vitamin Water or other high sugar sports drinks being marketed as containing antioxidants or vitamins. 3. Cereals that advertise they contain all the vitamins, nutrients, etc. that we need to make it appear a healthy alternative.*	73%

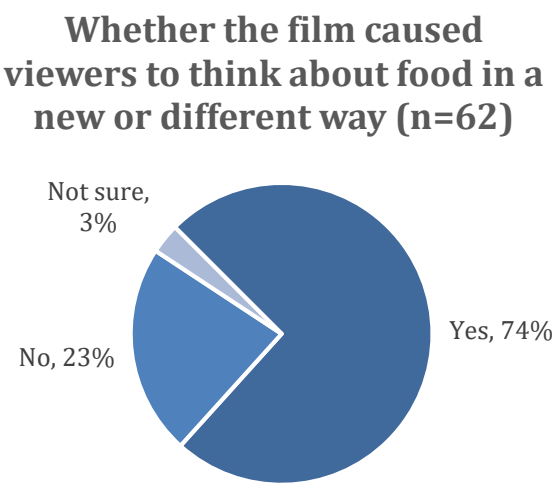
Nine-tenths (89%) of viewers compared to about one-half (53%) of control participants provided at least one or more examples of deceptive marketing practices. Three-quarters (73%) of viewers compared to one-fifth (21%) of control participants provided three or more examples.

Question 4: Did the film increase viewers' motivation to engage in healthy eating?

To assess viewers' motivation to engage in healthy eating, they were first asked if they thought or felt differently about food as a result of seeing the film. Next, viewers were asked if and how they expected to change their food purchases after viewing. Finally, viewers and control participants were asked about the likelihood that they would engage in healthy eating. These findings are presented below in 4.1 through 4.3.

4.1 Whether and how viewers perceived they thought or felt differently about food as a result of watching the film

Viewers were asked if, as a result of seeing *In Defense of Food*, they thought or felt differently about food. As shown in the chart to the right, most (74%) said this was the case. Of those who indicated that they thought or felt differently about food, half (50%) said that healthy eating felt more accessible or likely, while a third (35%) explained that they gained knowledge about healthy eating. A fifth (20%) thought they were more aware of marketing tactics, and a tenth (11%) said viewing the film affirmed their personal choices.



Less than a quarter (23%) of viewers said the film did *not* cause them to think or feel differently about food, with everyone in this group going on to explain that they were knowledgeable about the information in the film prior to viewing, to varying degrees.

Finally, a few viewers (3%) said they were *not sure*, with one explaining that s/he was "*in agreement with many of the film's recommendations already, but it did push some of my sentiments a little further or add some nuances and questions to my thinking*" and the other noting, "*I know I need to change my diet and eating habits, but this change is overwhelming*."

Examples of comments from viewers who answered *Yes* or *No* are shared below.

Yes, I think or feel differently about food after viewing (74%)

Healthy eating feels more accessible or likely (50%)

- *I feel I am more likely to choose the healthiest food to eat despite what friends and family may thing or feel about my choices.*
- *I will definitely be shopping differently and buying far less processed food!!!*
- *I feel like eating healthy is something that is much more accessible, and it gives me hope in my ability to eat better in the future.*

- *I feel more called to action in regards to eating healthy*
- *… the main impact was making me question some of my dietary practices again, and maybe feel inclined to improve my diet and health in general.*
- *I plan to do some additional research on whether to add foods into my current plan. I don't believe I would add red meats or cheese but perhaps chicken on occasion.*
- *I feel like I can make even better choices now, because I don't have to second guess myself.*

<u>Gained knowledge about healthy eating (35%)</u>
- *Eat your colors. Eat more natural and less processed food.*
- *I already knew about how processed foods are detrimental to your health, but I liked learning about how we can choose our eating habits based on portions, time, attitudes, and decisions (e.g. more vegetables/fruits).*
- *I feel even more aware of what a healthy diet is.*
- *I think a plant based diet can make a huge impact on my health.*
- *It confirms for me the importance of plant based diet, but it also reminded me that moderation is important with all foods. Too much of anything is not always good/healthy.*
- *Reiterated I need to eat more fresh fruits and vegetables...plants foods.*

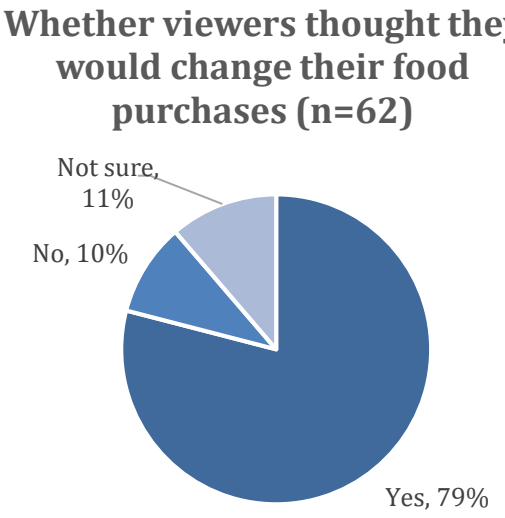
<u>More aware of marketing tactics (20%)</u>
- *Because most food companies don't want you to know what's really in the processed foods just as long as it tastes good*
- *I didn't realize how much processed "healthy" foods I am buying because of the marketing.*
- *I was inclined to think deeply about the relationship between food and culture. Rather depressingly, it highlighted the strength and influence of corporate culture in North America.*
- *…it underscored how manufacturers are only after profit; how government and science really does us no favors sometimes and that they are disproven at the expense of people's health and death*
- *the deceptive nature of nutritionism was something new, very helpful*
- *To be aware and less naive about what companies promote in terms of nutritional and health value.*

<u>Affirmed personal choices (11%)</u>
- *Reconfirmed my own ideas of how to properly nourish myself.*
- *It reminded and reinforced information I had already known*
- *I think it just reinforced what I already knew, and made me feel more confident that the food choices I'm making for my family are the right choices*
- *I already avoid processed foods but it really solidified my opinion on this area.*

No, I do not think or feel differently about food after viewing (23%)
- *I already knew a lot about eating mostly a plant based diet.*
- *The film reassured all of my previous views and opinions on food.*
- *It just reiterated my feelings about eating healthier and what to avoid and try to incorporate into my diet.*
- *I was pretty much on board beforehand. It did confirm some assumptions.*
- *I was aware of this book and many of its ideas, as it's been out for a while - I learned a lot upon its publication and hearing Pollan interviewed and reading excerpts. the film brought that previously learned knowledge to life in a new way, but didn't stray too far from the book in my opinion*
- *I already try to eat healthy, but t presented some further evidence about the amount of plants we should eat daily, and helped me to realize the effects it can have long term.*

4.2 Viewers' expectations regarding changes in future food purchases

Viewers were asked if they thought they would change their food purchases as a result of viewing the film. As shown in the chart to the right, most (79%) said this was the case. Of this group, when asked what they would buy more of, over three-quarters (78%) thought they would buy more plants, with smaller groups mentioning that they would buy more of the following: whole grains (22%), real food (18%), fish (6%), and organic food (6%). A few each said they didn't know (2%) or shared miscellaneous feedback (2%).



When asked that they would buy *less* of, the majority (84%) of those who said they would change their food purchases pointed to processed food, with smaller groups mentioning sugar (31%), meat (18%), and carbs, refined or otherwise (10%). A few each said they already try to avoid unhealthy food (6%) or shared miscellaneous feedback (8%).

About a tenth (10%) of viewers said they would *not* change their food purchases, with everyone in this group (100%) saying they already make healthy purchases and a few (17%) also sharing miscellaneous comments.

Another tenth (11%) of viewers said they were *not sure*, with less than a quarter (71%) of this group saying they already make healthy purchases and more than two-fifths (43%) sharing miscellaneous feedback.

Examples of comments from viewers are shared below.

Yes, I will change my food purchases (79%)

<u>I will purchase more…</u>

Plants (78%)

- *Fresh fruit and vegetables*
- *More fresh fruits and veggies for my family.*
- *More green vegetables i.e. Kale, arugula etc.*
- *Plant based foods*
- *More fruits and vegetables. Look for vegetables that can be entrees.*

Whole grains (22%)

- *Whole grain flour is the biggest change I will make.*
- *Switching to whole grain bread*
- *…more whole wheat vs white flour ….*

Real food (18%)

- *…butter instead of margarine*
- *I plan to consume more food that is not processed, especially fruits and vegetables.*
- *…less processed and packaged foods*
- *Get foods that are natural.*

Fish (6%)

- *Fish*
- *I would also like to eat more fish.*

Organic food (6%)

- *…the focus will be on buying more local, organic foods directly from farmer*
- *More organic foods, fruits, and vegetables.*
- *More organic and less processed.*

Don't know (2%)

- *Don't know.*

Miscellaneous (2%)

- *I won't buy more vegetables or meat, but I might change the vendors.*

I will purchase less…

Processed food (84%)

- *Less prepackaged foods*
- *Processed food are going to be an exception.*
- *I will purchase less artificial and processed foods…*
- *I'll probably splurge on processed foods even less*

Sugar (31%)

- *Sugar, corn syrup laden items...it difficult to call some things "food"*
- *Granola bars high in sugar, drinks high in sugar.*
- *Less…cookies!!*
- *Ice cream*
- *Less sugary drinks*

Meat (18%)

- *Processed meats*
- *Less meats*
- *Red meats*

Carbohydrates (10%)

- *Foods high in carbohydrates*
- *Processed grains.*
- *Processed foods, primarily white bread and cereal*
- *I think I'll rarely buy any breads made from white flour again.*

Already try to avoid unhealthy food (6%)

- *…can't say that I will reduce sugar and starch related to sugar products since I have avoided those for years already*
- *Processed, prepackaged foods...although try to avoid them already.*

Miscellaneous (8%)

- *I will probably eat less frequently in restaurants.*
- *I'm going to keep on my friends to make better choices…all that stuff*
- *No, I will not change my food purchases (10%)*

No, I will not change my food purchases (10%)

Already shop for healthy food (100%)

- *I already buy vegetables from a coop/farmer's market.*
- *Because I already eat according to the principles in the film*

Miscellaneous (17%)

- *I will think deeper about paying the extra money for foods that are better for you and maybe one day sourcing food and ingredients from my own personal garden.*

I'm not sure if I will change my food purchases (11%)

Already shop for healthy food (71%)

- *I already made big changes to my food purchases. I plan to evaluate it but happy with my results. I need to increase my vegetable and fruits. I plan to adapt the smaller plate practice & eat less!*
- *The film largely reinforced my current consumer habits.*
- *I already eat pretty darn good, and I am grateful to be afforded that luxury, therefore I am not certain the film will directly affect my purchases.*

Miscellaneous (43%)

- *Members of my household my not be willing to eat as I eat. I will need to strike a balance between what taste good and what is good for you.*
- *…in the future when the next new nutritionism based craze comes out, I will use this information to help me steer away from the false advertising or gimmick that is being sold.*
- *I don't do the grocery shopping for my family, but I will likely request more healthy and natural foods. When it comes to fast food, I may try to find healthier options, or just try to refrain from eating as much fast food as I have in the past.*

4.3 Likelihood that viewers thought they would engage in healthy eating, compared to control participants

Viewers and control participants were asked how likely they were to engage in various healthy eating activities addressed in the film in the coming weeks, choosing one number on the scale from 1.0 (*definitely won't*) to 5.0 (*definitely will*) for each activity listed. They were also given the option of reporting that they already did each activity. The table below shows the median ratings and IRQ for each activity, with the viewer medians highlighted in **bold.** Additionally, the table shows the percentage of participants who reported they "already do" that activity, with viewer percentages also in **bold**.[26]

Viewers' (n=62) and control participants' (n=66) median ratings of likelihood of doing various healthy eating activities in the coming weeks

	Already do	Definitely won't 1.0	Probably won't 2.0	May or may not 3.0	Probably will 4.0	Definitely will 5.0
Eat fewer processed foods	50% **42%**				4.0 (*IQR*=2)	**5.0 (*IQR*=1)**
Eat more real food	53% **42%**				4.0 (*IQR*=1)	**5.0 (*IQR*=1)**
Reduce portion sizes	27% **19%**			3.0 (*IQR*=1)	**4.0 (*IQR*=2)**	
Increase the amount of plant foods in your diet	39% **32%**				3.5 (*IQR*=1)	**5.0 (*IQR*=1)**

Among those who didn't check "already do," viewers tended to rate their likelihood of doing each activity in the coming weeks higher than did control participants. The medians for each statement are as follows, with viewer medians listed before control participants: *Eat fewer processed foods* (*Mdn* = 5.0 vs. 4.0); *Eat more real food* (*Mdn* = 5.0 vs. 4.0); *Reduce portion sizes* (*Mdn* = 4.0 vs. 3.0); and *Increase the amount of plant foods in your diet* (*Mdn* = 5.0 vs. 3.5). In each case Mann-Whitney tests demonstrated that the difference was statistically significant and the effect size was large, except for the portion size item where the effect size was small as indicated in the footnote.[27]

[26] Individual median ratings as opposed to overall mean scores are provided in this section as the statements do not comprise a scale but rather relate to distinct goals developed for the film.

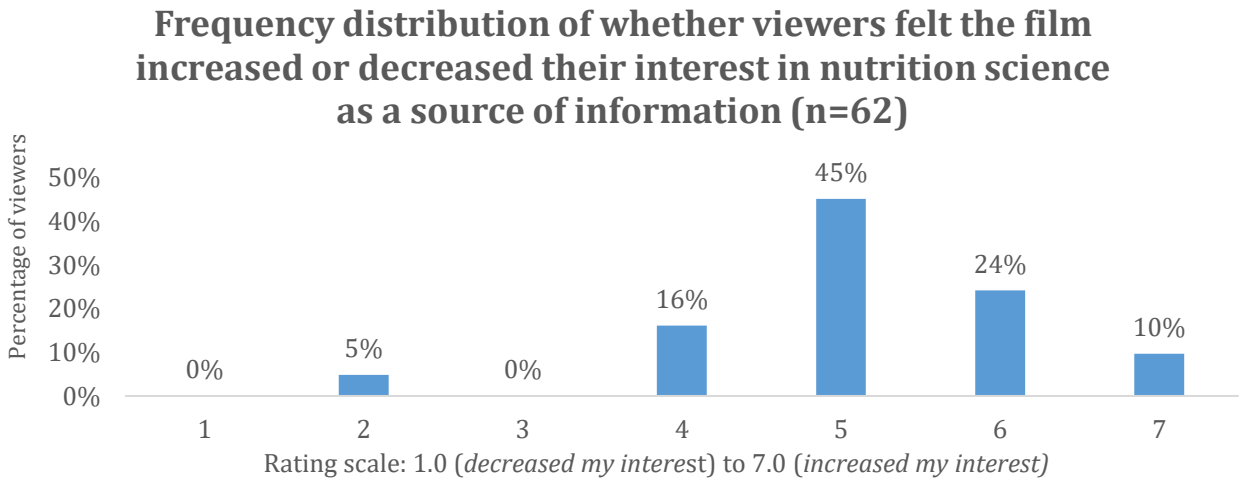
[27] The results of the Mann-Whitney test and the effect size for each statement are as follows: *Eat fewer processed foods* ($U = 197.5$, $p < .001$, $r = .45$); *Eat more real food* ($U = 227.5$ $p < .001$, $r = .40$); *Reduce portion sizes* ($U = 771.0$, $p < .001$, $r = .28$); *Increase the amount of plant foods in your diet* ($U = 292.5$, $p < .001$, $r = .48$).

Question 5: Did the film increase viewers' interest in nutrition science?

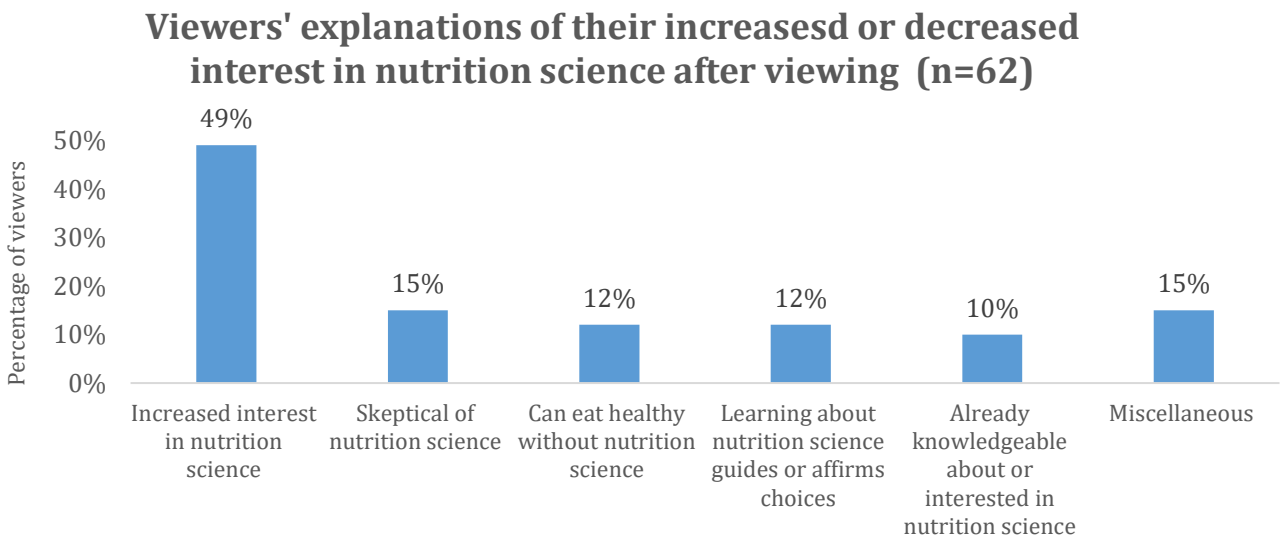
To assess whether the film increased viewers' interest in nutrition science, they were first asked to rate the extent to which seeing the film increased or decreased their interest in turning to nutrition science as a source of information about nutritional issues. Viewers and control participants were asked to rate the importance of knowing about nutrition science in order to eat a healthy diet. Finally, viewers and control participants were asked about the likelihood that they would learn more about nutrition science in the following weeks. These findings are presented below in 5.1 through 5.3.

5.1 Viewers' interest in turning to nutrition science as a source of information

Viewers were asked to rate the extent to which seeing the film increased or decreased their interest in turning to nutrition science as a source of information about nutritional issues, on a scale from 1.0 (*decreased my interest*) to 7.0 (*increased my interest*). Though they shared a range of ratings, overall the viewers felt that the film *slightly increased* their interest in turning to nutrition science (median rating 5.0). The chart below shows the percentage of viewers that selected each rating.



The chart on the next page shows the main themes viewers discussed when asked to elaborate on their ratings. Nearly half (49%) focused on their increased interest in nutrition science. Smaller groups indicated they were skeptical of nutrition science (15%), described how they would be able to practice healthy eating without knowledge of nutrition science (12%), pointed out how learning about nutrition science would guide or affirm their choices (12%), explained that they were already knowledgeable on this topic (10%), or shared miscellaneous feedback (15%).



Examples of the viewers' responses are shared below.

Increased interest in turning to nutrition science (49%)

- *Always interesting to see new ideas on eating healthier*
- *It was interesting, and it definitely increased my interest. Knowledge can be a powerful motivator.*
- *I think being more informed about the nutrition science as a source of information about nutritional issues can only help you to make more well informed choices that are going to be in your best interest.*
- *I am interested to keep up on research just to see which direction things are going, and if it looks like anything crazy from the past.*
- *You need to learn about the facts presented to you because the food industry did not grow to the size it is without using deceptive methods of advertising.*
- *It increased my awareness of food industry marketing and the value to be found in scientific studies of nutrition instead of advertisements.*

Skeptical of nutrition science (15%)

- *It is a science which is more interested in moving product and laboratory testing over general well-being.*
- *The overload from biased information about nutrition has made me cynical about anything I read related to nutrition science.*
- *I think nutrition science, like all science, is something that often evolves over time and should not necessarily be the basis for radical changes in our behavior.*
- *When nutrition science is clear, accurate, and addresses my whole body's health, then I am interested in it; when it is not, I am not interested in it*
- *It's a complicated topic and there are new theories or gimmicks presented every day. I'm not sure how much confidence I would have in making informed decisions based on the latest scientific finding. Part of this is due to one of the topics the video touched on: there can be a correlation between what we eat and certain health problems, but that doesn't necessarily mean that there is a causation.*

Able to practice healthy eating without knowledge of nutrition science (12%)

- *I do not want to have to study just to eat what keeps me feeling healthy and that makes me feel less guilty for ignoring the science to some degree*
- *For me it's not the science, it's the doing. Eat real foods, if it's a plant it's good, if it comes from a plant it's not, use a smaller plate to decrease portion size, use meat as flavoring or only on special occasions.*
- *For me the belief that everything should be in moderation is the best advice to follow.*
- *If I keep it simple and stick to mostly plant based foods, I don't need to worry about the science.*

Learning about nutrition science guides or affirms choices (12%)

- *I will now be more proactive in searching for data that will influence my eating decisions.*
- *Deeper understanding of the why can help me stick to eating right.*
- *This helped me to understand that the basics of nutrition science are enough to be able to build a healthy diet.*
- *The food history and science made me feel better in eating healthier.*

Already knowledgeable about or interested in nutrition science (10%)

- *I'm always interested. Nothing much has changed*
- *I am already pretty proactive with regards to my diet, so it is hard for me to state, with certainty, that this would increase my interest.*
- *I completed the program at the Institute for Integrative Nutrition where they covered a lot of what was addressed in this film; I've already learned a lot about nutrition science.*

Miscellaneous (15%)

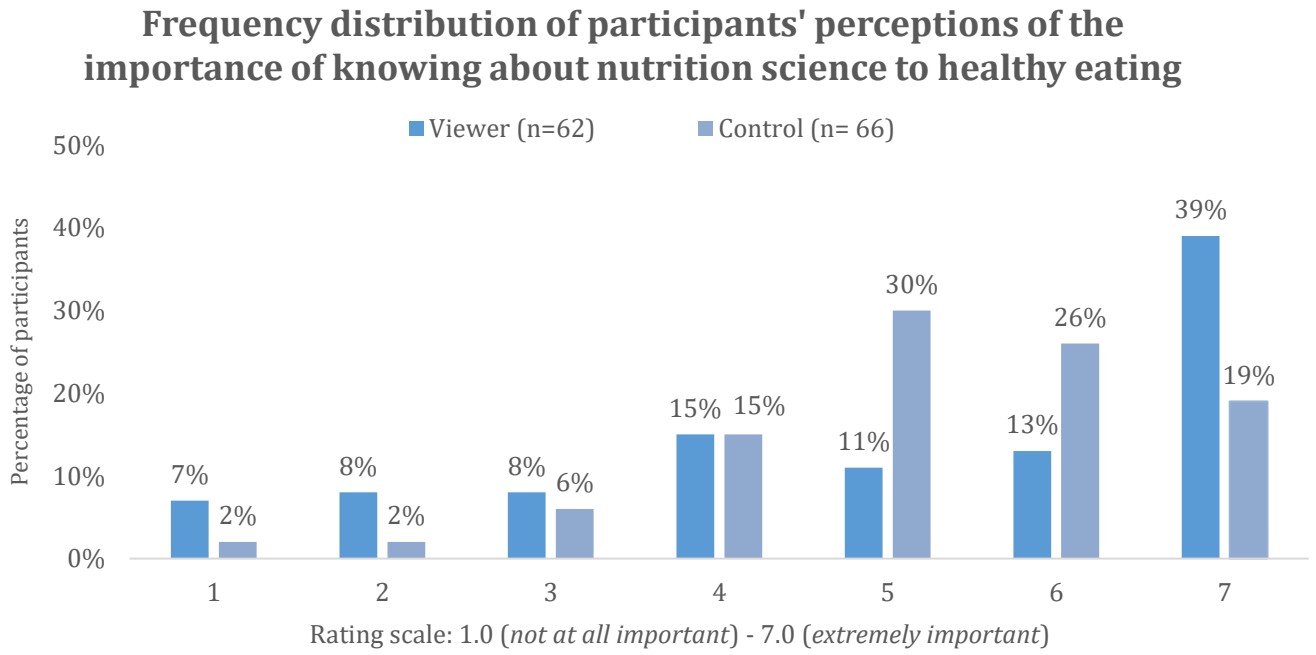
- *I'd like to research more recipes with less sugar and vegetables.*
- *It was technical*
- *I'll check when in doubt!!*
- *I am now more aware of processed foods.*
- *I learned nothing new from this film.*
- *I'm not really interested in nutrition science.*
- *I always thought of it as nutrition and NOT Nutritional science, but it makes sense to call it Nutritional Science.*

Additionally, it is worth noting that a tenth (10%) of viewers were conflicted in their responses, highlighting the complexity of the issue, as in:

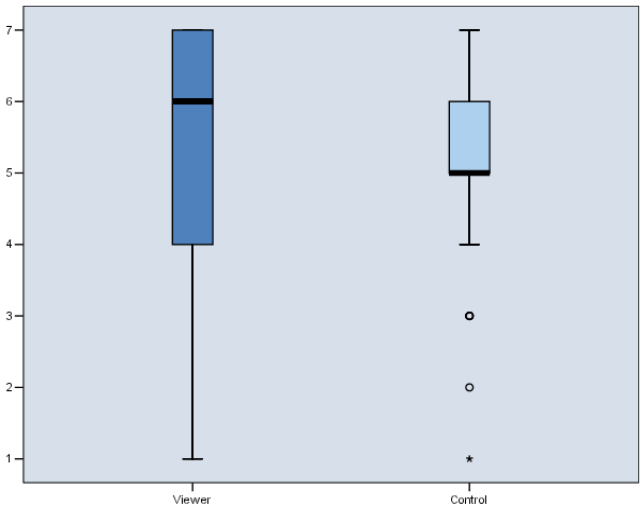
- *I provided a rating of 5 because as long as I follow the simple guidelines of eating food from plants and not made IN plants (i.e. processed foods) I trust that I will be eating healthy and will not need to look into the findings of nutrition science. This being said, I provided a rating of 5 and not 4 because if scientists come out with any new findings regarding general nutrition, I would very much like to know what said findings are moving forward.*
- *This is tough, because it is somewhat demonized in certain parts of the movie, and glorified in other parts. It does, however, show how food science is used to evaluate health problems and has therefore increased my interest.*
- *Nutrition science is helpful to us as humans, it may not always be 100% accurate, but I am glad that people are researching how food affects our health*
- *If I wasn't sure about a food that a family member wanted to try, I would probably look for information regarding it before making up my mind about its healthfulness. But I don't need to know the science about why real foods are healthy in my everyday life.*

5.2 Whether viewers think it is important to know about nutrition science in order to eat a healthy diet, compared to control participants

Viewers and control participants were asked to rate how important they felt it was to know about nutrition science in order to eat a healthy diet, using the scale from 1.0 (*not at all important*) to 7.0 (*extremely important*). They were also asked to explain their answer. The chart below shows the percentage of participants that selected each rating.



Overall, the median rating for the viewer group was a point higher (6.0, *IQR*=3) than the control group (5.0, *IQR*=1), although the difference was not statistically significant. The box plot to the right helps illustrate the variability of the ratings for each group. The comparatively short box plot for the control group shows a high level of agreement while the box plot for the viewer group, which is comparatively tall, indicates a higher level of variability among this group.



When invited to elaborate on their ratings, the largest groups of viewers and control participants explained why they felt nutrition science is important. Others explained why they felt nutrition that science was somewhat important or important to some, or said nutrition science was not important. Smaller groups said they didn't know or provided miscellaneous feedback. Examples of viewers' and control participants' responses in each area are shared in the table on the next page.

Responses shared by viewers and control participants when asked about the importance of knowing about nutrition science to eat a healthy diet

Viewer (n=61)

Important for eating a healthy diet

- *It is important to know why certain foods are good for you, and the evidence behind it.*
- *You absolutely need to know what you are putting in your body and how it can profoundly affect your health.*
- *Knowing what the benefits are in the food*
- *I think it's extremely important to know what exactly you are putting into your body and the effect it has on the body. Knowing nutrition science allows us to be healthier by means of regulating what we eat and how we eat it.*
- *An understanding of nutrition science can help the consumer decide what is healthy or not healthy.*
- *Without it, consumers are influenced by marketing of large corporations, who are pushing unhealthy but cost effective products. Consumers suffer by deteriorating health. Nutrition science regulates that.*
- *If you know about nutrition science, then you understand the basic principles behind the advice on what to eat. You won't be led astray by the latest quack idea.*

Somewhat important/important for some

- *I think is somewhat important to have a basic understanding of nutrition science to be able to make healthy choices.*
- *It's only slightly important because if you just make it simple you will be healthy. Eat real foods, mostly plants and use small plates.*
- *It is important if you are just becoming aware of which foods are considered healthy for your weight, size and metabolism.*
- *It's not necessarily important to understand exactly what happens in the body every time we eat food…However, in a western context, it is perhaps useful to know some amount of basic nutrition science in order to understand the difference between "real" and heavily processed foods that are marketed as healthy.*
- *Nutrition science is only important if you want to make food decisions in tandem with marketing BS. If you ignore the marketing, eat foods that don't have marketing, you are can make better decisions with less effort.*
- *In the Western world, I think it's important for people to know that their food choices are directly related to their health, especially with the overabundance of cheap processed foods.*

Not important

- *Every nutrient has pros and cons, ergo eating a balanced diet with everything in moderation will be fine for most people.*
- *Really Michael Pollan says, it is simple: eat from the non-processed sections mostly (vegetables and fruits) and in multiple colors, add meats as a treat, eat no processed foods, eat in moderation, etc.; thus, there is no need to know about the science, but just know that these rules increase one's health dramatically*
- *As Pollan said, if one is eating mostly whole, fresh foods, grown in nature and not produced in factories, those foods contain the healthy nutrients that humans need to thrive*

Miscellaneous

- *Insisting on the importance of nutrition science to the wrong audience will drive them away. Simple advice, such as is offered in this program, will draw them in and help them make healthier choices.*
- *I would rather eat natural food than processed food.*

Control (n=65)

Important for eating a healthy diet

- *A healthy diet requires knowledge of how food intake affects the body*
- *We know that in this country people tend to eat less healthy than they used to. A better understanding of nutrition science can help us understand why what we eat is so important.*
- *You need to know the nutritional value of the foods you consume to make the healthiest choices.*
- *The study of nutrition allows us to fully understand how to create and implement a healthy diet*
- *Some principles of science are not intuitive or are contrary to commonly held notions.*

Somewhat important/important for some

- *You don't need to "know about nutrition science," so much as you need to have an understanding of its VERY basic tenets.*
- *I think knowing a little about how the body processes different nutrients would be helpful, but isn't completely necessary to know how to eat healthy.*
- *I think while it's important in broad strokes, it's more important that you have a generally healthy diet that you can stick to than that you optimize every aspect of your food intake.*
- *I don't think it's necessary to know all the science, but to place trust in those who do by listening and heading their recommendations.*
- *Someone needs to know a lot about it, i.e. health care providers, dieticians, food manufacturers, etc…*

Not important

- *… the general public doesn't really need to understand the science behind good nutrition in order to lead healthy diets.*
- *… your average person can learn what is health to eat without knowing a lot about the topic.*
- *I think knowing about nutrition science can help sway decisions but you do not need to be well versed in it to eat healthy*
- *You cannot know its nutritious and still eat healthy*
- *Common sense is frequently more useful than science.*
- *I think overall principles of moderation, balance and sticking to natural foods over processed helps a lot and is easier to enact.*

Don't know

- *I'm not sure whether it is important to know about nutrition science in order to eat a healthy diet. In part this is because I'm not exactly sure what nutrition science is.*

Miscellaneous

- *It empowers people to make educated choices when…supporting policies that impact food support or regulation.*
- *It is important but taste and enjoyment of foods is also important.*
- *I think it is important…but sometimes too much information can be too overwhelming*

5.3 Viewers' expectations regarding following up on nutrition science, compared to control participants

Viewers and control participants were asked how likely they were to engage in various activities related to nutrition science addressed in the film in the coming weeks, choosing one number on the scale from 1.0 (*definitely won't*) to 5.0 (*definitely will*) for each activity listed. They were also given the option of reporting that they already did each activity. The table below shows the median ratings and IRQ for each activity, with the viewer medians highlighted in **bold** as well as the percentage of participants that reported they "already do" that activity.[28]

Viewers' (n=62) and control participants' (n=66) median ratings of likelihood of learning about nutrition science in the coming weeks						
	Already do	**Definitely won't 1.0**	**Probably won't 2.0**	**May or may not 3.0**	**Probably will 4.0**	**Definitely will 5.0**
Research about nutrition science	5% **3%**			3.0 (*IQR*=1) **3.0 (*IQR*=1)**		
Keep up on the latest nutrition science	5% **2%**			3.0 (*IQR*=1) **3.0 (*IQR*=2)**		
Carefully review the findings from nutrition science for faulty science or bias	5% **5%**			3.0 (*IQR*=1) **3.0 (*IQR*=2)**		

Among those who didn't check "already do," viewers and control participants both tended to indicate they may or may not do each activity in the coming weeks, with viewers and control participant median ratings both being 3.0 for the following three activities: *Research about nutrition science*; *Keep up on the latest nutrition science*; and *Carefully review the findings from nutrition science for faulty science or bias*. In each case Mann-Whitney tests demonstrated that the differences between the median ratings were not statistically significant.

[28] Individual median ratings as opposed to overall mean scores are provided in this section as the statements do not comprise a scale but rather relate to distinct goals developed for the project.

Question 6: Did the film increase viewers' ability to identify and analyze marketing messages about nutrition as well as their likelihood of doing so?

To assess whether the film increased viewers' ability to identify and analyze food-related marketing and their likelihood of doing so, viewers and in some cases control participants were asked a variety of questions. In addition to the question set described under the content learning section of 3.2c where both viewers and control participants were asked to identify deceptive marketing practices, viewers and control participants were asked to self-asses their ability to analyze deceptive marketing practices and to report on the likelihood that they would look for and analyze the accuracy of food-related advertising and marketing. Finally, viewers only were asked two additional questions, first to identify what they learned from the film about how to critically analyze food-related marketing and advertising, and second to report on if and how they thought they would apply what they learned from the film. These findings are presented below in 6.1 through 6.4.

6.1 Viewers' perceptions about their ability to analyze deceptive marketing messages, compared to control participants

Viewers and control participants were asked for their level of agreement with two statements about food advertising on a scale from 1.0 (*strongly disagree*) to 7.0 (*strongly agree*), with 4.0 being not sure. The table below shows the median ratings and IRQ for each statement, with the viewer medians highlighted in **bold**.[29]

Viewers' (n=62) and control participants' (n=66) median ratings of statements about their ability to analyze deceptive marketing messages							
	Strongly disagree 1.0	Disagree 2.0	Slightly disagree 3.0	Not sure 4.0	Slightly agree 5.0	Agree 6.0	Strongly agree 7.0
I know how to look for the tactics used in the food advertising/marketing that I encounter on an everyday basis.					5.0 (*IQR*=2)	**6.0 (*IQR*=1)**	
I can determine what information is accurate when analyzing food related advertising and marketing.					5.0 (*IQR*=1)	**6.0 (*IQR*=1)**	

As the table shows, viewers tended to rate each statement higher than did control participants. The medians for each statement are as follows, with viewer medians listed before control participants: *I know how to look for the tactics used in the food advertising/marketing that I encounter on an everyday basis* (*Mdn* = 6.0 vs. 5.0) and *I can determine what information is accurate when analyzing food related advertising and marketing* (*Mdn* = 6.0 vs. 5.0). In each

[29] Individual median ratings as opposed to overall mean scores are provided in this section as the statements do not comprise a scale but are rather relate to distinct goals developed for the film.

case Mann-Whitney tests demonstrated that the difference was statistically significant and the effect sizes were medium.[30]

6.2 Viewers' self-reported likelihood of analyzing food advertising/marketing tactics and accuracy

Viewers and control participants were asked how likely they were to analyze food advertising/marketing tactics and accuracy addressed in the film in the coming weeks, choosing one number on the scale from 1.0 (*definitely won't*) to 5.0 (*definitely will*) for each activity listed. The table below shows the median ratings and IRQ for each activity, with the viewer medians highlighted in **bold,** as well as the percentage of participants that indicated they "already do" that activity, with viewer percentages again in **bold**.[31]

Viewers' (n=62) and control participants' (n=66) median ratings of likelihood of analyzing food advertising/marketing tactics and accuracy in the coming weeks

	Already do	Definitely won't 1.0	Probably won't 2.0	May or may not 3.0	Probably will 4.0	Definitely will 5.0
Look for the tactics used in the food advertising/ marketing you encounter on an everyday basis	33% **34%**			3.0 (*IQR*=2)		**5.0 (*IQR*=1)**
Analyze the accuracy of the information presented in the food advertising/ marketing you encounter on an everyday basis	26% **23%**			3.0 (*IQR*=2)	**4.0 (*IQR*=1)**	

Among those who didn't check "already do" viewers tended to rate their likelihood of doing each activity in the coming weeks higher than did control participants. The medians for each statement are as follows, with viewer medians listed before control participants: *Look for the tactics used in the food advertising/marketing you encounter on an everyday basis* (*Mdn* = 5.0 vs. 3.0) and *Analyze the accuracy of the information presented in the food advertising/marketing you encounter on an everyday basis* (*Mdn* = 4.0 vs. 3.0). In each case Mann-Whitney tests demonstrated that the difference was statistically significant and the effect size was medium and small, respectively.[32]

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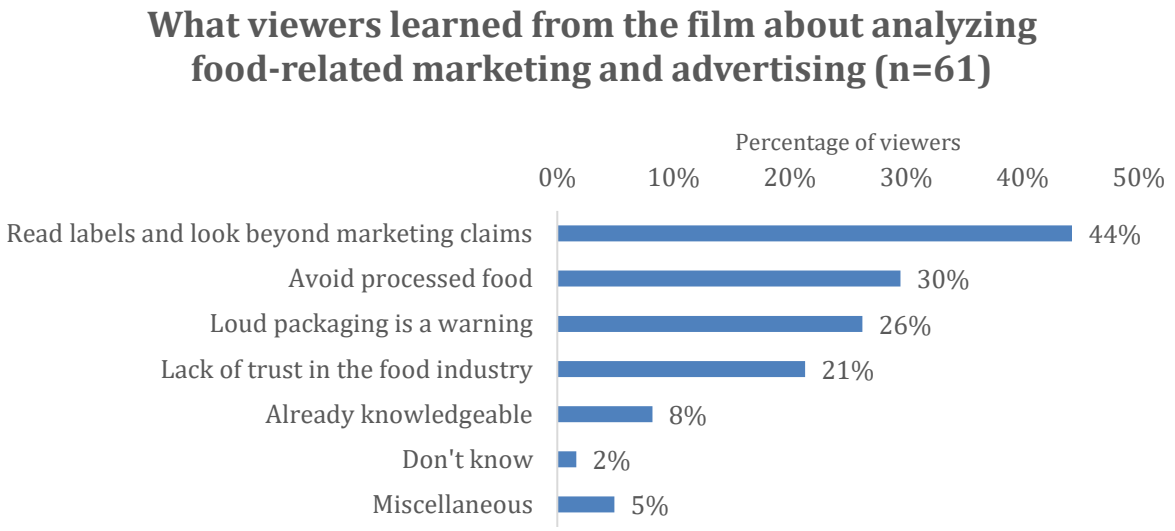
[30] The results of the Mann-Whitney test and the effect size for each statement are as follows: (1) *I know how to look for the tactics used in the food advertising/marketing that I encounter on an everyday basis* (U = 1079.0, p < .001, r = 43); and (2) *I can determine what information is accurate when analyzing food related advertising and marketing* (U = 1223.0, p < .001, r = .36).

[31] Individual median ratings as opposed to overall mean scores are provided in this section as the statements do not comprise a scale but are rather relate to distinct goals developed for the film.

[32] The results of the Mann-Whitney test and the effect sizes were as follows: *Look for the tactics used in the food advertising/ marketing you encounter on an everyday basis* (U = 1079.0, p < .001, r = .36); and *Analyze the accuracy of the information presented in the food advertising/marketing you encounter on an everyday basis* (U = 1223.0, p < .001, r = .24).

6.3 What viewers thought they learned from the film about how to critically analyze food-related marketing and advertising

Viewers were asked what they learned from the film about how to critically analyze food-related marketing and advertising. As shown in the chart below, the largest group (44%) of viewers who shared a response commented on what they learned about reading labels and looking beyond marketing claims. About a third (30%) said they learned to avoid processed food, a quarter (26%) learned that loud packaging is a warning, and a fifth (21%) commented on their lack of trust in the food industry. Smaller groups said they were already knowledgeable (8%), that they didn't know (2%), or shared miscellaneous responses (5%).



Examples of viewers' feedback are provided below.

Read labels and look beyond marketing claims (44%)

- *I learned to look at the ingredients instead of the packaging/advertising.*
- *Look at the list of ingredients. Do I know what everything is? Can I pronounce the ingredients? A food isn't a real food if I don't know what it contains, and the ingredients that I don't know will signify that it is something processed. If I'm looking at the nutritional content of something that is "low fat", look at how much sugar it has and compare it to its full fat counterpart.*
- *Look at the type of fats that the foods contain, look for sugar in all the forms that it comes in and can be disguised as! Look for word like "added nutrients" since that means they are replacing what has been removed in the processing of the food-like substances! I learned to look for misleading packaging based solely on statistical nutrition.*
- *I know to look out for "low fat" because that often just translates to higher sugar.*
- *Look for less trans-fat and less sugar*
- *Learned to look at the ingredients no matter what. If something is sugar free or has zero trans-fat look to see what else is added or how much saturated fat there is.*
- *When I purchase packaged food, I will be looking at how much sugar and sodium are REALLY contained within and not the claims on the packaging.*
- *I will look at the whole picture. Not just one detail in a product that is overall unhealthy. For example, Gummy Bears being 100% fat free is a joke. Of course they are full of sugar.*

Avoid processed food (30%)

- *I learned to look for stuff that was not processed*
- *Real fruits and vegetables.*
- *I learned that eating the right portions and the right amount of omega 3 and the intake of right nutrients can help you have a much stable life without eating all the processed foods*
- *I love the line "if it comes from a plant eat it, if it was made in a plant avoid it." Not verbatim but the concept is clearly simple and I can breech the healthy approach now and then.*
- *I think the simplest thing for me that I took away was to focus on buying groceries from the outside perimeter of the grocery store.*

Loud packaging is a warning (26%)

- *Silence... the less you hear the better it is for you!*
- *Better to stay with the food that doesn't talk.*
- *Quieter foods are better, usually more healthy.*
- *I think the point of how the interior of the grocery store has products screaming about added health benefits, while the produce section doesn't because it doesn't, was a great point*
- *I'm not going to start reading labels because I am only going to eat food that does not tell me how good it is on a label because the foods I am going to eat don't have labels.*

Commented on lack of trust in the food industry (21%)

- *To me, marketing advertising agencies are criminals. I won't take anything at face value. I will listen to every fact that they tout and challenge them by looking them up.*
- *I tend to think of advertising as a kind of lie--by which I mean that in the case of food, the more that it proclaims its health benefits, the more I feel inclined toward skepticism.*
- *I learned to think about why the author of the marketing or advertising is saying what they are, and how to understand their perspective and motives.*
- *I learned not to trust food advertisers. I was already a bit skeptical, but the video made me realize that a lot of it is very misleading.*

Already knowledgeable (8%)

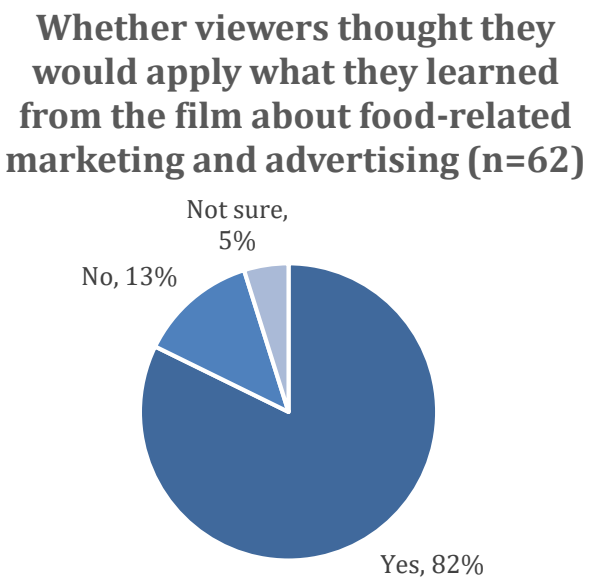
- *I didn't really learn it from the film. I already knew it*
- *I'm already able to do so!! The film was just a great reminder.*

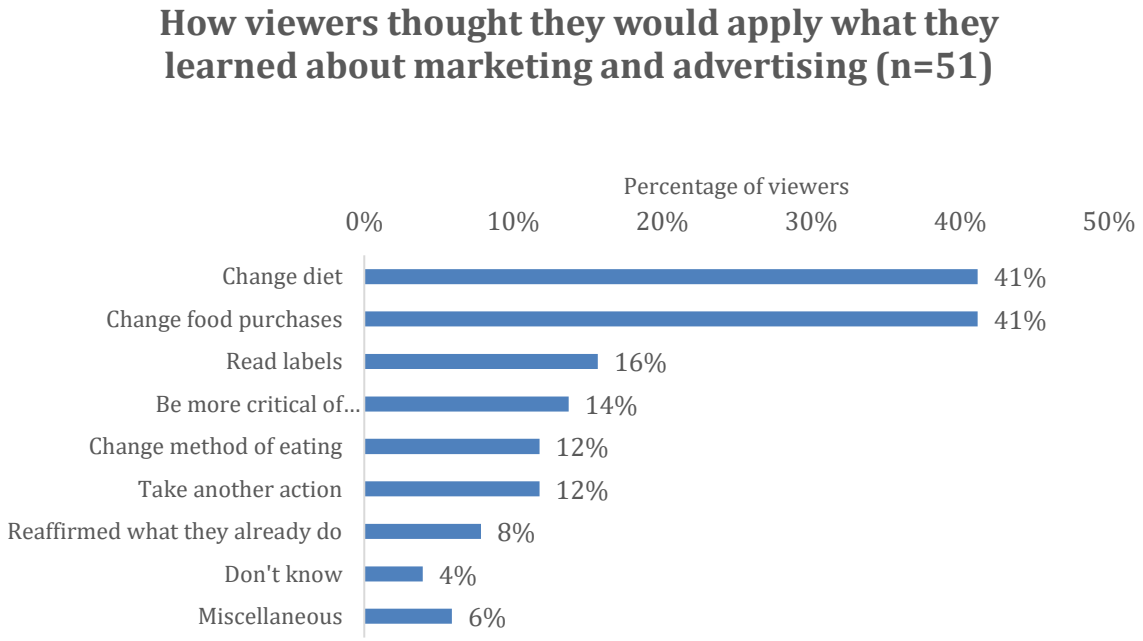
Miscellaneous (5%)

- *To be more discerning about the differences between packaged fruits and vegetables and fresh fruits and vegetables.*
- *It reiterated to me the ill-advised nature of reducing foods to nutritional components.*

6.4 Viewers' expectations of whether and how they would apply what they learned from the film about food-related advertising/marketing

Viewers were asked if they thought they would apply what they learned from the film about food-related marketing and advertising in the coming weeks. As shown in the chart to the right, most viewers (82%) said this was the case. Of this group, as shown in the chart below, about two-fifths each (41% each) expected to change their diets or food purchases. More than a tenth each thought they would read labels (16%), be more critical of marketing and advertising (14%), change their method of eating (12%), and/or take another action like gardening or exercising (12%). Less than a tenth each commented on things they already do (8%), said they didn't know (4%), or shared a miscellaneous comment (6%).





About a tenth (13%) of viewers said they would *not* apply what they learned about food-related marketing and advertising, with almost everyone in this group (88%) going on to explain that they were already informed and weren't influenced by marketing/advertising, and one (12%) saying the subject wasn't relevant to his or her life. Finally, a few viewers (5%) said they were *not sure*, for various reasons.

Examples of comments from viewers are shared on the next two pages.

Yes, I will apply what I learned about food marketing and advertising (82%)

Change diet (41%)

- *I will include more green vegetables with my main meal.*
- *Eating mostly plants, and less meat.*
- *Eating more whole foods.*
- *… think in terms of eating real food that can actually rot ;)*
- *Choose healthy food options more often and limit the instances where processed foods can even be an option.*

Change food purchases (41%)

- *Buying more natural foods*
- *I'll buy more vegetables*
- *I'm going to stay on the outside isles of the market and if there is text on the packaging telling me how healthy the contents are I am not going to buy it.*
- *I will definitely buy more fruits and vegetables at the grocery store and eat out less.*

Read labels (16%)

- *I will read boxes at the grocery store and evaluate what they are promoting.*
- *Look for the amount of trans fat and sugar*
- *Also, I will examine what food is given to me by looking at all components. "The quieter the food, the healthier it will be.*
- *If it claims to be low in fat or otherwise healthy, I will check how many carbohydrates and/or sugar grams are included.*

Be more critical of marketing and advertisements (14%)

- *I will pay close attention to commercials I see and listen carefully to what they promote as healthy and why.*
- *I think I will not take advertisements as seriously and doubt their "scientific evidence" before I buy a product.*
- *To not fall for an over exaggerated commercial of a succulent bowl of mac and cheese or something.*

Change method of eating (12%)

- *I will eat…more slowly*
- *Enjoy and eat slowly.*
- *I will eat more regularly*
- *…stick to an eating schedule*
- *…maybe even purchase some smaller plates*
- *…may consider using the smaller of my plates*

Take another action (12%)

- *… it made me think about adding a hydro phonic garden in my green house.*
- *I'm going to look into growing vegetables hydroponically.*
- *… make an effort to make my own food and grow my own garden.*
- *I will also go back to longer walks…*
- *But we also need exercise.*
- *I will evaluate current nutrition experts and their beliefs.*

Commented on things they already do (8%)

- *I already apply this in my own life by shopping for more organic produce, choosing the healthier choices when it comes to packaged and processed foods, and not falling for any of the latest nutritionism trends.*
- *I feel I already apply what the film is teaching by trying to avoid processed foods and when I do eat processed, read the labels and stay away from the omega-6 oils and sugar.*
- *I'll keep eating on small plates.*
- *Makes me feel good about buying veggies at the farmer's market.*

Don't know (4%)

- *Don't know.*

Miscellaneous (6%)

- *Indeed because I'm aware now*
- *As needed.*
- *I will likely feel more shame next time I reach for a processed protein bar or anything of the sort.*

No, I won't apply what I learned about food marketing and advertising (13%)

Already informed, not influenced by ads (88%)

- *I already knew it!*
- *I already shop for real foods that don't have any marketing. If I shop in the center store, it's for something specific and I'm not making the purchase based on claims of advertising. The film reinforced what I already knew, so it won't really change my behavior.*
- *I feel, in general, immune to food marketing and advertisement. I prefer to consume mostly fresh produce.*

Not relevant (12%)

- *Because it is not relevant to my lifestyle right now.*

I'm not sure if I will apply what I learned about food marketing and advertising (5%)

- *My version of the perfect diet would equal a shopping trip to four different stores every month. This is just not practical for someone with limited time.*
- *I think I will try to continue to be analytical when seeing food advertisement, but not much more than I already would have been.*
- *I need to do more research*

Summary of findings

Study 1 assessed the overall appeal, clarity, comprehensibility, learning value, and motivational impact of *In Defense of Food* as determined by the recruited viewers' and, in some instances, control participants' responses on the questionnaires completed for the evaluation. A summary of the evaluation findings based on the responses of these 128 adults from 22 different states is presented below in six parts, following the goals of the project.

Question 1: Did viewers find the film appealing, engaging, and comprehensible?

1.1 Extent to which viewers found the film appealing: When asked to rate aspects of the film's appeal on a scale from 1.0 (rated the lowest) to 7.0 (rated the highest), the ratings overall indicated that viewers generally found the film very appealing (overall scale mean *M* = 6.5). Specifically, viewers indicated that they liked the film (*M* = 6.55), found the storytelling both engaging (*M* = 6.4) and cohesive (*M* = 6.3), thought the presentation was clear (*M* = 6.50), felt the tone was hopeful (*M* = 6.3), and expected they would recommend the film (*M* = 6.6).

With respect to subgroup differences, a Welsh's t-test revealed that females rated the film's overall appeal significantly higher than did males and the effect size was medium, although in this case the means for both groups exceeded 6.0 (Females *M* = 6.7 vs. Males *M* = 6.2). In addition, a one-way ANOVA test determined that there was a significant difference between age groups for the film's overall appeal. A Games-Howell post hoc test revealed that although in each case the means exceeded 6.0, the viewing group's oldest participants (50 years and older) rated the film's overall appeal significantly higher than did participants in the youngest (18-31) and middle age (32-49) brackets (50 years and older aget: *M* = 6.8; 18-31 years: *M* = 6.3; 32-49 years: *M* = 6.2). No other subgroup differences were found with respect to age, education level, healthy eating engagement, or nutrition science engagement.

1.2 What viewers liked about the film: When asked what they liked about the film, half of the viewers pointed to learning about healthy eating and nutrition. About a third each mentioned the engaging presentation/storytelling, liked that the nutrition recommendations were clear and simple, and/or liked the examples of how different groups or cultures eat. More than a quarter each liked the film's focus on the history of the Western diet and/or the focus on science/research findings. About one-fifth each liked Michael Pollan and/or the focus on healthy eating solutions in underserved communities, while smaller groups found the film motivating or inspiring, liked the focus on marketing/advertising tactics, or commented on miscellaneous elements.

1.3 What viewers did not like about the film: The largest group of viewers who shared a response, two-fifths, said there was nothing they disliked about the film, while a slightly smaller group indicated that they desired more in-depth information or wanted information on a variety of other topics. More than a tenth each found the film too long and/or pointed to an issue with a specific scene. Less than a tenth said they didn't know, and more than a tenth shared miscellaneous responses.

1.4 Extent to which viewers found the film comprehensible: When asked to rate aspects of the film's comprehensibility using a scale of 1.0 (rated the lowest) to 7.0 (rated the highest), with 4.0 being "just right," viewers generally found the film too be "just right" (scale mean *M* = 4.0). On the specific scale items, viewers generally indicated that the film's pace was about right (*M* = 4.0), that it featured about the right amount of information (*M* = 4.1) and science (*M* = 4.0) and that the level of scientific explanations were at about the right level (*M* = 4.0).

Question 2: What were the most interesting things viewers thought they learned from the film, and how did they assess their knowledge of healthy eating and nutrition science after viewing?

2.1 Most interesting things viewers thought they learned from the film: When asked about the most interesting things they learned from the film, the largest groups of viewers, about two-fifths each, pointed to something they learned about how different groups or cultures eat, the role of science/research findings about health or healthy eating, and/or the history and impact of the Western diet/food industry. More than a tenth cited something they learned about healthy eating solutions in underserved communities, while smaller groups pointed to the role of marketing in nutrition decisions, the simplicity of the film's recommendations, or commented on miscellaneous topics. Finally, between one-twentieth and one-fifth pointed to one of the three main recommendations in the film: eat food, not too much, mostly plants, with nearly a third of viewers citing at least one of the three recommendations.

2.2 Viewers' assessment of their knowledge about healthy eating, compared to control participants: When asked for their level of agreement with a set of statements about their knowledge of healthy eating on a scale from 1.0 (*strongly disagree*) to 7.0 (*strongly agree*), viewers and control participants generally *agreed* with the statement *A wide variety of diets can be healthy if they contain the types of whole foods our species have evolved to eat* (*Mdn* = 6.0). A Mann-Whitney test demonstrated that viewers had a significantly higher level of agreement with this statement than did control participants, though the effect size was small. Meanwhile, both groups tended to *slightly disagree*-to-*disagree* with the statement *Figuring out how to eat healthy is confusing* and Mann-Whitney tests demonstrated that there was no significant difference between the groups for this item (*Mdn* = 2.5 vs. 3.0). Finally, viewers tended to have a higher level of agreement with the statement *I have a good understanding of how to eat healthy* (*Mdn* = 6.0 vs. 5.0) and a lower level of agreement with the statement *I need to know about the biology of nutrients in order to eat a healthy diet* (*Mdn* = 2.0 vs. 3.0). In these two instances Mann-Whitney tests demonstrated that the differences were significant and the effect sizes were medium and small, respectively.

2.3 Viewers' assessment of their knowledge about the accomplishments and limitations of nutrition science, compared to control participants: When asked for their level of agreement with a set of statements about the accomplishments and limitations of nutrition science on a scale from 1.0 (*strongly disagree*) to 7.0 (*strongly agree*), viewers tended to rate each statement higher than did control participants. Mann-Whitney tests demonstrated that the differences between the groups were statistically significant in each case and the effect sizes were large. The medians for each statement are as follows, with viewer medians listed before control participants: *I understand what nutrition researchers do and the kinds of*

methods they use (*Mdn* = 5.0 vs. 4.0); *I can give examples of how nutrition science has contributed to our understanding of what constitutes a healthy diet* (*Mdn* = 6.0 vs. 4.0); *I can give examples of how nutrition science has produced findings about healthy eating that have subsequently been shown to be wrong* (*Mdn* = 6.0 vs. 4.0); and *I have an understanding of how nutrition science has changed our food system within the U.S.* (*Mdn* = 6.0 vs. 5.0).

Question 3: Did the film increase viewers' knowledge of healthy eating, nutrition science, and deceptive food marketing practices?

To evaluate the impact of *In Defense of Food* on viewers' knowledge of content covered in the film, both viewers and control participants were asked to complete a 25 point assessment consisting of true/false, fill in the blank, and short answer questions. Each question set was assigned a point value based on the relative importance the series placed on the content addressed and the project's informal science learning goals as prioritized for a general audience. Out of a total possible score of 25, viewers averaged 21 points, while control participants averaged 12. In addition to this higher overall score, viewers also significantly outperformed control participants on each of the two science content areas assessed, detailed below under 3.1 and 3.2.

3.1 Viewers' knowledge of nutrition and healthy eating, compared to control participants: For the question set relating to *viewers' knowledge of nutrition and healthy eating,* out of a total possible score of 12, viewers averaged 10 points while control participants averaged 7.

- **3.1a Viewers' knowledge of nutrition-related facts, compared to control participants:** To assess viewer learning of nutrition-related facts featured in the film, viewers and control participants completed a set of six true/false questions. Viewers outperformed control participants on all but one question, as summarized below.

  More than nine-tenths of viewers compared to about half of control participants correctly answered true to the statement *A deficiency of omega-3 fatty acids increases risk of heart disease death*. Nearly half of viewers compared to about one-sixth of control participants correctly answered false to the statement *Processed foods make up about 30% of the Western diet*. More than nine-tenths of viewers compared to four-fifths of control participants correctly answered true to the statement *In general, Americans consume about one-thousand percent more sugar per day than 200 years ago*. More than nine-tenths of viewers compared to three-quarters of control participants correctly answered false to the statement *The smaller the serving plate the more food people tend to serve themselves*. More than nine-tenths of viewers compared to about nine-tenths of control participants correctly answered true to the statement *The rate of childhood obesity in America has more than doubled over the last thirty years*. Finally, about one-fifth each of viewers and control participants correctly answered true to the statement *Human milk contains material that babies can't digest.*

- **3.1b Viewers' knowledge of the Western diet, compared to control participants:** To assess viewer learning about the Western diet, viewers and control participants were asked the question: *Briefly describe the Western diet and what it typically includes*. Nine-tenths of viewers compared to less than one-quarter of control participants provided full

explanations while the few remaining viewers provided partial explanations, and the remaining three-quarters of control participants provided either partial or incorrect or no explanations.

- **3.1c Viewers' knowledge of the Western diet's links to disease, compared to control participants**: To assess viewer learning about the Western diet's links to disease, viewers and control participants were asked the question: *Are you aware of any major health problems or diseases that are related to eating a Western diet?* Those who answered *Yes* were asked: *What diseases or health problems do you think are related to eating a Western diet? List at least three that come to mind*. In response to the question, more than nine-tenths of viewers compared to just over half of control participants provided full explanations. Meanwhile, the few remaining viewers provided partial explanations, and the remaining control participants, not quite half, provided either partial or incorrect or no explanations.

- **3.1d Viewers' knowledge of what can be learned from the diets or eating habits of healthy populations, compared to control participants:** To assess viewer learning about what we can learn about healthy eating from different groups' diets or eating practices, viewers and control participants were asked the question: *Choose one of the three groups below and describe what we can learn about healthy eating from their diet or eating practices: a) The French, b) The Hadza tribe in Tanzania, and c) The Seventh Day Adventists.* After selecting one of these groups participants were then prompted with the question: *What can we learn about healthy eating from their diet or eating practices?* Participants in both groups most often selected the French, followed by the Seventh Day Adventists and the Hadza tribe in Tanzania. In response to the question about what can be learned, more than nine-tenths of viewers compared to one-third of control participants provided full explanations while the few remaining viewers provided partial explanations and more than two-thirds of control participants provided either partial or incorrect or no explanations.

- **3.1e Viewers' knowledge of basic principles of healthy eating, compared to control participants:** Finally, both groups were asked a question that was not scored with the question set addressed in 3.1 a-d, but was included to generate qualitative information reflective of what viewers gleaned from the film about how to approach healthy eating. In this case, participants were asked what they would tell a friend who asked them to suggest a few basic guidelines for healthy eating. The largest groups of viewers, between almost two-thirds and four-fifths each, pointed to the three main recommendations from the film: eat food, not too much, mostly plants, with more than two-fifths of viewers citing all three suggestions. Other suggestions for their friends were shared by smaller groups of viewers, one-third or less, as follows: eat less meat or meat of a higher quality, eat less sugar, enjoy the ritual of eating and don't take it too seriously, eat fewer (refined) carbohydrates, drink water, eat a range of foods or nutrients, and eat less fat. Less than a tenth of viewers shared miscellaneous responses.

  Among control participants, nearly three-quarters suggested eating food, while more than a quarter recommended moderation/not too much and less than one-fifth pointed to the value of eating mostly plants. Less than one-tenth mentioned all three recommendations. At the same time, about a third of control participants thought they would suggest that

their hypothetical friend eat less sugar, and more than a quarter pointed to reducing (refined) carbohydrates. About a fifth mentioned drinking water, and smaller groups shared the following recommendations: eat less meat or meat or a higher quality, eat a range of foods/nutrients, eat less fat, eat small and frequent meals, eat more protein, and enjoy eating/trying not to take it too seriously. Less than a tenth said they didn't know, and more than one-tenth shared miscellaneous responses.

3.2 Viewers' knowledge of nutrition science and deceptive food marketing practices, compared to control participants: For the question set relating to *viewers' knowledge of nutrition science and deceptive food marketing*, out of a total possible score of 13, viewers averaged 11 points while control participants averaged 5.

- **3.2a Viewers' knowledge of nutrition science and how it differs from nutritionism, compared to control participants:** To assess viewers' learning about nutrition science and nutritionism, viewers and control participants were asked a three-part question that asked them to fill in the blank, as follows: (a) *Nutrition science is* _____, (b) *Nutritionism is* _____, and (c) *The main difference is* _____. In response to all three questions, more than nine-tenths of viewers provided partial or full explanations, while three-quarters of control participants did so for Part a (nutrition science) and just over one-tenth each did so for Part b (nutritionism) and Part c (the difference between the two).

- **3.2b Viewers' knowledge of nutrition science research, compared to control participants:** To assess viewer learning about nutrition science research as presented in the film viewers and control participants were asked the question: *Choose one of the three nutrients below and answer the following questions about how nutrition science research has impacted Americans' view of the nutrient and its use in our processed food*: *a) Vitamins, b) Fat, c) Fiber*. After selecting one of these nutrients participants were then prompted with the following two questions: *a) How has research on this nutrient contributed to the American public seeing it as healthy and/or unhealthy? b) Give an example of how this research has influenced use of the nutrient in our processed food.*

  Participants in both groups most often selected fat, followed by vitamins and fiber. For Part a (relating to how research on the nutrient has contributed to the American public seeing it as healthy or unhealthy), nine-tenths of viewers compared to two-fifths of control participants provided full explanations. Meanwhile the relatively few remaining viewers provided partial or incorrect explanations, while the remaining three-fifths of control participants provided either partial or incorrect or no explanations.

  For Part b (relating to an example of how research on the nutrient has influenced its use in processed food), nine-tenths of viewers compared to less than two-thirds of control participants provided full explanations. Meanwhile, the few remaining viewers provided incorrect explanations, and the remaining two-fifths of control participants provided either partial or incorrect or no explanations.

- **3.2c Viewers' ability to identify deceptive marketing messages, compared to control participants:** To assess viewers' learning about deceptive food marketing messages, viewers and control participants were asked the question: *Are you aware of any deceptive marketing practices that U.S food manufactures use (or have used) to encourage Americans*

to buy processed "food-like" substances in place of real food? Those who checked *Yes* were then prompted with the request: *Please list at least three such deceptive marketing practices but no more than five.* In response to this question, nine-tenths of viewers compared to half of control participants provided at least one or more examples. Three-quarters of viewers compared to one-fifth of control participants provided three or more examples of deceptive marketing practices.

Question 4: Did the film increase viewers' motivation to engage in healthy eating?

4.1 Whether and how viewers perceived they thought or felt differently about food as a result of watching the film: Three-quarters of viewers indicated that they thought or felt differently about food after watching the film. Of this group, half said that healthy eating felt more accessible or likely, while a third explained that they gained knowledge about healthy eating. A fifth thought they were more aware of marketing tactics, and a tenth said viewing the film affirmed their personal choices. Less than a quarter of viewers said the film did *not* cause them to think or feel differently about food, with everyone in this group going on to explain that they were knowledgeable about the information in the film prior to viewing, to varying degrees. Finally, a few viewers said they were *not sure.*

4.2 Viewers' expectations regarding changes in future food purchases: When asked if they thought they would change their food purchases as a result of viewing the film, four-fifths of viewers said this was the case. Of this group, when asked what they would buy more of, over three-quarters thought they would buy more plants, with smaller groups mentioning that they would buy more of the following: whole grains, real food, fish, and organic food. A few each said they didn't know or shared miscellaneous feedback.

When asked that they would buy *less* of, the majority of those who said they would change their food purchases pointed to processed food, with smaller groups mentioning sugar, meat, and carbs (refined or otherwise). A few each said they already try to avoid unhealthy food or shared miscellaneous feedback. About a tenth of viewers said they would *not* change their food purchases, with everyone in this group saying they already make healthy purchases and a few also sharing miscellaneous comments. Another tenth of viewers said they were *not sure*, with less than a quarter of this group saying they already make healthy purchases and more than two-fifths sharing miscellaneous feedback.

4.3 Likelihood that viewers thought they would engage in healthy eating, compared to control participants: Viewers tended to rate their likelihood of doing activities relating to healthy eating in the coming weeks higher than did control participants. Among participants who indicated they did not already do each activity, the medians for each statement are as follows, with viewer medians listed before control participants: *Eat fewer processed foods* (*Mdn* = 5.0 vs. 4.0); *Eat more real food* (*Mdn* = 5.0 vs. 4.0); *Reduce portion sizes* (*Mdn* = 4.0 vs. 3.0); and *Increase the amount of plant foods in your diet* (*Mdn* = 5.0 vs. 3.5). In each case Mann-Whitney tests demonstrated that the difference was statistically significant and the effect size was large, with the exception of the portion size item where the effect size was small.

Question 5: Did the film increase viewers' interest in nutrition science?

5.1 Viewers' interest in turning to nutrition science as a source of information: Viewers were asked to rate the extent to which seeing the film increased or decreased their interest in turning to nutrition science as a source of information about nutritional issues, on a scale from 1.0 (*decreased my interest*) to 7.0 (*increased my interest*). Though they shared a range of ratings, overall the viewers felt that the film *slightly increased* their interest in turning to nutrition science (*Mdn* = 5.0). When invited to elaborate on their ratings, nearly half of viewers who shared a response commented on their increased interest. Smaller groups indicated that they were skeptical of nutrition science, described how they would be able to practice healthy eating without knowledge of nutrition science, pointed out how learning about nutrition science would guide or affirm their choices, explained that they were already knowledgeable on this topic, or shared miscellaneous feedback.

5.2 Whether viewers think it is important to know about nutrition science in order to eat a healthy diet, compared to control participants: When asked to rate how important they felt it was to know about nutrition science in order to eat a healthy diet, using the scale from 1.0 (*not at all important*) to 7.0 (*extremely important*), viewers generally felt that this was slightly more important than did control participants. The median rating for the viewer group was a point higher (*Mdn* = 6.0) than the control group (*Mdn* = 5.0), although the difference was not statistically significant.

5.3 Viewers' expectations regarding following up on nutrition science, compared to control participants: When asked to rate their likelihood of taking follow-up actions using a scale from 1.0 (*definitely won't*) to 5.0 (*definitely w*ill), viewers and control participants both generally indicated they may or may not do each of three activities related to following up on nutrition science in the coming weeks: *Research about nutrition science*; *Keep up on the latest nutrition science*; and *Carefully review the findings from nutrition science for faulty science or bias*. Among participants who indicated they did not already do each activity, in each case the median ratings for the viewers and control participants were the same (*Mdn* = 3.0). Mann-Whitney tests further showed that the differences between the median ratings were not statistically significant.

Question 6: Did the film increase viewers' ability to identify and analyze marketing messages about nutrition as well as their likelihood of doing so?

6.1 Viewers' perceptions about their ability to analyze deceptive marketing messages, compared to control participants: When asked for their level of agreement with a set of statements about their ability to analyze deceptive marketing messages on a scale from 1.0 (*strongly disagree*) to 7.0 (*strongly agree*), viewers tended to rate each statement higher than did control participants. The medians for each statement are as follows, with viewer medians listed before control participants: *I know how to look for the tactics used in the food advertising/marketing that I encounter on an everyday basis* (*Mdn* = 6.0 vs. 5.0) and *I can determine what information is accurate when analyzing food related advertising and marketing* (*Mdn* = 6.0 vs. 5.0). In each case Mann-Whitney tests demonstrated that the difference was

statistically significant and the effect sizes were medium.

6.2 Viewers' self-reported likelihood of analyzing food advertising/marketing tactics and accuracy: When asked to rate their likelihood of taking follow-up actions related to food marketing tactics using a scale from 1.0 (*definitely won't*) to 5.0 (*definitely will*), viewers tended to rate their likelihood of doing each activity in the coming weeks higher than did control participants. Among participants who indicated they did not already do each action, the medians for each statement are as follows, with viewer medians listed before control participants: *Look for the tactics used in the food advertising/marketing you encounter on an everyday basis* (*Mdn* = 5.0 vs. 3.0) and *Analyze the accuracy of the information presented in the food advertising/marketing you encounter on an everyday basis* (*Mdn* = 4.0 vs. 3.0). In each case Mann-Whitney tests demonstrated that the difference was statistically significant and the effect size was medium and small, respectively.

6.3 What viewers thought they learned from the film about how to critically analyze food-related marketing and advertising: Viewers were asked what they learned from the film about how to critically analyze food-related marketing and advertising. Nearly half of viewers who shared a response commented on what they learned about reading labels and looking beyond marketing claims. About a third said they learned to avoid processed food, a quarter learned that loud packaging is a warning, and a fifth commented on their lack of trust in the food industry. Smaller groups said they were already knowledgeable, that they didn't know, or shared miscellaneous responses.

6.4 Viewers' expectations of whether and how they would apply what they learned from the film about food-related advertising/marketing: When viewers were asked if they thought they would apply what they learned from the film about food-related marketing and advertising in the coming weeks, more than four-fifths said this was the case. Of this group, about two-fifths each expected to change their diets or food purchases. More than a tenth each thought they would read labels, be more critical of marketing and advertising, change their method of eating, and/or take another action like gardening or exercising. Less than a tenth each commented on things they already do, said they didn't know, or shared a miscellaneous comment.

About a tenth of viewers said they would *not* apply what they learned about food-related marketing and advertising, with almost everyone in this group going on to explain that they were already informed and weren't influenced by marketing/advertising, and one saying the subject wasn't relevant to his or her life. Finally, a few viewers said they were *not sure*.

Final remarks

The evaluation results indicate that *In Defense of Food* was a successful informal science learning initiative with the participants recruited for Study 1 of the evaluation. Looking across the findings and at themes that emerged in numerous places, we briefly summarize a few key issues below and provide comments and suggestions in the spirit of assisting the *In Defense of Food* team (and others) on this and future projects, recognizing that these ideas are certainly not the only way to respond to the findings.

Overall, the findings show that the *In Defense of Food* film appealed to and engaged viewers recruited for the evaluation. Overall, viewers liked the film, thought the content was interesting, found the storytelling engaging, thought the tone was hopeful, and expected to recommend the film to others. In general, they also thought *In Defense of Food* was well-paced, clear, and had cohesive storytelling. Additionally, viewers generally indicated that film struck the right balance in terms of amount of information, amount of science, and level of scientific explanations provided.

When asked to describe what they most liked about the film, all of the viewers identified at least one thing that they liked, with many citing two or more elements. As a group, viewers most often pointed to liking: the nutrition information and what they learned about healthy eating; the engaging storytelling or presentation; how the suggested guidelines were *simple*, *clear*, and *doable*; and the use of *diverse* and *interesting* examples of healthy eating from different cultures. Throughout their surveys, many viewers also praised the film for having an *empowering* or *motivating* tone that many felt inspired them to reflect on their own diets and eating practices. When asked to describe what, if anything, they did not like about the film, no one aspect stood out to the majority of viewers. The largest group of those who pointed to a dislike indicated that they desired more in-depth information or wanted information on a variety of other topics.

With respect to subgroup differences, the evaluation only found two. First, females tended to rate the film's overall appeal significantly higher than did males, although in this case the overall means for both females and males were over 6.0 (on a scale with 7.0 being the highest). Second, there was a significant difference between age groups for the film's overall appeal such that the viewing group's oldest participants (50 and older) rated the film's overall appeal significantly higher than participants in the youngest (18-31) and middle age (32-49) brackets although, here again, in each case the means exceeded 6.0. No other subgroup differences were found with respect to age, education level, healthy eating engagement, and nutrition science engagement.

In closing, below we share comments and suggestions related to viewers' experiences with and learning from the film.

- Throughout their surveys, a number of viewers commented on the value of learning about the diets or eating habits of other populations. For example, when asked what they found most interesting about the film, the largest group of viewers (44%) pointed to something they learned about how different groups or cultures eat, with some viewers noting that – even across vastly different cultures – the message of the film was still applicable, as in, "*I*

liked the way it presented healthy lifestyles of multiple groups – each group was different and yet [it] all came back to being mostly plant-based, real food."

Turning the lens of reflection away from other cultures, a number of viewers also shared an appreciation for what they learned about the health effects of the typical Western diet. Additionally, when asked to describe diseases or health problems linked to the Western diet, a substantially higher percentage of viewers provided full explanations (94%) compared to control participants (55%), indicating that learning was relatively high in this area.

Taken together, it seems that the film's presentation of the problem and a range of alternatives – that is, learning about the dangers of the Western diet and learning about the healthy diets/eating habits of other populations – were linked in viewers' minds, at least to some extent, which may have helped reinforce the message of the film.

- In general, viewers tended to rate the likelihood that they would eat less processed food, eat more real food, reduce portion sizes, and increase plant consumption higher than control participants. The majority of viewers also indicated that the film caused them to think or feel differently about food, with about half of this group explaining that healthy eating felt more accessible or likely. In addition, most viewers indicated that they thought they would change their food purchases, with the largest groups explaining that they thought they would buy more plant-based food and less processed food.

  Among the quarter (23%) of viewers who said the film did *not* cause them to think or feel differently about food, everyone in this group went on to explain that they were knowledgeable about the information in the film prior to viewing. Similarly, among the fifth (21%) of viewers who said they would *not* change their food purchases or weren't sure that they would change their purchases, the majority indicated that they already shop for healthy food.

  Given their overall interest in, engagement with, and learning from *In Defense of Food*, it appears that familiarity with the subject of the film was not particularly troubling for these viewers. In fact, some viewers pointed to the value of additional exposure, for example saying that even though they were knowledgeable about healthy eating they felt motivated to "*think deeper*" about the issues after watching the film, or that they planned to "*watch this movie many more times just to keep…motivated and refresh it in [their] conscience*."

- Compared with control participants, viewers tended to more strongly agree that they knew how to look for tactics used in food advertising/marketing and that they could determine what information was accurate when analyzing food advertising/marketing. Additionally, viewers tended to more strongly agree that they would look for marketing tactics and that they would analyze the accuracy of food advertising/marketing. In particular, the largest groups of viewers noted that they had learned to read labels and look beyond marketing claims, avoid processed food, and be wary of loud packaging.

- Compared to control participants, viewers were less likely to agree that they needed to know about the biology of nutrients in order to eat a healthy diet. However, viewers generally felt that the film *slightly increased* their interest in turning to nutrition science as

a source of information about nutritional issues, and they thought it was important to know about nutrition science in order to eat a healthy diet to a slightly greater degree than did control participants. Viewers' survey responses further touched upon the intricacy of their interest in and appreciation of nutrition science (for example, "*If I wasn't sure about a food that a family member wanted to try, I would probably look for information regarding [nutrition science] before making up my mind about its healthfulness. But I don't need to know the science about why real foods are healthy in my everyday life*.").

Additionally, and adding another layer of complexity to viewers' perception of nutrition science, a number of viewers pointed out that, although it may not be important for humans in general to understand nutrition science in order to eat a healthy diet, in the Western context, information about nutrition science can help people "*understand the difference between 'real' and heavily processed foods that are marketed as healthy*" and "*make food decisions in tandem with marketing BS."*

- When asked what they would tell a friend who asked them to suggest a few basic guidelines for healthy eating, the largest groups of viewers pointed to the three main recommendations from the film: eat food (73%), not too much (60%), mostly plants (81%), with more than two-fifths (42%) of viewers citing all three suggestions (as in, "*Basically what Michael Pollan said: Eat food, not too much, mostly plants. Food means real food, close to how it's found in nature, not something out of a box.").* Other suggestions were shared by relatively small groups of viewers. In comparison, control participants were less likely to share all three of these recommendations: nearly three-quarters (71%) suggested eating food, more than a quarter (29%) recommended moderation/not too much, and less than one-fifth (17%) pointed to the value of eating mostly plants.

  Of the three recommendations shared in the film, mostly plants was mentioned by the smallest number of control participants (17%) and the largest number of viewers (81%), indicating that this message, in particular, struck a chord with viewers. Additionally, on the subject of mostly plants, it is worth noting that throughout their surveys a number of viewers simplified this message into comments like "*eat more green vegetables*" – not a bad message to send, but slightly different than the one that was intended.

- Finally, returning to the subject of suggestions participants would share with their hypothetical friend, control participants shared a larger range of recommendations than did viewers, potentially pointing to a higher level of confusion about healthy eating. As noted by Michael Pollan in the film, *"…it's no wonder people are confused. Every day there's a new headline: Eat more fiber. Drink less milk. Eggs are bad. Eggs are good. As eaters, we feel whipsawed by the changes in the nutritional advice we're getting*" – a sentiment that is supported by recent research. For example, in 2016 *The New York Times* worked with the Morning Consult, a media and polling firm, to survey hundreds of nutritionists and a representative sample of the American public about whether they thought certain foods were healthy:

  > *The results suggest a surprising diversity of opinion, even among experts. Yes, some foods, like kale, apples and oatmeal, are considered "healthy" by nearly everyone. And some, like soda, french fries and chocolate chip cookies, are not. But in between, some foods appear to benefit from a positive public perception, while others befuddle*

> *the public and experts alike… [For example,] some of the foods in our survey split both the public and our panel of experts. Four of the foods listed above – steak, cheddar cheese, whole milk and pork chops – tend to have a lot of fat. And fat is a topic few experts can agree on. Years ago, the nutritional consensus was that fat, and particularly the saturated fat found in dairy and red meat, was bad for your heart. Newer studies are less clear, and many of the fights among nutritionists tend to be about the right amount of protein and fat in a healthy diet.*[33]

Rather than overwhelming the American public, however, a recent study from Pew Research Center indicates that this confusion may be seen as a necessary byproduct of improved understanding: "*A majority of the American public (61%) says 'new research is constantly improving our understanding about the health effects of what people eat and drink, so it makes sense that these findings conflict with prior studies.'*" [34] The same study also found that, collectively, Americans are paying more attention to healthy eating but not fully embracing what they learn[35], perhaps in response to this range of conflicting information.

[33] Quealy, Kevin and Margot Sanger-Katz. (2016). "Is Sushi 'Healthy'? What About Granola? Where Americans and Nutritionists Disagree." *The New York Times*. Web. Accessed 10 Dec. 2016.
[34] Funk, Cary and Brian Kennedy. (2016). "The New Food Fights: U.S. Public Divides Over Food Science." *Pew Research Center: Internet, Science & Tech*. Web. Accessed 10 Dec. 2016.
[35] Ibid.