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Williams-Piehota, Pamela; Cox, Ashley R.; Navarro Silvera, Stephanie A.; Mowad, Linda Z.; Garcia, Sharon; Katulak, Nicole A.; and Salovey, Peter, "Casting Health Messages in Terms of Responsibility for Dietary Change: Increasing Fruit and Vegetable Consumption" (2004). *Department of Public Health Scholarship and Creative Works*. 67.

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Casting Health Messages in Terms of Responsibility for Dietary Change: Increasing Fruit and Vegetable Consumption

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ABSTRACT

Objective: To compare the effectiveness of messages emphasizing the importance of either personal or social responsibility for dietary behavior change in increasing fruit and vegetable intake.

Design/Setting: Randomly assigned individually or socially oriented messages were delivered at baseline, 1 week, and 2 and 3 months later. Telephone surveys were conducted at baseline and 1 and 4 months later.

Participants: 528 callers to a cancer information hotline who were not meeting the “5 A Day” dietary recommendation.

Interventions: A brief telephone-delivered message and 3 mailings of pamphlets and promotional items encouraging fruit and vegetable intake that emphasized either personal or social responsibility.

Main Outcome Measures: Fruit and vegetable intake 1 and 4 months postbaseline.

Analysis: Chi-square, *t* tests, and analyses of variance and covariance.

Results: Both types of messages increased intake substantially ($P = .01$). To some extent, the social responsibility message continued to motivate increased intake over time compared with the personal responsibility message.

Conclusions and Implications: These minimal interventions had a substantial impact on fruit and vegetable intake. Health messages might be more effective over the longer term if they are designed to emphasize the importance of social responsibility, although further study is needed to confirm the robustness of these findings.

KEY WORDS: food habits, responsibility, fruit and vegetables, health behavior

(*J Nutr Educ Behav.* 2004;36:114-120.)

INTRODUCTION

Many health conditions and diseases can be prevented or delayed by individuals' own behavior. Therefore, it is commonplace for health messages to emphasize personal responsibility for performing health behaviors such as dietary behavior. Consider, for example, the national public health education campaign to prevent and address diabetes: “Eat well. Be active. Have fun. You can prevent type 2 diabetes.”¹ A focus on personal responsibility is thought to provide individuals with a sense of control and empowerment, thereby leading to behavioral change.² Focusing on personal responsibility acknowledges human agency or autonomy in decisions to perform health behaviors, a notion particularly important in Western cultures.³ Popular models of the antecedents of health behavior, such as Social Cognitive Theory,² the Health Belief Model,⁴ and the Theory of Planned Behavior,⁵ emphasize, to a great extent, personal responsibility.⁶

Although health messages emphasizing personal responsibility have been persuasive for motivating some behaviors (eg, stress management,⁷ mammography⁸), heightened attention to personal responsibility may have the paradoxical effect of evoking feelings of anger, frustration, guilt, blame, and/or fatalism.^{9,10} These feelings may promote reactance to or avoidance of a health recommendation, thereby hindering behavior change.¹¹ In contrast, health messages might be more effective for motivating some behaviors if they also acknowledge the social context in which these behaviors are performed.^{12,13} Dietary habits, for example, are developed within and supported by social groups, such as families, friends, and communities.¹⁴⁻¹⁶ Eating is a “social” health behavior that is performed in the presence of others, relies

The research reported in this article was funded by National Cancer Institute grant R01-CA68427. National Institute of Mental Health grant P01-MH/DA56826 and National Institute on Drug Abuse grant P50-DA13334 facilitated manuscript preparation. Address for correspondence: Peter Salovey, PhD, Department of Psychology, Yale University, PO Box 208205, New Haven, CT 06520-8205; Tel: (203) 432-4546; Fax: (203) 432-8430; E-mail: peter.salovey@yale.edu.

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on the behaviors of others to some extent, and is intertwined with other social activities. Health messages emphasizing social responsibility are ones that recognize the existence of the social world and convey a realistic perception of control over behaviors taking place in the social world.¹⁷ They are similar to messages that focus on the social benefits of modeling positive health behaviors, such as the impact of parental presence at the dinner table on fruit and vegetable consumption¹⁸; however, these messages generally focus on parental responsibility (ie, individual responsibility) for caring for others' health. In contrast, social responsibility messages, as we are using them, more readily recognize the interplay between the individual and the social environment, also consistent with theories such as Social Cognitive Theory, which acknowledge the role of the environment in behavioral change and adherence.

Many US health organizations recommend that Americans eat 5 or more servings of fruits and vegetables per day,¹⁹ prompted by evidence showing a consistent relationship between regular fruit and vegetable intake and reduced risk for some diseases.²⁰ The goal of the "5 A Day" campaign is to promote knowledge of the recommendation and, ultimately, to increase fruit and vegetable intake.¹⁹ This health behavior lends itself well to research investigating the influence of emphasizing personal versus social responsibility in health messages because eating fruits and vegetables occurs in social contexts, yet, ultimately, it is the individual who puts the food into his or her own mouth.

The present investigation tested the hypothesis that messages emphasizing the importance of social responsibility for behavior change would be more effective than otherwise equivalent messages emphasizing the importance of personal responsibility in encouraging fruit and vegetable consumption. This comparison was conducted in the context of a health promotion campaign advocating an increase in fruit and vegetable intake among individuals not previously complying with the 5 A Day recommendation.

INTERVENTION DELIVERY AND EVALUATION PROCESS

Participants

Callers to the New England office of the Cancer Information Service (CIS) from May 1, 2002, to July 31, 2002, were asked questions to determine their eligibility for this experiment at the end of the regular CIS-provided service. The CIS is a branch of the National Cancer Institute (NCI) that offers expert cancer information to the public through a toll-free hotline. CIS callers were screened for eligibility if they spoke English; had not called the CIS for diet or nutrition information, so the intervention could be delivered proactively; were not a current cancer patient, waiting for cancer treatment, or terminally ill, to avoid potential participant burden; and were not significantly distressed at the time

of the call in the opinion of the cancer information specialists who answered the telephones. A total of 1761 callers were asked to answer the eligibility questions, and 147 (8%) refused. Of the remaining 1614 callers, 30% were already meeting the recommended intake of 5 A Day, 2% had already been recruited to the study from a previous call to the CIS, 3% were waiting for or receiving cancer treatment, 3% were on a physician-prescribed diet limiting their fruit and vegetable intake, less than 1% were younger than 18 years of age or refused to report their age, and less than 1% were unable to recall their current fruit and vegetable intake, rendering them ineligible for the study. Of the 913 eligible callers, 58% (528/913) agreed to participate in the study and were randomized into one of the intervention arms. Among the 528 participants who entered the study at baseline, 75% (398/528) completed 1-month follow-up interviews, 74% (392/528) completed 4-month follow-up interviews, 63% (332/528) returned the mailed follow-up survey, and 48% (253/528) completed all 3 follow-up measures.

Procedure

After eligibility and informed consent were established, callers completed a brief telephone survey. Then CIS cancer information specialists presented participants with a randomly assigned telephone message promoting fruit and vegetable intake that emphasized the importance of either *individual* or *social* responsibility for behavior change.

Following the call, 3 packets of fruit and vegetable promotional materials were mailed to participants, consistent with the initial message type. The first packet, sent within a week of baseline, contained an individually or socially oriented booklet promoting fruit and vegetable intake and a 5 A Day pencil. The second packet, mailed 2 months after baseline, contained an individually or socially oriented refrigerator magnet, another individual or social booklet, and a survey to be completed after reading the booklet. Booklets for both mailings were partially adapted from *Take Five: A Guide to Healthful Eating*²¹ and contained information on serving sizes, benefits of eating fruits and vegetables, ways to overcome common barriers, and suggestions for increasing intake. Magnets contained a brief message and graphic promoting fruit and vegetable consumption. Participants who completed and returned at least part of the accompanying survey were compensated with \$10. The third packet was sent 3 months following baseline and contained 5 recipe cards featuring various fruit and vegetable dishes and an individually or socially oriented bookmark. The bookmark, based on *Eat More Salads*²² provided several suggestions for meeting the 5 A Day recommendation through increased salad consumption.

In addition, brief 1- and 4-month follow-up telephone interviews were conducted. Participants who could not be reached after 8 telephone attempts were mailed a stamped, preaddressed postcard to return indicating their fruit and vegetable intake (the same 1-item measure used at baseline

and at the 1- and 4-month follow-up calls, described below).

The Messages

The 2 types of fruit and vegetable promotional messages (the telephone-delivered baseline message, booklets, magnet, and bookmark) differed only in their attribution of responsibility for one's dietary behavior and resulting health. One type of message emphasized *individual responsibility* (eg, "You hold the key to your health. By eating 5 A Day, you can reduce your risk of developing cancer," and "The responsibility for maintaining your good health belongs to you."). The other type of message emphasized *social responsibility* (eg, "Others hold the key to your health. By helping you get your 5 A Day, others can reduce your risk of developing cancer," and "The responsibility for maintaining your good health resides in your partnerships with your family, friends, community members, and health professionals.").

Measures

Baseline measures. The baseline survey included abbreviated measures owing to a CIS-imposed 7-minute time limit restriction on telephone-based research studies as part of regular CIS calls. After providing participants with NCI-defined serving sizes,²³ their *fruit and vegetable intake* was assessed with the open-ended question, "About how many servings of fruits and vegetables do you usually eat or drink on an average day? Please include fruits, vegetables, and 100% fruit or vegetable juices in your answer." This continuous response item, taken from the Block food frequency questionnaire,²⁴ has been successfully employed in other studies with CIS-based samples.^{22,25,26} *Knowledge* of the 5 A Day recommendation was assessed with the open-ended question, "How many servings of fruits and vegetables do you think a person should eat each day for good health?" Demographic information was also collected.

Follow-up packet measures. Participants were asked to evaluate the booklets in the second mailing. A manipulation check asked, "How much did the booklet focus on you versus others as being responsible for your health?" (1 = mostly on others, 5 = mostly on you). We also asked participants how *informative* and *interesting* the brochures were (1 = not at all, 5 = extremely). No differences on these latter 2 items were expected across message groups.

One- and 4-month follow-up telephone call measures. The impact of the booklets was assessed by asking participants how much of the booklets they *read* (0 = none, 4 = all). The baseline measures of *knowledge* of the 5 A Day recommendation and *fruit and vegetable intake* were repeated to assess change from baseline. Finally, we included a 7-item food frequency questionnaire assessing *fruit and vegetable consumption* to validate the 1-item fruit and vegetable intake measure. The 7-item questionnaire asked how often partici-

pants ate or drank 100% orange or grapefruit juice; other 100% juices; green salad; French fries or fried potatoes; and baked, broiled, or mashed potatoes. Additionally, it asked how many servings participants ate of vegetables, not counting salad or potatoes, and of fruit, not counting juices. In accordance with the questionnaire's scoring instructions, the servings of French fries and fried potatoes were subtracted from the total, providing a measure of daily fruit and vegetable servings. This questionnaire has been validated²⁷ and used previously in 5 A Day research with CIS-based samples.^{22,25,26}

Data Analysis

First, we examined the demographic characteristics of participants at baseline and checked to see which characteristics, if any, were associated with loss to follow-up at 1 and 4 months. Then chi-square analyses and *t* tests were conducted to compare the demographic characteristics of the message groups to determine if randomization was successful. Next, we examined participants' evaluations of the messages and the impact of the intervention on knowledge and overall intake. Finally, analyses of covariance (ANCOVAs) were used to assess changes in fruit and vegetable consumption owing to message type after 1 month and then 4 months, including demographic characteristics that were associated with message group as covariates. All analyses examining fruit and vegetable intake were conducted using the 1-item measure; because of its brevity, it was the only measure that could be administered at all time points.

DESCRIPTION OF OUTCOMES

Description of the Sample

Demographic data describing the baseline sample are presented in the Table. Most of the 528 study participants were non-Hispanic white (86%) females (78%), who earned at least \$40 000/year (63%) and had completed at least some college (75%), with a mean age of 48 years (SD = 14.0). Participants reported a mean baseline intake of 2.69 servings of fruit and vegetables per day (SD = 1.12; range = 0–4), with 60% consuming between 3 and 4 servings per day.

Participants who were lost to follow-up at 1 month were more likely to be nonwhite (21% vs 12%; $\chi^2_1 = 6.62$, $P = .01$), have a lower income ($\chi^2_4 = 11.22$, $P < .05$), and consume fewer servings of fruits and vegetables at baseline (mean = 2.47, SD = 1.20 vs mean = 2.78, SD = 1.08; $F_{1,496} = 7.95$, $P < .001$) than were those participants who completed the 1-month interview. Participants lost to follow-up at 4 months were more likely to be nonwhite (22.9% vs 11.14%; $\chi^2_1 = 10.61$, $P = .001$) and younger (mean = 45.20, SD = 12.98 vs mean = 49.69, SD = 12.73; $F_{1,496} = 10.18$, $P < .001$) than were those who completed the 4-month interview. Loss to follow-up was not associated with message group ($F_{1,485} = 0.06$), however (ie, there was no evidence of differential dropout).

Table. Demographic Characteristics Describing the Full Sample and Showing Comparisons between Message Type Groups

	Full Sample (N = 528)	Message Type		χ^2	P
		Personal Responsibility (n = 265)	Social Responsibility (n = 263)		
Age, yr, mean (SD)	48.29 (14.08)	48.34 (13.74)	48.30 (14.50)	0.07*	.98
Baseline servings/d, mean (SD)	2.69 (1.12)	2.74 (1.10)	2.66 (1.13)	0.97*	.36
Gender, %				3.97	.05
Female	77.69	81.30	73.73		
Male	22.31	18.70	26.27		
Race, %				3.86	.05
White	85.50	82.53	88.74		
Nonwhite	14.50	17.65	11.26		
Highest level of education, %				6.89	.31
Grade school	2.93	2.06	3.86		
High school graduate	21.76	2.22	21.46		
Some college	28.87	29.22	28.76		
College graduate	25.73	28.40	22.32		
Postgraduate training	20.71	18.11	23.61		
Income, %				0.37	.98
< 20 000	15.67	15.52	15.07		
20 000-39 000	21.63	20.69	22.83		
40 000-59 000	17.88	18.10	17.81		
60 000-79 000	13.91	13.79	14.16		
80 000+	30.91	31.90	30.14		

**t* values from Student's *t* test.

Although callers were assigned randomly to the 2 message conditions, participants assigned to receive the message emphasizing personal responsibility were more likely to be female than were participants assigned to receive the message emphasizing social responsibility (81% vs 74%; $\chi^2_1 = 3.97$, $P = .05$), as shown in the Table. In contrast, participants assigned to receive the message emphasizing social responsibility were more likely to identify themselves as nonwhite than were those assigned to receive the message emphasizing personal responsibility (18% vs 11%; $\chi^2_1 = 3.86$, $P = .05$). Therefore, gender and race were included as covariates in all ANCOVAs.

Evaluations of the Messages

Overall, 67% of participants reported reading "most" or "all" of the mailed materials at 1 month, and 82% of participants did so at 4 months. There was no difference between the type of message received with respect to how much of the information was read at either of the follow-up time points. Participants who received the message emphasizing social responsibility rated the brochure as having more of a focus on others (mean = 4.36, SD = 0.17) than did those who received the message emphasizing personal responsibility (mean = 4.02, SD = 0.17; $F_{1,289} = 8.04$, $P < .01$), confirming the effectiveness of the message manipulation. There

were no differences between message groups in the ratings of how informative or interesting participants found the brochures ($F_{1,290} = 0.58$, not significant, and $F_{1,287} = 0.43$, not significant, respectively), as expected.

Intervention Effects

Change in knowledge of the 5 A Day recommendation was assessed using McNemar's score tests (S). Significant increases in knowledge were found between baseline and the 1- and 4-month follow-ups, with 47% of the sample knowing the recommendation at baseline, 75% at 1 month (S (1) = 65.30, $P < .0001$), and 80% at 4 months, a significant further increase from 1 month (S (1) = 10.42, $P < .05$). There were no differences between message groups in participants' ability to report correctly that a person should eat 5 or more servings of fruits and vegetables per day.

For all participants, the average number of servings of fruits and vegetables consumed increased from 2.69 (SD = 1.12) at baseline to 3.86 (SD = 1.57) at the 1-month follow-up ($t_{352} = 15.17$, $P < .001$). This increase was maintained at 4 months; the average intake was 3.87 servings (SD = 1.40). A paired *t* test revealed an effect of time indicating an overall increase of 1.14 servings per day from baseline to 4 months ($t_{350} = 16.76$, $P < .001$). Correlations between the 1-item and 7-item measures of intake at each follow-up time

point were moderate to high ($r_{309} = .48, P < .001$ at 1 month and $r_{316} = .89, P < .01$ at 4 months).

The Figure shows the change in fruit and vegetable consumption from baseline to 1 month and 4 months by message group. Note that both groups increased consumption rather dramatically and similarly from baseline to 1 month. From 1 month to 4 months, the social responsibility message group improved even a little more, whereas the individual responsibility message group maintained their previous gain. As a conservative test of these changes, we first conducted a mixed-model 2-way ANCOVA in which we explored group differences over time, controlling for gender and race. Not surprisingly, there was a significant increase among all participants in fruit and vegetable consumption over time ($F_{2,267} = 4.43, P = .01$). However, the predicted message group \times time interaction was not significant.

To conduct a potentially more sensitive analysis, we examined fruit and vegetable consumption at the 1-month and 4-month follow-ups separately, in each case controlling for previous levels of intake. These ANCOVAs looked at message group differences at each point in time, controlling for gender, race, and prior behavior. The ANCOVA at the 1-month follow-up indicated that participants reported similar increases in fruit and vegetable consumption, regardless of message type (social responsibility: mean = 3.86, SD = 1.58 vs personal responsibility: mean = 3.87, SD = 1.49; $F_{4,337} = 0.02$, not significant). However, the results of the ANCOVA at the 4-month follow-up showed that participants who received the social responsibility message reported somewhat greater, although not significantly greater, intake than participants who received the personal responsibility message (mean = 4.04, SD = 1.46 vs mean = 3.87, SD = 1.36; $F_{5,266} = 1.27$, not significant).

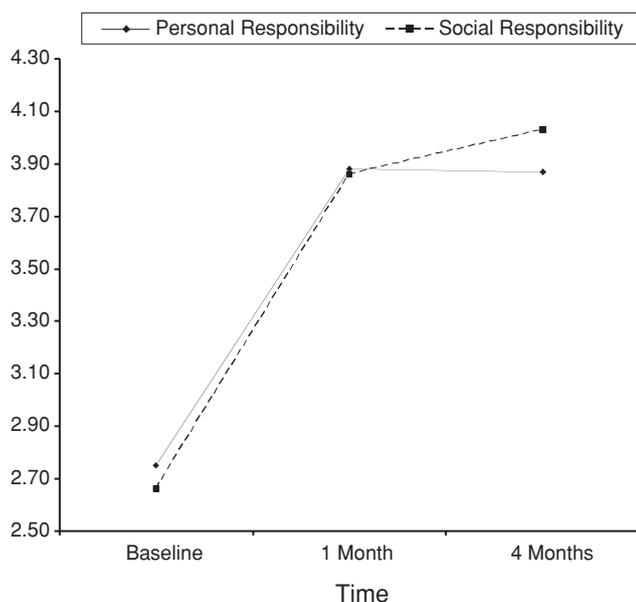


Figure. Reported fruit and vegetable intake servings over time by message type.

DISCUSSION

This experiment tested the hypothesis that health messages that focused on the importance of social responsibility for dietary change would be more effective in increasing fruit and vegetable intake than would messages that emphasized the importance of personal responsibility. The findings showed that both types of messages increased fruit and vegetable intake substantially, although the socially oriented messages led to somewhat (but not significantly) greater reported intake over time. Even though the magnitude of the differential impact of the messages was not great, these findings hint at the importance of acknowledging the social context in which behaviors are performed, consistent with suggestions and findings from previous studies.^{13,14,16} Our findings corroborate the importance of the environment as predicted by some theories, such as Social Cognitive Theory, although there is a lack of directly comparable studies against which to weigh our findings.² In contrast, in a similar study aimed at increasing mammography use, messages focusing on personal responsibility were more influential than ones focusing on the importance of social responsibility or the responsibility of one's physician.¹¹ However, mammography use is a more private behavior compared with eating, which is often a social, public behavior.

We found an overall increase in reported fruit and vegetable consumption from baseline to 1 month that was sustained after 4 months, but somewhat more so for callers receiving socially oriented messages. This finding stands in contrast to similar interventions that produced either greater intake over the course of a 4-month study²⁸ or effects that peaked at 1 month and then weakened over time.^{22,25,26} It appears that the educational information contained in both types of message raised intake over the short term (1 month) but that the social responsibility message continued to motivate some increased intake over time (after 4 months), whereas the personal responsibility message led to no change in intake from 1 month to 4 months.

The repeated messages focusing on personal responsibility, although still effective in increasing fruit and vegetable consumption, may also have led to more negative thoughts and feelings than did those messages focusing on social responsibility. It is possible that participants interpreted the emphasis on personal responsibility to mean that they were responsible for the cause of any future illness.²⁹ Perhaps the messages focusing on personal responsibility evoked feelings of guilt for their current dietary choices¹⁴ or related outcomes, such as body weight or body composition.

Every study has limitations, and this one is no exception. First, the single-item, self-report measure of fruit and vegetable intake used in this study is less than ideal, although it was necessary given the time constraints stipulated by the CIS. Nonetheless, correlations between the single-item and 7-item measures of intake in this study were moderate to high. Similar correlations were found in other studies testing interventions using CIS-based samples, and the use of these

same measures enables comparison of intervention effects across studies.^{22,25,26} Although the self-reported increase in intake could be related to an increase in knowledge and/or social desirability, there is also some evidence that social desirability and the need for social approval have limited influence on self-reported dietary intake.³⁰ Second, participants who were lost to follow-up reported a slightly lower baseline intake level, which may have inflated the overall intake amounts at the follow-ups to some extent. However, there is no reason to believe that these factors led to differential reporting of intake between the message groups because there was no differential dropout by message condition.

Third, the sample was composed of primarily non-Hispanic white, relatively educated, female CIS callers who had already expressed interest in receiving health information by virtue of calling the CIS, although they were approached proactively regarding fruit and vegetable intake. It is possible that callers who agreed to participate (58% of eligible callers) represent a population with greater concerns about their health or with more motivation to comply with requests in general, including the request to increase their fruit and vegetable intake. Thus, these health messages may not be as effective or may have differential influences on other demographic groups or with samples of individuals who are less interested or less motivated to obtain health information. Additionally, a no-message control group was not included in this study; thus, the natural impact of time alone and of social desirability (had it been measured) cannot be determined.

Finally, the difference between the social and personal message groups was not statistically significant. Both kinds of communication strategies increased fruit and vegetable intake. These findings demonstrate that the health messages were effective in increasing fruit and vegetable intake among CIS callers who were not currently meeting the 5 A Day dietary recommendation. The increases in intake following this brief public health intervention were substantial, with an average increase of more than 1 serving per day after 4 months, although it is important to keep in mind that intake was measured through self-report only. Intervention messages highlighting the importance of social responsibility for dietary behavior change were not significantly more effective in encouraging fruit and vegetable consumption than messages highlighting the importance of individual responsibility, but the trend was in that direction.

IMPLICATIONS FOR RESEARCH AND PRACTICE

In light of these findings, health promotion messages that typically focus on the importance of personal responsibility for dietary behavior change might be more effective over the long term if they were designed to emphasize the importance of social responsibility, although additional research is

warranted to confirm the enhanced effectiveness of socially oriented messages given the lack of statistically significant findings from this study. Further work needs to be done to explicate the distinction between more private versus more social, public behaviors and the potential differential effects of health messages on these types of behavior. Future efforts also should examine differences in the cognitive and emotional reactions to these types of messages to determine the mechanisms behind any differential influence of them.

NOTE

Copies of the messages used in this research are available on request.

ACKNOWLEDGMENTS

The research reported in this article was funded by National Cancer Institute grant R01-CA68427. National Institute of Mental Health grant P01-MH/DA56826 and National Institute on Drug Abuse grant P50-DA13334 facilitated manuscript preparation. We thank the cancer information specialists at the New England Cancer Information Service for their contributions to this research. We also thank Amy McQueen, PhD, for her helpful comments on an early version of the manuscript.

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Correction

McCullum C, Pelletier D, Barr D, Wilkins J. Agenda setting within a community-based food security planning process: the influence of power. *J Nutr Educ Behav*. 2003;35:189-199.

The numbering in the first column of Table 4 in the original article was incorrect. The corrected table follows.

Table 4. Rank Order of Disenfranchised Stakeholders' Most Salient Interests (n = 14) as Reported in Focus Groups Conducted prior to and after the Search Conference on Community Food Security

Pre-Search Conference Focus Groups	Salience Score*	Post-Search Conference Focus Groups	Salience Score
1. High food prices in low-income neighborhoods	54	1. Food safety	66
2. Food safety	50	2. High food prices in low-income neighborhoods	54
2. Lack of access to high-quality foods	50	3. Lack of access to high-quality foods	50
3. Lack of adequate food preparation skills	40	3. Lack of adequate food preparation skills	50
4. Store fraud/false advertising	38	3. Store fraud/false advertising	50
5. Negative impact of food advertising on diet and health	36	4. Negative impact of food advertising on diet and health	43
6. Lack of availability of locally produced foods	22	5. Lack of availability of locally produced foods	34

*The salience score was calculated by the frequency with which the issue was mentioned multiplied by the intensity.