

Video-Based Grocery Shopping Intervention Effect on Purchasing Behaviors Among Latina Shoppers

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Objectives. To compare changes in food-purchasing knowledge, self-efficacy, and behavior after viewing nutrition education videos among Los Angeles, California Latinas responsible for household grocery shopping.

Methods. From February to May 2015, a convenience sample of 113 Latinas watched 1 video (*El Carrito Saludable*) featuring MyPlate guidelines applied to grocery shopping (1-video intervention) and another convenience sample of 105 Latinas watched 2 videos (*El Carrito Saludable* and *Ser Consciente*), the latter featuring mindfulness to support attention and overcome distractions while grocery shopping (2-video intervention). We administered questionnaires before and after intervention. A preselected sample in each intervention condition ($n = 72$) completed questionnaires at 2-months after intervention and provided grocery receipts (before and 2-months after intervention).

Results. Knowledge improved in both intervention groups ($P < .001$). The 2-video group improved more in self-efficacy and use of a shopping list (both $P < .05$) and purchased more healthy foods ($d = 0.60$; $P < .05$) at 2 months than did the 1-video group.

Conclusions. Culturally tailored videos that model food-purchasing behavior and mindfulness show promise for improving the quality of foods that Latinas bring into the home. (*Am J Public Health.* 2017;107:800–806. doi:10.2105/AJPH.2017.303725)

Overweight and obesity are a growing and pervasive threat to public health in the United States, with substantial costs to society and future generations.^{1–3} Latinas have among the highest rates of overweight and obesity (77%), and Latino children are disproportionately affected by obesity (22%).⁴ Mexican Americans are particularly at risk for obesity, with overweight or obesity reported in more than three fourths of Mexican American women, and obesity reported in one fourth of Mexican American children 6 to 11 years of age.⁵

Effective consumption-focused obesity intervention approaches seek to help with weight loss through changes in dietary habits and dietary intake.⁶ Factors related to household shopping behavior, such as planning ahead and being a conscientious nutritional shopper, can affect dietary intake.^{7,8} Educating Latinos/as about food-purchasing decisions that occur at the grocery store^{9–11} can change food planning decisions and in-store shopping practices, resulting in

decreases in total mean calories and increases in purchases of fruits and vegetables.^{9,10,12,13} Improving nutritional knowledge and grocery list planning skills appears to be the main target for promoting healthier eating.^{14,15} Additional low-cost and effective interventions are needed to facilitate the purchase of healthy foods and subsequent access to a healthy diet at home.

Although efforts have been made to increase access to healthy food items in communities featuring economically disadvantaged populations, offering healthier

options does not appear to be sufficient.¹⁶ Interventions focused on equipping “food gatekeepers” (i.e., those responsible for purchasing food and cooking family meals) to make decisions about food purchases have the potential to promote healthier eating habits in the home.¹⁷ Mindfulness-based interventions¹⁸ can support individuals to change their obesity-related eating behaviors.¹⁹

Considering previous work, it is unclear whether brief, culturally tailored videos can spur healthy change in grocery shopping behavior among Latinas who serve as food gatekeepers for their households. To address this limitation, we compared 2 interventions featuring culturally tailored videos designed to improve cognitive and behavioral skills and help Latinas prepare a shopping plan of action, acquire knowledge of healthy food choices, and focus attention on their intended grocery list while managing distractions during shopping. The *El Carrito Saludable* video uses the US Department of Agriculture’s MyPlate icon²⁰ to guide food choices while shopping by translating the icon to food distribution in the grocery cart. The *Ser Consciente* video demonstrates a mindfulness¹⁸ approach (i.e., paying attention, on purpose, in the present moment, nonjudgmentally) while shopping to bolster self-regulation of attention and awareness to overcome distractions while shopping to support intentional decision-making.

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This article was accepted February 9, 2017.

doi: 10.2105/AJPH.2017.303725

We compared the effects of viewing *El Carrito Saludable* (1-video intervention) alone with those of viewing both *El Carrito Saludable* and *Ser Consciente* (2-video intervention). We hypothesized that the 2-video intervention would outperform the 1-video intervention on outcomes related to healthy food purchasing.

METHODS

We conducted a 2-group nonrandomized controlled study (with pretest, posttest, and 2-months posttest measurements) from February to May 2015. We recruited participants at Head Start programs and churches in East and South Los Angeles, California. Participants were Spanish- or English-literate Latinas aged 18 to 55 years who self-identified as the primary person responsible for family grocery shopping.

First, we enrolled a cohort for the 1-video condition to be followed for 2 months. Next, we enrolled a cohort for the 2-video condition to be followed for 2 months. Last, we consecutively enrolled a cohort for each intervention condition to complete pre- and posttest assessments only (Figure 1). To reduce potential bias, at enrollment, participants were unaware of which study condition they were assigned. We determined sample size ($n = 218$, of whom we preselected 72 for 2-month follow-up) on the basis of budget and to test intervention feasibility and promise. All participants completed the postintervention questionnaire. In the preselected 2-month follow-up sample, 94% completed the 2-month assessment ($n = 68$).

Procedures

We notified participants of intervention location, date, and time. We asked the follow-up sample to bring 2 recent grocery store receipts representative of usual grocery shopping before the pretest and follow-up appointments. A bilingual-bicultural researcher orally administered the paper-and-pencil baseline questionnaire to groups of 15 to 25 participants, collected receipts from the follow-up sample, showed the video or videos in English or Spanish (language groups

scheduled separately), and administered the posttest questionnaire.

We scheduled follow-up sample participants to complete the 2-month post-intervention questionnaire at the original community sites. Participants received \$25 for combined pre-post questionnaire completion. Follow-up sample participants received \$25 for 2-month questionnaire completion plus \$5 per grocery receipt at pretest and 2-month follow-up.

Interventions

El Carrito Saludable is a 13-minute video that author D. E. C. developed previously.¹¹ It features a Latina nutritional health educator in a Latino supermarket shopping for foods by category while explaining the components of the MyPlate icon (grains, protein, fruits, vegetables, and dairy) and adapting them to the quadrants of the shopping cart. She discusses her choice to purchase culturally relevant options that are cost-efficient and of high nutritional value.

Ser Consciente is an 11-minute video that the study team developed to build on the lessons of *El Carrito Saludable*. It features a Latina mother and her child shopping in a Latino supermarket and demonstrates her use of mindfulness approaches while confronting challenges to making healthy choices. The video teaches viewers how to self-regulate attention and awareness while shopping to promote intentional decision-making. Consumer behavior and social cognitive theories guided both videos. The role of mindful attention in conscious decision-making also guided *Ser Consciente*.

Measures

We used questionnaires to collect socio-demographic information, including age; number of people in the household; number of children younger than 18 years in the household; country of birth; language preference derived from the question, “What languages do you speak?” and rated on a scale of 1 (only Spanish), 2 (mostly Spanish), 3 (both English and Spanish), 4 (mostly English), and 5 (only English) then recoded as Spanish monolingual versus other responses; and highest level of education completed (coded as completed less than high school vs completed high school or above). To better

understand household composition, we asked participants whether anyone in their household is overweight or obese or has high blood pressure; if children living in the household eat meals at school (breakfast, lunch, and a snack), selecting all that apply (coded as yes or no); whether their family receives food stamps or Women, Infants, and Children benefits; and which family member determines the monthly grocery budget (coded as participant vs someone else).

We collected background information on the participants’ familiarity with nutritional concepts by asking whether they were familiar with the MyPlate icon (yes or no) and whether they considered a well-balanced diet as part of healthy eating (yes or no). We also asked participants, “When you are grocery shopping, how confident are you in your ability to select whole-grain bread?” and “When you are grocery shopping, how confident are you in your ability to select foods that are low in saturated fat?” We measured these items on a scale of 1 to 5 as follows: 1 (not at all confident), 2 (not confident), 3 (neither), 4 (confident), and 5 (very confident).

We quantified food-purchasing knowledge as a sum score of 5 true or false questions that the research team developed using the MyPlate icon and dietary recommendations,²¹ with higher scores indicating greater knowledge:

1. “When shopping for grains, it is better to choose whole wheat grains.”
2. “Frozen vegetables are included in MyPlate Method.”
3. “Fish, meat, and chicken can be included in the protein section of MyPlate Method.”
4. “Pasta and bread can be included in the grain section of MyPlate Method.”
5. “Yogurt, cheese, and butter can be included in the dairy section of MyPlate Method.”

We measured self-efficacy with the validated Self-Efficacy of Eating and Purchasing Healthy Foods Scale,²² which features 16 items rated on a 5-point Likert scale, with higher scores indicating greater self-efficacy. We assessed preparatory grocery shopping behavior with 2 questions (yes or no): “Do you use a shopping list when grocery

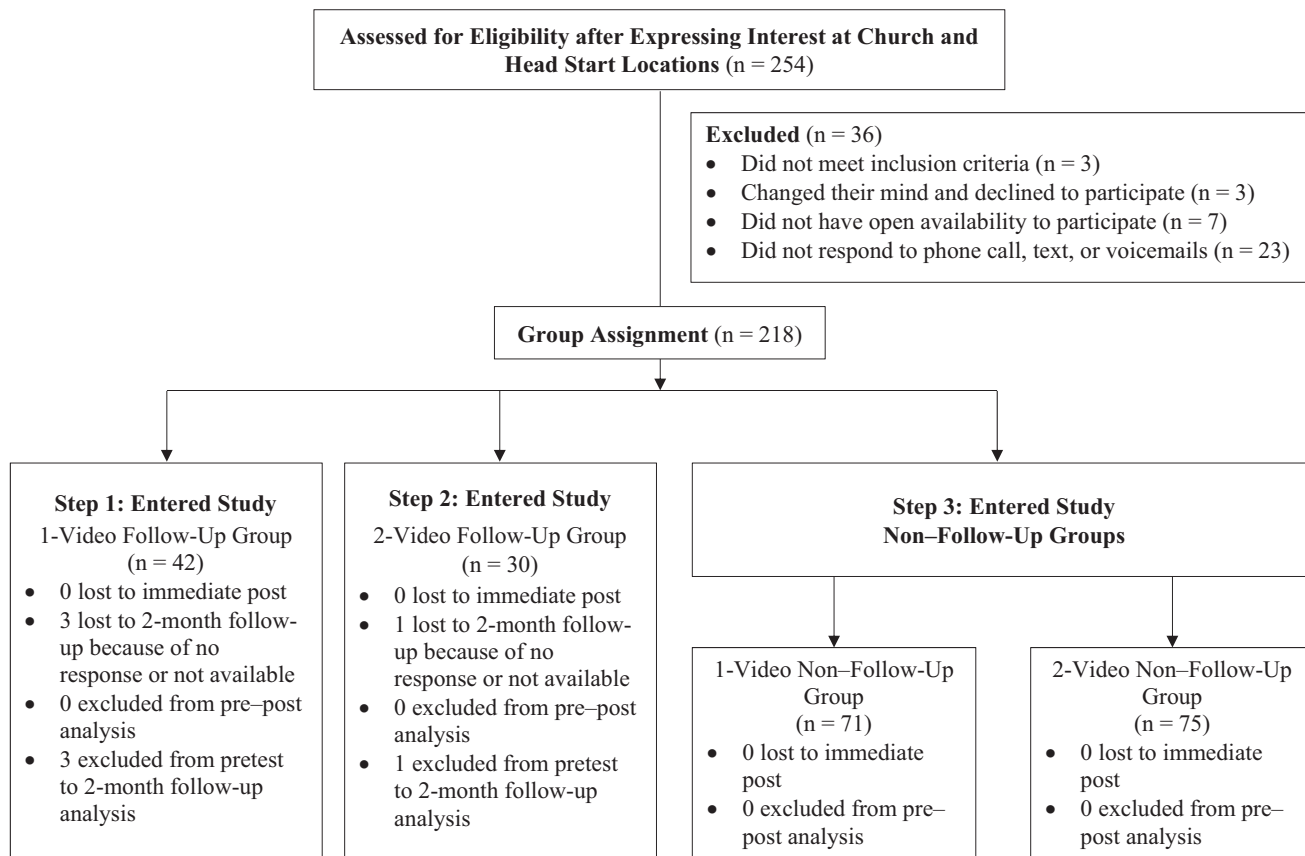


FIGURE 1—Flow Chart of Study Enrollment and Steps in Intervention and Follow-Up Sample Implementation: Los Angeles, CA, 2015

shopping?” and “Do you eat before you go grocery shopping?” With guidance from a nutritional health consultant, we rated food items on grocery receipts (qualified, unqualified, or not specified) on the basis of nutritional value using federal dietary guidelines and MyPlate recommendations.²¹

Analysis

We compared the 1- and 2-video groups on demographic and behavior variables at baseline with the independent *t* test to identify potential differences. We adjusted statistical models for variables showing $P < .05$ difference by group at baseline, which included

1. A household member is overweight or obese.
2. A household member has high blood pressure.

3. The household receives Women, Infants, and Children benefits.
4. The children eat breakfast at school.
5. The children eat snacks at school.
6. The participant agreed that a well-balanced diet is part of healthy eating.
7. The participant has confidence in her ability to select whole-grain bread when shopping.
8. The participant has confidence in her ability to select foods with low saturated fat when shopping.

Among these covariates, 1 through 3 are time-invariant variables measured at baseline only, whereas 4 through 8 were measured at baseline and 2-month follow-up.

We tested between-group contrasts in outcomes and differences in changes across the assessment periods using mixed-effect models. By specifying both random and fixed effects, the model accounted for the correlation

between repeated measures within individuals. The mixed-effect model included the effect of time, group, and a time by group interaction term while adjusting for covariates. We selected maximum likelihood to address missing data. With an iterative optimization algorithm, this approach yields unbiased parameter estimates by using all available data points under the assumption that data are missing at random.²³

We obtained adjusted means and SEs for each time point of the 1- and 2-video conditions. We reported the Cohen effect sizes, *d* and *h* (the latter is derived from the arcsine transformation of probabilities), for continuous outcome and binary outcomes, respectively, as standardized measures.²⁴ Guided by intent-to-treat principles, we assessed whether data provided evidence of a null effect or the equivalence in change between the 2 intervention conditions, according to original group assignment regardless of program attendance or missing

data. We performed all statistical analyses using SAS version 9.3 (SAS Institute, Cary, NC).

RESULTS

Table 1 lists summary descriptive statistics comparing 1-video and 2-video conditions at baseline and comparing the follow-up sample with the original sample. At baseline, most participants were foreign born (82.1%), and 40.3% were monolingual Spanish speakers. Pretest differences between the 1- and 2-video conditions are noted in Table 1 and controlled in all subsequent analyses. Individuals in the follow-up sample were more likely to be monolingual Spanish speakers, to have completed high school, and to report having a family member who is obese or has high blood pressure.

Postintervention Changes in Knowledge and Self-Efficacy

Table 2 provides results of unadjusted and adjusted models controlling for intervention groups' pretest differences. In the adjusted model, pre-post improvements in food-purchasing knowledge were significant for both the 1-video and 2-video ($P < .001$) groups, and these changes were statistically equivalent between groups ($d = 0.19$; $P > .05$).

As shown in the adjusted model, self-efficacy scores of the 2-video group improved by a mean of 0.13 ($P < .01$), whereas the 1-video group showed a mean reduction of -0.03 , indicating relative improvement in the 2-video group ($d = 0.25$; $P < .05$).

Changes in Knowledge, Self-Efficacy, and Shopping Behavior

As shown in Table 2 (adjusted model), both groups improved in food-purchasing

knowledge at 2-month follow-up. The 2-video group improved by a mean of 0.83 ($P < .001$), the 1-video group improved by a mean of 0.56 ($P < .001$), and changes were equivalent between groups ($d = 0.24$; $P > .05$). Only the 2-video group showed significant improvement in mean self-efficacy scores ($P < .05$) in the adjusted model, and this relative improvement over time did not reach statistical significance between groups ($d = 0.23$; $P > .05$).

We found significant improvements in grocery shopping preparation in the 2-video group. In the 2-video intervention, participants who used a shopping list increased 31.3% ($P < .05$) and participants who ate before grocery shopping increased 27.2% ($P = .05$) from baseline, whereas the corresponding change in the 1-video group was 3.2% and 8.0%, respectively. The difference in changes between the 2 groups did not reach statistical significance ($P > .05$), although the effect sizes were between medium and large, suggesting an artifact of the small sample size.

TABLE 1—Latina Food Shopper Characteristics at Baseline by Group and Total Sample Compared With Follow-Up Sample: Los Angeles, CA, 2015

Variable	1-Video (n = 113), Mean \pm SD or No. (%)	2-Video (n = 105), Mean \pm SD or No. (%)	Total (n = 218), Mean \pm SD or No. (%)	2-Mo Follow-Up (n = 68), Mean \pm SD or No. (%)
Age, y	39.8 \pm 10.7	38.8 \pm 9.2	39.3 \pm 10.0	39.1 \pm 9.7
No. people in the household	4.5 \pm 2.0	4.5 \pm 1.3	4.5 \pm 1.7	4.4 \pm 1.5
No. children 18 y or younger in household	1.8 \pm 1.3	2.0 \pm 1.1	1.9 \pm 1.2	1.7 \pm 1.2
Born in United States	19 (16.8)	20 (19.1)	39 (17.9)	18 (26.5)
Monolingual Spanish speaker	48 (42.5)	39 (37.9)	87 (40.3)	18 (26.5) ^b
High school education completed or above	57 (50.4)	58 (55.2)	115 (52.8)	46 (67.7) ^b
Household member is overweight or obese	51 (51.5)	28 (30.4) ^a	79 (41.4)	31 (58.5) ^b
Household member has high blood pressure	49 (47.6)	33 (34.0)	82 (41.0)	40 (67.8) ^b
Children eat breakfast at school	34 (30.6)	53 (51.0) ^a	87 (40.5)	30 (44.8)
Children eat snack at school	19 (17.1)	39 (37.5) ^a	58 (27.0)	21 (31.3)
Household receives food stamps	33 (29.7)	37 (35.6)	70 (32.6)	16 (23.9)
Household receives Women, Infants, and Children benefits	30 (27.3)	44 (41.9) ^a	74 (34.4)	15 (22.7)
Sets monthly household food budget	67 (63.8)	66 (64.7)	133 (64.3)	41 (63.1)
Considers a well-balanced diet part of healthy eating	45 (39.8)	64 (61.0) ^a	109 (50.0)	32 (47.1)
Familiar with MyPlate icon	39 (35.5)	38 (36.2)	77 (35.8)	22 (32.4)
Confidence in ability to select whole-grain bread when shopping	3.8 \pm 1.3	4.2 \pm 1.0 ^a	4.0 \pm 1.2	4.0 \pm 1.2
Confidence in ability to select foods with low saturated fat when shopping	3.4 \pm 1.4	3.9 \pm 1.1 ^a	3.6 \pm 1.3	3.5 \pm 1.2

Note. Figures may not sum to 100% because of missing data or rounding error. 1-Video = *El Carrito Saludable*; 2-Video = *El Carrito Saludable* and *Ser Consciente*.

^a1-video and 2-video values are significantly different at $P < .05$ (2-sided).

^bFull sample and 2-month follow-up sample values are significantly different at $P < .05$ (2-tailed).

TABLE 2—Video-Based Intervention Effects on Cognitive and Behavioral Measures of Food Purchasing Among Latina Food Shoppers: Los Angeles, CA, 2015

Outcome ^a	Pretest (n = 218) ^a		Posttest (n = 218)		Time × Group, Posttest, Cohen <i>d</i> or <i>h</i>	2-Mo Follow-Up (n = 68)		Time × Group, 2-Mo Follow-Up, Cohen <i>d</i> or <i>h</i>
	1-Video (n = 113), Mean ±SE or %	2-Video (n = 105), Mean ±SE or %	1-Video (n = 113), Mean ±SE or %	2-Video (n = 105)		1-Video (n = 39), Mean ±SE or %	2-Video (n = 29), Mean ±SE or %	
Food-purchasing knowledge								
Unadjusted	3.86 ±0.09	3.72 ±0.09	4.50 ±0.09***	4.56 ±0.09***	0.19	4.47 ±0.14***	4.54 ±0.16***	0.19
Adjusted	3.89 ±0.09	3.71 ±0.09	4.51 ±0.09***	4.54 ±0.09***	0.19	4.45 ±0.14***	4.54 ±0.16***	0.24
Self-efficacy								
Unadjusted	3.44 ±0.06	3.55 ±0.06	3.55 ±0.06	3.76 ±0.06**	0.14	3.71 ±0.10*	3.86 ±0.11**	0.06
Adjusted	3.60 ±0.05	3.51 ±0.05	3.57 ±0.05	3.64 ±0.05**	0.25*	3.68 ±0.08	3.74 ±0.09*	0.23
Uses shopping list^a								
Unadjusted	60.0	54.7	...	...	...	61.4	90.5*	0.70*
Adjusted	56.0	61.1	...	...	...	59.2	92.4*	0.57
Eats before shopping^a								
Unadjusted	70.6	54.1	...	...	...	79.4	85.0*	0.45
Adjusted	73.5	55.7	...	...	...	81.5	82.9	0.39
Percentage of qualified foods^a								
Unadjusted	72.70 ±0.04	68.39 ±0.04	...	...	...	75.48 ±0.04	84.35 ±0.04**	0.53
Adjusted	73.64 ±0.04	67.62 ±0.05	...	...	...	74.93 ±0.04	84.87 ±0.05**	0.60*

Note. 1-Video = *El Carrito Saludable*; 2-Video = *El Carrito Saludable* and *Ser Consciente*. Unadjusted and adjusted estimates obtained from mixed models.

^an = 68 at baseline and 2-month follow-up for using a shopping list, eating before shopping, and percentage of qualified foods.

*P < .05; **P < .01; ***P < .001 (2-tailed significance test values for time, group, and time by group effects).

The percentage of qualified foods purchased on the basis of grocery store receipts in the 2-video group improved by a mean of 17.25 and in the 1-video group by a percentage mean of 1.29, indicating greater improvement in the 2-video group (*h* = 0.60; *P* < .05), as shown in the adjusted model.

DISCUSSION

In this community-based trial, we examined the effects of a 1-video health education intervention (focused on grocery shopping) and a 2-video health education intervention (focused on grocery shopping and mindfulness) on food-purchasing knowledge, self-efficacy, and grocery shopping behavior of low-income Latina adult food gatekeepers. Exposure to either nutrition education video condition improved food-purchasing knowledge that lasted through the 2-month assessment. The 2-video intervention extended improvements to self-efficacy, using a shopping list, and percentage of qualified

foods purchased that lasted through the 2-month assessment. The 2-video intervention outperformed the 1-video intervention on percentage of healthy foods purchased at 2 months, which suggests a lasting change in food-purchasing behavior. The 2-video intervention was infused with the modeling of mindfulness for self-regulation of attention and awareness.

In 2-month follow-up adjusted models, the relative effect sizes for the 2- versus 1-video intervention were medium to large for several grocery shopping behavioral changes (0.39–0.60). We could not identify previous video-based intervention studies seeking to improve grocery shopping behaviors that provided effect sizes; however, meta-analyses evaluating e-health interventions for dietary behavior change (effect sizes ranged from 0 to 0.29 for fruit and vegetable servings and dietary fat)²⁵ and brief computer-delivered interventions to decrease fat and increase fruit and vegetable consumption (effect sizes on knowledge = 0.36, self-efficacy = 0.16, and nutrition = 0.15)²⁶ reported small to medium

effect sizes. Most of these were multiple-session interventions with varying demographic groups and varying follow-up measurement points.

Previous research has shown that although nutrition knowledge is a factor in food choices, it is insufficient to produce behavior change.^{27,28} For example, previous studies have documented the importance of self-efficacy and specific behavioral skills in behavior change.^{29–33} Furthermore, mindfulness-related factors such as awareness, attention, and self-regulation elements have been noted as influential in food choice.^{34–37} Mindfulness-based interventions have documented benefits, including improved food selection, among individuals with eating disorders.^{38–41} However, these previous studies have been largely limited to clinical populations and counseling interventions. A recent community-based mindfulness intervention achieved stress reduction for general health promotion.⁴² To our knowledge, no previous studies have targeted mindfulness-related factors through a grocery shopping intervention for Latinos in the

community. We advanced these findings by showing that healthy grocery shopping choices can be improved through a brief video-based intervention.

Our findings suggest that the 2-video condition illustrating how to sustain attention to purchasing healthier food options and respond to distractions may have helped curtail impulsive item selection. This finding is aligned with the basic skill of mindfulness, a nonreactive attentional stance to events occurring in the present moment. This stance is thought to bolster self-regulation^{18,43–45} and might increase an individual's ability to remain focused on purchasing healthy foods. Previous studies have shown that inducing mindfulness can increase activation of attention networks and executive function, which are prominent cognitive features of conscious decision-making that counter habitual responses.^{46–48} Thus, integrating mindfulness cues during our education program had the potential to enhance attention and awareness, which can bolster conscious decision-making regarding food purchasing. This extends previous work on the impact of mindfulness on decision-making and health behavior.⁴⁹ The intervention group that viewed the mindfulness education video demonstrated greater improvement in grocery shopping behaviors than did individuals in the 1-video intervention, and this process of change likely entails improved decision-making processes.

Our findings support earlier findings related to the suitability of the MyPlate method to educate individuals about healthy eating because it does not rely on complex nutritional information, numeracy skills, or measuring devices, which may complicate understanding already complex information.⁵⁰ Our results also support the feasibility of focusing on grocery shopping education to change grocery shopping behavior to promote healthy eating—an emerging research field—and ameliorate environmental forces such as the grocery store setting, which tends to offer an overwhelming array of distracting alternatives to healthier options that disadvantaged populations with limited nutrition knowledge may not be prepared to decipher.^{9–11}

Strengths and Limitations

Study strengths include combining food-purchasing education with

mindfulness-informed educational messages regarding managing challenges faced in a shopping environment, the use of a community sample, and that participants were unaware of their assigned intervention condition at recruitment.

Although lack of randomization may jeopardize our findings, analytic methods controlled for all identified baseline differences between intervention groups. The risk of potential bias of confounding owing to unmeasured between-group differences still exists. Other limitations include small follow-up sample size, possible reporting bias of behavior and receipt selection, and baseline differences in variables in the preselected follow-up sample and total sample. Although generalizability of findings may be limited to populations with a similar demographic profile to study participants, it is important to note that study participants had a similar demographic profile (e.g., education, language spoken, and Hispanic group)^{51,52} to residents in the study communities.

Our study shows promise, yet further research is needed to test the efficacy of the intervention in a randomized controlled study to address threats to validity and rule out alternative explanations. Such a study should also include a larger follow-up sample, feature diverse samples of Latino populations, and investigate the mechanisms of action that lead to intervention effects.

Public Health Implications

Culturally tailored educational videos about food-purchasing choice and mindfulness delivered to Latina adults can improve the quality of household food, which can modulate the impact of food quality access on overweight and obesity. Videos allow wide dissemination, are not costly, and have low participant burden. **AJPH**

CONTRIBUTORS

H. Amaro supervised the study. H. Amaro and D. E. Cortés obtained funding. H. Amaro, D. E. Cortés, and D. S. Black contributed to the study concept and design and provided administrative, technical, or material support. H. Amaro, S. Garcia, L. Duan, and D. S. Black contributed to data acquisition, analysis, or interpretation. H. Amaro and D. S. Black critically revised the article for important intellectual content. L. Duan conducted statistical analysis. All authors drafted the article.

ACKNOWLEDGMENTS

The study and the development of the *Ser Consciente* video were funded by the USC Community Benefits and

Sponsorship Program, Keck Medical Center, University of Southern California (USC); grant to H. A., principal investigator). The *El Carrito Saludable* video was developed with funding from the Hispanic Health Services Research Grant Program, Centers for Medicare and Medicaid Services, US Department of Health and Human Services (grant 1HOCMS331089 to D. E. C., principal investigator).

The following students or staff from USC assisted in data collection or grocery store receipt coding: Maria Alejandra Heman, Edith Jaurequi, Beatriz Sosa-Prado, Lucette Sosa, Connie Valencia, and Ruth Vergara. The following community partners facilitated participant recruitment in their respective locations and provided space for data collection and intervention delivery: Fathers John Moretta and David Matz of the Los Angeles Catholic Archdiocese; Phillipa Johnson, executive director, USC School for Early Childhood Education; and Theda Douglas, vice president, USC Government Partnerships and Programs. Intercultural Productions of Boston, Massachusetts developed the script and produced the *Ser Consciente* video and produced the English version of the *El Carrito Saludable* video. Teresa Abdala, mindfulness teacher, provided input during the conceptualization of the *Ser Consciente* video. Erick Lindberg provided editorial assistance on an early draft of the article.

HUMAN PARTICIPANT PROTECTION

The University of Southern California institutional review board approved the study protocol.

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