

# EFFECTIVENESS OF A MEXICAN HEALTH EDUCATION PROGRAM IN A POVERTY-STRICKEN RURAL AREA OF GUATEMALA

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In this article, the authors discuss the transfer to Guatemala of an integral health education program, originally developed for indigenous women in southern Mexico. The program was implemented with some 400 indigenous women in rural Guatemala living under dire poverty, and was carried out through a closely supervised cascade process in which specially trained local women conducted workshops to their fellow countrywomen. The program aimed at imparting knowledge as well as enabling changes in behavior with respect to everyday life issues, including nutrition, hygiene, sanitation, and sexual and reproductive health. Evaluation of the impact through questionnaires and direct observations showed significant increases in knowledge and actual behaviors.

**Keywords:** health education; health programs; agency; Guatemala; social desirability

In Guatemala, indigenous people account for about two thirds of the country's total population. Most of them live under harsh conditions of poverty. Especially the women, who additionally suffer from a serious gender inequity, face severe problems, particularly with respect to health issues. Cultural gender roles often involve a discrimination of women, indeed. Young girls frequently drop out of school staying at home, helping with household chores; even if they go to school, they are expected to comply with more obligations than their male siblings (Stith, Gorman, & Choudhury, 2003). They are taught to be submissive and quiet and to obey their parents and older brothers. When they get married, they change from being "bossed around" by parents and brothers to being at the disposition of their husband and/or mother-in-law (Carter, 2004).

The dismal conditions Guatemalan indigenous women live in are amply illustrated by reports from national and international development-aid organizations (for an overview,

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particularly aimed at girls and young women, see United Nations Children's Fund [UNICEF], 2007). In 2001, Guatemalan maternal death rates were among the highest of Central America with about 89 deaths per 100,000 live births nationally; in Alta Verapaz, a predominantly indigenous area, this number reached 192 per 100,000 live births (UNICEF, 2002). Maternal mortality is related to the availability and quality of prenatal and childbirth services and to the mother's health state, particularly her dietary habits, hygiene conditions in which she lives, number of pregnancies she had before, and her age (Instituto Nacional de Estadística [INE], 1999).

A related problem concerns the high number of unwanted pregnancies. The general fertility rate of Guatemalan women is 4.7 children per woman (Central Intelligence Agency, 2003), although women between 15 and 49 years consider the ideal number of children to be on average 3.4 (INE, 1999). Availability of contraceptive methods is limited in rural areas, and myths and incorrect knowledge as well as presumed or real opposition by the partner negatively affect their use (Rice, 1992). Communication about sex-related issues is virtually nonexistent, and women often leave the decision about contraceptive use to their husband (Pick, Givaudan, Guzmán, & Vera, 2004).

Furthermore, the civil war severely deteriorated the social fabric within the indigenous population. A general feeling of fear and mistrust has crept in people's minds (Anckermann et al., 2005; Green, 1999; Rodríguez, Bergonzoli, & Levav, 2002). Together with the harsh conditions of poverty and gender inequity, this has contributed to a strong marginalization of indigenous women in Guatemala. An additional complicating factor is the language barrier: A great part of the indigenous people does not speak Spanish. In the experience of NGOs, this contributes to isolation and makes the women less receptive to health education programs.

In this article, we present a pilot study in which we took up the latter challenge and in which we evaluated a program that has been shown to be effective in Mexico (Venguer et al., 2002; Venguer, Pick, & Fishbein, 2007). The rationale for our approach to health programs, which has been described previously (Givaudan, Pick, Poortinga, Fuertes, & Gold, 2005; Pick, Givaudan, & Poortinga, 2003; Pick, Poortinga, & Givaudan, 2003; Venguer et al., 2007), emphasizes the cultural context in which the target population is living, including structural conditions (e.g., poverty) and sociocultural factors (e.g., norms and values). This is in agreement with theories and concepts found in the current literature: The role of social influence in changing behaviors has been documented extensively (e.g., Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996; Fishbein & Yzer, 2003), and the importance of the context, including economic wealth and related factors such as education, has been emphasized in cross-cultural research (Berry, Poortinga, Segall, & Dasen, 2002; see also Cleland & Van Ginneken, 1988).

Another principle in our health programs is that behavior change, especially in uneducated populations, is brought about by enabling individuals to change their behavior in concrete situations. Among determinants of health behavior that have been mentioned are knowledge and behavioral intentions (Ajzen, 1991; Fishbein & Ajzen, 1975; Sen, 1999; Wallston, 1994). When emphasis is placed on processes of change in the individual, other key concepts include perceived self-efficacy (Bandura, 1997) and self-esteem (Baumeister, 1993). However, to reach the latter more generalized effects, programs first have to build decision-making and other life skills in real situations and at the level of specific domains (World Health Organization, 1994). Broader changes in the person are seen as the result of increased competencies to deal with a variety of concrete situations. In other words, a successful program is likely to contribute to long-term changes in the person, but the primary target of development programs are changes in behavior in concrete circumstances.

Following the perspective outlined here, at least two elements are needed—a context that allows one to have actual physical access to health services (Weiss, Whelan, & Rao Gupta, 1996) and the knowledge and skills needed to enable individuals to make choices and act on these. Given the submissive position of women in the Guatemalan indigenous society and their being unfamiliar with making their own decisions, there is a need for the development of knowledge and skills to decide about alternative courses of action and to implement such choices through the strengthening of specific competencies.

The general effect of an increasing number of competencies refers to *agency*, that is, a person's general capability to deal with difficult situations in a socially competent and confident manner. This psychosocial conception of agency is in line with recent views in both psychology (Kagitcibasi, 2005) and developmental economics where development is seen as a process of expanding the freedoms of people (Sen, 1999). Also Rissel (1994) identifies making informed choices in a range of situations as an essential aspect of agency.

The health education program for women in rural areas "Si Yo Estoy Bien, Mi Familia También" [If I am OK, my family is too], with acronym SYEB, reflects the perspective described. The NGO Instituto Mexicano de Investigación de Familia y Población, with which most of the authors of this article are associated, originally developed and implemented this program with 39,000 women in the Mixteca region of the state of Oaxaca in southern Mexico (Venguer et al., 2002; Venguer et al., 2007). In view of the high costs of program development, there can be great economic advantages in implementing programs for which effectiveness has been demonstrated elsewhere. The question is whether such a transfer does not undermine program effectiveness, given that cultural context, including ecocultural as well as sociocultural aspects, may make program content, or even the psychological principles on which a program is based, culturally inappropriate.

The question of cultural transfer has been debated extensively in the cross-cultural literature, especially for psychometric tests (e.g., Berry et al., 2002; Greenfield, 1997). Most cross-cultural psychologists tend to see transfer of tests as an empirical question that has to be carefully examined (e.g., Van de Vijver & Hambleton, 1996). This empirical approach has been strengthened by methodological developments, especially the distinction between levels in equivalence (Fontaine, Poortinga, Setiadi, & Markam, 2002; Van de Vijver & Leung, 1997). For example, the question whether score variables have the same meaning across cultures may have to be answered negatively for a quantitative comparison of scores obtained in different cultures, whereas the answer can be positive for a comparison of the underlying conceptual structure (e.g., through a factor analysis) of the instrument.

For the cross-cultural transfer of intervention programs, similar distinctions have been made as for the transfer of psychometric tests (Poortinga, 2002, 2003). Two requirements have been distinguished as follows: First, the program's relevant concepts can be defined in the same way for the target population as for the population of origin (Fontaine et al., 2002; Poortinga, 1989). Second, these concepts manifest themselves in similar behaviors in both societies. For example, if discrimination of women is a relevant concept, it should be manifest in the same domains (e.g., economically, her position in the family, etc.) in both societies. On the other hand, cross-cultural transfer of an intervention program on poor nutrition may be difficult if in one society poor nutrition is related to low calorie intake, whereas in the other to low protein intake. These requirements also apply to scales and instruments used for evaluation that are being transferred.

Additional levels of equivalence apply when quantitative comparisons are planned, for example, to assess whether program impact is lower in the target society as in the society of origin. However, such comparisons were not considered in the current project where the goal

was to evaluate applicability of the SYEB program in rural Guatemala, and no comparison was intended of the level of impact or effectiveness with any other population.

In test transfer, it often happens that factor structures are similar, but that some of the separate items show evidence of item bias, or “differential item functioning” (Holland & Wainer, 1993). If only a limited proportion of items is biased, an instrument can be made more equivalent by changes in wording or the biased items can be eliminated without noticeable impact on construct validity. Werner and Campbell (1970) have called this “cultural decentering.” In health education programs, many cultural features are not central to what the program intends to convey and thus can be replaced. How such adaptations were made in the present project is described below.

Here, we present the results of the implementation of the SYEB program with women of 15 to 50 years old from rural communities in Guatemala. The structure of the remainder of the article is as follows: In the next section, we briefly present the contents of the program. Then, we deal with the methods of implementation and evaluation. Thereafter, the evaluation results are described, and in the final section, we discuss the main findings.

### THE PROGRAM IMPLEMENTED IN GUATEMALA

The original SYEB program consisted of six modules: Four for the women’s own health and two about the health and education of their children (Venguer et al., 2002). In Guatemala, we administered the first four modules only, omitting the modules for the children (because the funders wanted to focus directly on improving women’s health). SYEB is a broad program with a time-consuming mode of presentation, based on active participation and interaction. It is an illusion to think that a short program can make a noticeable difference to women who have grown up under conditions of extreme poverty. The program’s central theme is that individuals should have control over their lives: Agency is woven into each module. As outlined above, this implies developing various skills, including decision making, effective communication, and problem solving. These skills were trained in group activities such as simulation and role playing.

Module 1 on health aims at knowledge of and reflection on the factors that affect the health of rural women. Discussions and group exercises center on gender roles and on how a submissive role of women can prevent them from communicating their feelings and needs. Other topics include how to make health-oriented decisions and negotiate family decisions with their partner. The module further deals with domestic violence, stress, and the use of tobacco and alcohol. It also incorporates human rights, women’s rights, values, and self-knowledge.

Module 2 centers on the relation between health and nutrition and on the right of all to a sufficient and balanced diet. Special consideration is given to women’s nutritional needs related to menstruation, pregnancy, and breast-feeding. It promotes fruits and vegetables and the use of oilseeds as substitute for meat products. The women learn how to prepare healthy and low-cost meals and how to maintain a family vegetable garden.

Module 3 on hygiene and sanitation deals with general health and well-being and the prevention of infectious diseases. Causes of disease in the house environment and preventive actions are discussed, such as removing household garbage, protection against vermin, and keeping latrines clean. Assuming responsibility for hygiene by all members of the family is emphasized.

Module 4 on sexuality and reproductive health deals with cultural taboos on sexuality and the control that men have regarding sexual intercourse, number of children, use of contraceptives, and so on. The women gain knowledge about fertility, contraception,

sexual rights and values, sexually transmitted infections, and cervical cancer. Through group discussions and exercises, women are made aware of their skills to communicate and negotiate these matters, to make plans for developing their abilities, and to change their behavior accordingly.

Each module is administered by a health promoter who has been trained specifically for this task. With the program comes an extensive set of manuals and posters with designer-drawn diagrams and pictures for use in the workshops.

## METHOD

### PROGRAM ADAPTATION

Early on, the question was raised whether cultural transfer would be a feasible prospect, in terms of both program contents and program goals. These questions were answered positively by two experts whom we consulted (Paul White, United States Agency for International Development, personal communication, September, 2001; Ricardo Vernon, Population Council Mexico, personal communication, September, 2001). Thereafter, cooperation was sought with a Guatemalan counterpart. Asociación de Servicios Comunitarios de Salud (ASECSA) was invited and accepted to participate. This organization has been involved in development programs in Guatemala, mostly for indigenous communities. ASECSA evaluated the program goals and strategies as suitable and meaningful for rural women in Guatemala.

Several minor changes in program content were made during the training of the health promoters who were to implement the program locally. These women were also asked about the cultural fit of the program content and program goals. They strongly supported the goals of the program to help women to gain knowledge and skills and make more choices of their own. The most extensive changes included adding and removing pictures to reflect the local flora (especially edible plants) and local dress.

### PARTICIPANTS

*Communities.* Thirty-four communities of the department Alta Verapaz in Guatemala, 3 communities from Baja Verapaz (Alta Verapaz's neighboring department at the south), and 3 communities from Izabal (the eastern neighboring region) participated in the project. Only communities were considered (a) where local women took part in health programs with which ASECSA was involved, (b) where there were a sufficient number of women in the age range specified by the program, and (c) where public transport was available at less than 3-hour walking distance. The program was implemented in 21 communities; the remaining 19 served as "controls" for purposes of evaluation. In the assignment of communities to control and experimental conditions, the traveling time to reach the experimental villages was taken into consideration. This, indeed, may involve differences between experimental and control communities before program implementation; however, the statistical model used for the data analysis (see below) explicitly accounted for initial differences among communities.

*Health promoters.* ASECSA selected in each experimental community one or two women who volunteered to participate in the implementation of the program. In total, 26 women, 16 to 50 years of age, were recruited. They all spoke Spanish and the local language of their village and could read and write. During their 4-day training (see below), they received a small daily allowance and reimbursement for costs.

*Rural women.* Each health promoter (or pair of health promoters from the same community) assembled a group of about 10 women from her community. Most participants were acquaintances (often, close neighbors) of the promoter. Word-of-mouth advertising raised the interest in the program, so that actual participation in most communities extended well beyond 10 women. The total number of women who attended the program regularly (i.e., at least 75% of the sessions) was 410, well in excess of the initial goal of 200 women.

*Evaluation samples.* For purposes of program evaluation, 168 rural women were interviewed (with a standardized questionnaire) at the start of the program (pretest) and 181 women about 1 month after completion of the program (posttest). Women from both the experimental and the control communities were included. The posttest sample from the experimental communities consisted of women who attended the program. For each community, a target number of interviewees was set. In door-to-door visits, women were invited for the interview on a voluntary basis until this number had been reached. Although in all likelihood some women participated in both preinterviews and postinterviews (for which we do not see any negative implications on the validity of the statistical analyses presented below), no special effort was made to have a paired sample; previous research in rural areas has shown many difficulties in realizing paired samples (Venguer et al., 2002).

#### **PROGRAM IMPLEMENTATION**

The application of SYEB is through a closely supervised cascade process (Venguer et al., 2007). Trainees who have taken part in the program become trainers who in turn implement the program with other participants. At each level, the replicators receive a two-phase training. First, they are provided with the necessary skills to take care of their own health and the health of their family. In the second phase, they are taught to present the program to others. Given that a target of 200 women was set, a two-level cascade was required. The 26 health promoters received a 4-day training for each module. At the end, a questionnaire was applied to assess whether the knowledge and attitudes promoted by the module had been attained. With few exceptions, the results were positive. Differences found in scores between promoters were taken into consideration in the statistical analyses.

After each training, the promoters replicated the module with the local women in fifteen 3-hr workshop sessions, so that, overall, the program covered 180 contact hours. On four occasions, once for each module, a supervisor attended (unexpectedly) a session and assessed the training abilities of the promoter and the group's behavior using previously composed guidelines.

#### **QUESTIONNAIRE FOR IMPACT EVALUATION**

Apart from some introductory demographic items, there were three parts in the questionnaire: (a) 64 items that assessed knowledge about health issues, (b) 16 items on attitudes reflecting agency, and (c) 38 items to assess (self-reported) health and agency-related behaviors. Mixed in with the latter were 8 items to assess social desirability. Each part was divided in domains and/or subscales. For women who did not have a partner, partner-related behavior questions were phrased in a conditional mode and were analyzed separately as intentions to behavior. Similarly, questions on sexual behavior were rephrased and analyzed separately for women who reported to have had no sexual relations in the last 6 months.



After the interview, the interviewer filled out an annex to the questionnaire with a checklist of 9 observations about the state of the woman's house and her clothing.

Examples of items for knowledge are "Women who have had several deliveries of babies are stronger" and "Some sexually transmittable infections may cause that a woman cannot have children." For agency attitude, items included "If a woman has an opinion that is different from her husband, she should not say so" and "A couple has the right to decide not to have children." It may be noted that these are situations governed by strong norms in traditional Latin American societies where the woman is supposed to be submissive to her husband and sex-related issues are not talked about (Rice, 1992; Venguer et al., 2002). Items on behavior asked for actions actually undertaken, for example, "Do you talk with other women about sexual health?" and "Have you talked with your partner about using contraceptive methods?" Social desirability items included the following: "Do you boil the water that you give the animals?" and "Do you wash your hands every hour to ensure they are kept clean?" Finally, an example of an observation item is, "During the interview, there were chicken or other poultry in the rooms of the house." Because the respondents were largely illiterate, the questionnaire was administered as a structured interview. The knowledge items had the alternatives *Yes*, *No*, and *Don't know*; the items for attitude about agency *Yes, I agree* and *No, I don't agree*; and the behavior and social desirability items were answered with *Yes* or *No*. The questionnaire was administered during a visit to the woman's house by 1 of 10 female staff members of ASECSA, trained for this purpose. Each interviewer was accompanied by a local health promoter, who acted as an interpreter if the interviewee did not speak Spanish.

## ANALYSIS

The main objective of the questionnaire was to evaluate the impact of the program on the women's knowledge, attitudes, and behavior. The analyses are divided into two steps. In the first, psychometric models from item response theory were applied to validate the Knowledge, Attitude, and Social Desirability Scales and obtain a score for each woman on each scale. In the second step, we examined the effects of various independent variables on the scale scores and on the answers on the behavior and observation items, using MANOVA and fitting multilevel models to the data. The latter models take account of the hierarchical structure of the data, with women (Level 1) nested within communities (Level 2).<sup>1</sup>

Before the analyses, we removed two items from the Knowledge Scale (because of an erroneous change in some postquestionnaires and because of ambiguous formulation), leaving 62 items. Likewise, one of the nine observation items was removed. In the course of the analyses, we discovered a few clusters of questionnaires that were almost exact copies of each other. All but two of these protocols were from the same interviewer, who presumably, contrary to the instructions, had administered the questionnaires on occasion in small groups of women. We discarded 25 protocols, leaving one from each cluster in the analyses. Although it is hard to demonstrate conclusively that the retained questionnaires are free of problems, additional probes did not give any further indications of fraud.

## RESULTS

### PROGRAM DELIVERY AND ATTENDANCE

As a general finding, supervisors who assessed program delivery during their surprise visits to the workshops reported that, after a few initial sessions, the promoters implemented

**TABLE 1**  
**Size of Samples, Age, Language, and Education Level of Participants in Control and Experimental Groups for Both Applications**

<i>Moment</i>	<i>Treatment</i>	n	<i>Age (in years)</i>		<i>Spanish<sup>a</sup></i>	<i>Primary School<sup>b</sup></i>
			M	SD	%	%
Pre	Experimental	77	26.6	8.5	39	68
	Control	87	25.5	7.7	35	64
Post	Experimental	83	27.8	8.5	6	54
	Control	77	25.0	6.8	48	69

a. Percentage of interviews in Spanish (not necessarily the applicant's mother tongue).

b. Percentage of women who went to primary school.

the program in a competent manner. Moreover, on the part of the women, they recorded high levels of participation during the sessions. Also levels of attendance in the workshops were high: From the available data, it emerged that on average the women attended 85% of the sessions. These attendance figures do not by themselves show that the program led to any intended behavior changes, but they positively reflect on essential conditions for program impact. If attendance is low, and thus the interest in the program, it becomes highly unlikely that the effectiveness of a program will be high. These attendance figures were further strengthened by numerous comments. Women frequently expressed how important some issues were to them and how helpless they felt before in dealing with them.

#### PRELIMINARY ANALYSES OF QUESTIONNAIRE DATA

The main focus in the analysis was on the evaluation of program impact through the questionnaire and observation study. For the 324 valid questionnaires, Table 1 shows the number of women in the experimental and the control group for both pretest and posttest, together with the mean and standard deviation for some demographic variables. The table shows that in the posttest sample, relatively few women spoke Spanish or went to school. A likely explanation is that the selection procedure led to overrepresentation of the most deprived women in the experimental group.

As a first, easy to grasp analysis of the questionnaire data, we calculated for each woman the percentage of correct or desired responses (across all given responses) in each of the four parts of the questionnaire: knowledge, agency, behavior, and observations. Table 2 presents the mean percentages for women at baseline and women in the experimental and control groups after the program was applied. (The means for the control and experimental group at baseline were pooled because in all four variables, the differences were small and nonsignificant, i.e.,  $p > .10$ .) Although these results may reveal some tendencies in the data, it is particularly perilous to use them as a basis to decide on the absence or presence of a program effect. The most important drawbacks of using these simple means for inferences include the following: (a) missing values are not appropriately dealt with, (b) no information is provided about the psychometric qualities of the scales, (c) differences among communities are not accounted for, (d) possible effects of social desirability are ignored, and (e) the effects of confounding variables (such as language and education that were found to be unequally distributed among different treatment groups, see Table 1) are not controlled for. The more advanced analyses in the subsequent sections overcome these drawbacks.



**TABLE 2**  
**Mean Percentage of Correct/Desired Responses for Knowledge, Agency, Behavior, and Observation Questions Before the Intervention and Afterward in Control and Experimental Groups**

<i>Variable</i>	<i>Pre</i>	<i>Postcontrol</i>	<i>Postexperimental</i>
Knowledge	57 (54, 59)	56 (52, 60)	65 (62, 68)
Agency	66 (64, 69)	60 (57, 64)	60 (54, 65)
Behavior	57 (55, 58)	59 (57, 62)	64 (61, 67)
Observations	54 (50, 57)	56 (51, 60)	57 (53, 61)

NOTE: Between parentheses, lower and upper limits of the 95% confidence interval for the mean.

### PSYCHOMETRIC ANALYSES

We tested whether the knowledge, agency attitude, and social desirability items form unidimensional scales by fitting Verhelst and Glas's (1995) one parameter logistic model (OPLM) to the data (using the associated OPLM computer program, Verhelst, Glas, & Verstralen, 1995). For the Knowledge and Social Desirability Scales, the fit of the model was acceptable ( $R_{1c} = 206.49$ ,  $df = 183$ ,  $p = .11$ ,  $n = 286$  for knowledge;  $R_{1c} = 12.03$ ,  $df = 14$ ,  $p = .60$ ,  $n = 318$  for social desirability). Moreover, the reliability for the estimated person parameters was satisfactory: .86 for knowledge and .80 for social desirability. For the Agency Scale, the OPLM model did not hold ( $R_{1c} = 128.44$ ,  $df = 45$ ,  $p < .01$ ,  $n = 313$ ). After omitting four problematic items from the scale, we found an acceptable fit ( $R_{1c} = 44.04$ ,  $df = 33$ ,  $p = .09$ ,  $n = 313$ ). However, any further results regarding the Agency Scale should be interpreted with care because the reliability of the estimated person parameters for the reduced scale was only .53.

### MANOVA

Both the behavior and observation questions address independent domains of action and, as a result, imply multidimensionality and heterogeneity, as such violating the assumptions underlying the OPLM model. Therefore, we analyzed the set of behavior questions and the set of observation questions in multivariate analyses of variance with moment of application (pre vs. post), treatment condition (experimental vs. control group), and their interaction as independent variables. Table 3 shows the values of Wilks's Lambda and associated  $p$  values, which is a test of the null hypothesis that there is no overall effect of the independent variables on the set of dependent variables (Tabachnick & Fidell, 1996). For both the set of behaviors and the set of observations, the Moment  $\times$  Treatment interaction is significant, which is an index of an overall program effect. To interpret this overall significant result, we look at multilevel analyses of the separate dependent variables.

### MULTILEVEL ANALYSES

Table 4 shows the estimates of the parameters in the multilevel model we used for evaluating the effects on the continuous dependent variables in the study, that is, the Knowledge Scales and subscales, Agency Attitude subscales, and (behavioral) nutrition indices. Each row in Table 4 shows the parameter estimates for the analysis of the dependent variable mentioned in the first column. The columns labeled  $\hat{\beta}_1$  to  $\hat{\beta}_7$  contain the

**TABLE 3**  
**Wilks's Lambda and Associated *p* Values For Moment, Treatment,**  
**and Moment  $\times$  Treatment in the MANOVA on the (Self-Reported)**  
**Behaviors and the Observations**

	Wilks's Lambda	F Value	Degrees of Freedom		p Value
			Numerator	Denominator	
Behaviors					
Moment	0.727	5.59	18	268	<.001
Treatment	0.886	1.92	18	268	.015
Moment $\times$ Treatment	0.893	1.78	18	268	.027
Observations					
Moment	0.805	8.10	8	268	<.001
Treatment	0.967	1.16	8	268	.325
Moment $\times$ Treatment	0.934	2.39	8	268	.017

parameter estimates for a general intercept, civil status, age, social desirability, language, moment of testing, treatment, and quality of program delivery by the local health promoter, respectively. Note that the net treatment effect is assessed as the Moment  $\times$  Treatment interaction effect, because treatment is confounded with moment. Similarly, quality of program delivery, which only applies in the case of women in the experimental sample and in the posttest condition, actually corresponds to a Moment  $\times$  Treatment  $\times$  Quality interaction.

Following the parametrization used in the multilevel model, the general intercept  $\beta_0$  corresponds to the predicted value for a woman who is single has an age equal to the mean age does not speak Spanish and was interviewed before the program. Because we standardized the dependent variables,  $\beta_0 = -0.59$  implies that the expected knowledge score of such a participant is 0.59 *SD* below the mean of all the women in the sample. For women who are married, the estimated value 0.32 for  $\beta_1$  must be added to this baseline value. Similarly, women who speak Spanish generally have a knowledge score, that is,  $\beta_4 = 0.46$  *SD* higher than women who do not. The effect of age (modeled to be linear) amounts to 0.014 *SD* per year; so the expected difference between a 20-year-old woman and a 30-year-old woman is 0.14 *SD*, in favor of the latter. Furthermore, the estimate for  $\beta_5$  shows a slight increase during the program period of 0.03 *SD* for women of both experimental and control communities. Note that social desirability does not have a value for the Knowledge (sub)Scales: The effect of social desirability was omitted from the model for these scales, as knowledge was assumed not to be influenced by this response style.

The net treatment effect, with a value of  $\beta_6 = 0.83$ , shows that in women from experimental communities, contrary to women from control communities, overall knowledge strongly increases. The total increase for women who were taught the program equals  $\beta_5 + \beta_6 = 0.03 + 0.83 = 0.86$  *SD*. The value for  $\beta_6$  can be interpreted as the difference in increase between women who participated in the program and women who did not. Thus, for overall knowledge, the estimated effect of the program corresponds to an increase of 0.83 *SD*. The value for  $\beta_7$  shows that if the program is taught by a promoter who is 1.0 *SD* above the mean quality level, the program's effect is increased with 0.10, amounting to  $\beta_6 + \beta_7 = 0.93$ . To interpret the effect size, Cohen's (1992) rule of thumb can be used, where changes of 0.20, 0.50, and 0.80 on a standardized scale are considered as small, medium, and large, respectively.

**TABLE 4**  
**Estimates of the Fixed Effects in the Multilevel Model for the Knowledge,  
 Agency, and Nutrition Scores**

	$\hat{\beta}_0$ (Intercept)	$\hat{\beta}_1$ (Civil State)	$\hat{\beta}_2$ (Age)	$\hat{\beta}_3$ (Soc. Des.)	$\hat{\beta}_4$ (Language)	$\hat{\beta}_5$ (Moment)	$\hat{\beta}_6$ (Treatment)	$\hat{\beta}_7$ (Quality)
<b>Knowledge</b>								
Overall	-0.59 <sup>‡</sup>	0.32 <sup>‡</sup>	0.014		0.46 <sup>‡</sup>	0.03	0.83 <sup>‡</sup>	0.10
Nutrition	-0.21	-0.11	0.015		0.27 <sup>†</sup>	0.04	0.60 <sup>‡</sup>	0.04
Hygiene	-0.10	-0.23	0.021 <sup>†</sup>		0.22	0.09	0.61 <sup>†</sup>	0.08
Sexuality	-0.24	0.04	0.019 <sup>†</sup>		0.21	-0.00	0.50 <sup>†</sup>	0.13
STI	-0.49 <sup>‡</sup>	0.21	0.009		0.49 <sup>‡</sup>	-0.10	0.92 <sup>‡</sup>	0.13
Pregnancy	-0.70 <sup>‡</sup>	0.73 <sup>‡</sup>	0.000		0.39 <sup>‡</sup>	0.08	0.28	0.12
Contraception	-0.55 <sup>‡</sup>	0.40 <sup>‡</sup>	-0.001		0.22	0.07	0.68 <sup>‡</sup>	-0.07
General	-0.31 <sup>†</sup>	-0.01	0.013		0.46 <sup>‡</sup>	0.17	0.34	0.20 <sup>†</sup>
<b>Agency attitude</b>								
Overall	0.12	-0.23	0.015	0.03	0.32 <sup>†</sup>	-0.35	0.24	-0.03
Sexuality	0.09	-0.23	0.013	0.04	0.40 <sup>‡</sup>	-0.43 <sup>†</sup>	0.48 <sup>†</sup>	-0.10
General	0.12	-0.06	0.004	-0.02	0.09	-0.07	-0.44	0.02
<b>Nutrition indices</b>								
Variety	-0.11	-0.03	-0.029 <sup>‡</sup>	0.26 <sup>‡</sup>	0.33 <sup>‡</sup>	-0.29	0.65 <sup>‡</sup>	0.06
Completeness	-0.14	-0.06	-0.026 <sup>‡</sup>	0.25 <sup>‡</sup>	0.29 <sup>†</sup>	-0.25	0.80 <sup>‡</sup>	0.05

NOTE: <sup>†</sup>Denotes that the estimated parameter value is significantly different from 0 ( $p < .05$ ), <sup>‡</sup> $p < .01$ . Social desirability (soc. des.) was omitted from the model for the knowledge dependent variables.

Importantly, the model takes into account differences among communities before program implementation, beyond differences already explained by the effects of civil status ( $\hat{\beta}_1$ ), age ( $\hat{\beta}_2$ ), social desirability ( $\hat{\beta}_3$ ), and language ( $\hat{\beta}_4$ ). This actually means that the general intercept  $\hat{\beta}_0$  is allowed to vary among communities and that all effects included in the model are relative to the initial level of the community in which the woman lives. Likewise, the model accounts for differences among communities with respect to the change between both application moments, beyond the differences because of program implementation ( $\hat{\beta}_5$ ) or quality of program delivery ( $\hat{\beta}_7$ ). This means that the time effect  $\hat{\beta}_5$  may vary among communities because of, for example, local initiatives by the community authorities. Although the results showed significant contributions of the associated parameters (so underscoring the necessity of multilevel modeling), we omitted them from Table 4 as they are less important from a substantive point of view.

Inspection of Table 4 shows positive effects of the program in most variables. Particularly in knowledge and nutrition, the treatment effect  $\hat{\beta}_6$  shows a large increase for women of the experimental communities. The gain in knowledge is most pronounced regarding sexually transmitted infections and contraception, two issues with which many indigenous groups are not familiar.

In the (overall) Agency Scale, the effect is smaller and not statistically significant, although for sexuality, the program did have a significant positive effect. Perhaps there is a general decrease over time in all women as indicated by the negative value for  $\hat{\beta}_5 = -0.43$ ; combined with the positive value  $\hat{\beta}_6 = 0.48$ , this points to a decrease in the control group while women in the experimental group maintain (or slightly increase) their level.

With respect to the other effects included in the model, it is observed that, in all variables, women who speak Spanish have considerably more favorable scores. Civil state and

**TABLE 5**  
**Estimates of the Fixed Effects in the Logistic Multilevel Model for the**  
**(Self-Reported) Behaviors and Observations**

	$\hat{\beta}_0$ (Intercept)	$\hat{\beta}_1$ (Civil State)	$\hat{\beta}_2$ (Age)	$\hat{\beta}_3$ (Soc. Des.)	$\hat{\beta}_4$ (Language)	$\hat{\beta}_5$ (Moment)	$\hat{\beta}_6$ (Treatment)	$\hat{\beta}_7$ (Quality)
<b>Hygiene</b>								
Dispose of garbage	1.64 <sup>‡</sup>	-0.41	0.028	0.48 <sup>†</sup>	0.53	-0.71	1.07	-0.35
Separate garbage	-1.03 <sup>‡</sup>	0.36	0.032	0.39 <sup>‡</sup>	0.67	0.95 <sup>†</sup>	-0.41	0.42 <sup>†</sup>
<b>General health</b>								
Tetanus vaccination	-0.09	0.90 <sup>‡</sup>	-0.015	0.23	0.10	0.08	-0.01	0.28 <sup>†</sup>
Do exercise	-0.42	-0.07	-0.002	0.75 <sup>‡</sup>	0.26	-0.75	0.70	-0.09
Brush teeth at last meal	1.64 <sup>‡</sup>	-0.78	-0.061 <sup>†</sup>	0.43 <sup>†</sup>	0.82	0.51	0.43	0.09
Brush teeth last night	1.57 <sup>‡</sup>	-0.74	-0.037	0.44	0.91 <sup>†</sup>	1.00	1.19	-0.30
<b>Agency</b>								
Give sexual education	-0.83 <sup>†</sup>	-0.94 <sup>†</sup>	0.051 <sup>†</sup>	0.12	1.42 <sup>‡</sup>	-0.37	0.98	0.23
Participate in community	-1.28 <sup>‡</sup>	-0.04	0.009	0.54 <sup>‡</sup>	0.50	0.07	0.83	-0.08
Talk about health	-1.00 <sup>‡</sup>	-0.13	0.007	0.42 <sup>‡</sup>	0.52	-0.96 <sup>†</sup>	1.15 <sup>†</sup>	-0.08
Talk about sex	-1.11 <sup>‡</sup>	-0.20	0.046 <sup>†</sup>	0.26	-0.14	-0.05	0.27	0.32
Go out with friends	0.58	-0.87 <sup>†</sup>	0.022	0.66 <sup>‡</sup>	-0.52	0.70	-0.15	-0.14
Doctor visit	-0.35	0.49	0.021	0.33 <sup>†</sup>	0.35	0.15	0.75	0.00
Talk about emotions	-0.34	-0.07	0.016	0.35 <sup>†</sup>	0.24	-0.17	0.26	0.06
<b>Nutrition</b>								
Using iron pans	1.11 <sup>‡</sup>	-0.55	-0.018	0.17	0.18	-0.92 <sup>†</sup>	-0.23	0.03
<b>Sexual health</b>								
Pap smear test	-3.69 <sup>‡</sup>	2.15 <sup>‡</sup>	0.013	0.15	1.10 <sup>‡</sup>	0.60	-0.22	0.03
Inspect genitalia	-0.39	-0.33	0.003	0.20	0.64	1.19 <sup>‡</sup>	-0.27	0.08
<b>Observations</b>								
Poultry in the house	-0.04	0.37	-0.021		0.79 <sup>†</sup>	0.59	0.21	-0.01
Garbage container inside	-1.07 <sup>‡</sup>	-0.12	0.005		1.07 <sup>‡</sup>	-0.30	1.22 <sup>†</sup>	0.31
Garbage container outside	1.23 <sup>‡</sup>	-0.72	0.023		0.18	0.44	0.12	0.04
Vegetable garden	-1.01 <sup>‡</sup>	-0.08	-0.006		0.35	1.02 <sup>‡</sup>	0.70	0.41
Cat/dog in kitchen	-0.61	-0.04	-0.007		1.17 <sup>‡</sup>	1.19 <sup>‡</sup>	-0.47	-0.25

NOTE. <sup>†</sup>Denotes that the estimated parameter value is significantly different from 0 ( $p < .05$ ), <sup>‡</sup> $p < .01$ . Social desirability (soc. des.) was omitted from the model for the observations.

age generally have small effects except for the large values of  $\hat{\beta}_1$  in the Pregnancy and Contraception subscales.

Table 5 presents the parameter estimates of the (logistic) multilevel model we used for the binary behavior and observation questions. This model is similar to the model for the

continuous dependent variables (used in Table 4) except that a logit link function is applied, as such yielding a model for the probability that the desired behavior occurs. In this analysis, items with a very high percentage (i.e., above 85) of desired responses were omitted, because they yielded unstable results. (Note that a logit transformation causes small differences between extreme probabilities to become relatively large that partly explains the problems in the estimation procedure for items with a strongly skewed distribution.) The results are interpreted in the same way as in Table 4. The values for  $\beta_6$  (net treatment) suggest positive effects for most variables, particularly agency and general health variables. Other striking results are the mainly positive, and sometimes strong, estimates for social desirability and language. The former implies that the women's answers on the behavior questions are colored by their tendency to give socially desirable answers. The language effect shows an advantage for women who speak Spanish over women who only speak an indigenous language.

As mentioned before, the analyses for the partner questions were conducted separately for women with and without partner. In both subsamples, the results were similar to those in Table 5 but more inconsistent, most likely because of the smaller number of observations per subsample.

## DISCUSSION

Two sets of findings point to positive program effects. First, there was a clear and continuing interest in the program. Women kept coming to the workshop sessions, despite the considerable amount of time these occupied and the difficulties they had with some of the presented issues. These observations were strengthened by numerous comments from the women. This evidence is noted here as it is in line with and supports the second set of findings, derived from the more formal evaluation of program impact that we are reporting in this article.

The program led to a large increase in knowledge in various health-related domains. Also with respect to eating habits, positive effects were found. For attitudes toward agency, the results are less clear. This is partly because of a less reliable measurement and a decrease between pre and post in the control group. At face value, such a decrease perhaps reflects the widely reported disintegration of rural communities in Guatemala (see the introduction), but such an interpretation is beyond the scope of our study. Furthermore, in addition to the women's self-reports, independent observations also indicated changes in behavior, especially regarding hygiene.

The pattern of findings is in agreement with the perspective outlined in the introduction. Knowledge and concrete behaviors that were the target of the program show larger changes than more general characteristics, such as the attitude toward agency. The smaller size of this effect points to slower and less substantial changes in broader characteristics of the person. It can be argued that only after actual behavior has started to change that broader aspects of social functioning will be modified (Pick, Poortinga et al., 2003).

Exceptions to the positive trends in the results were found for sexuality-related behaviors, such as going for a Pap smear test and inspection of one's genitalia. There are various possible explanations for the absence of an effect on these behaviors. A first possibility is that for indigenous women talking about sex, in particular with an unknown person (albeit another woman) provokes uneasiness and embarrassment, causing any sex-related questions to yield unreliable answers. Alternatively, the health promoters teaching the course may have felt embarrassed when dealing with sexual issues. Some evidence for the

latter comes from the earlier application of the program in Mexico where supervision scores dropped somewhat for Module 4 about sexual and reproductive health (Venguer et al., 2002). A third possible explanation is that the women did not sufficiently trust the anonymity of the interview to report actual sexuality-related behaviors.

The strong language effect in almost all variables may be because of the fact that women who speak Spanish have a higher level of education and therefore more access to information regarding health issues. Note in this respect that the Spearman correlation between language and the level of the last school year equals .31 ( $p < .01$ ).

The demographic variables had limited effects on the dependent variables. Married (and divorced and widowed) women showed about the same level of knowledge, attitude, and behaviors as single women. Also older women did not obtain markedly different results from younger. The finding that married women know more about pregnancy and contraception stands to reason, as does the finding that more married women are vaccinated against tetanus given that pregnant women are encouraged to take a tetanus vaccination. Similarly, it is common that unmarried women spend more time with their friends than married ones. The negative effect of age on diet, implying that younger women eat more varied and include more of the basic nutrients in their meals than older women do, is possibly because of younger women being less bound to traditions and more open to external sources of information about health and nutrition.

We like to draw attention to the important effects of social desirability. Although it is well known that social desirability can affect self-reports (Crowne & Marlowe, 1964; Paulhus, 1991), it is often not considered in program evaluations. Our findings argue clearly in favor of including measures of this factor so that scores on dependent variables that are possibly affected by social desirability can be (statistically) corrected. As an aside, one may wonder whether the intervention itself and possibly other independent variables like civil state or age affect the tendency of giving socially desirable answers. An analysis with social desirability as the dependent variable in a multilevel model similar to the one used for the analyses in Table 4 does not show any evidence that the program would promote social desirability nor that this response style is related to differences on demographic variables.

Overall, the findings support the conclusion that the SYEB program, with minor adaptations, can be meaningfully implemented in rural Guatemala. As such, our study has demonstrated the feasibility of program transfer. The reach of this general conclusion is constrained by two considerations. First, we cannot tell whether there was loss in program effectiveness with the transfer. The main reason is that the questionnaire used in the present study differs from the one used in the evaluation study in Mexico (Venguer et al., 2002; Venguer et al., 2007). Second, compared with the range of cultural diversity across the world, the cultural distance between rural Oaxaca and rural Guatemala is rather small. Indigenous languages are mutually incomprehensible (this even holds for the home languages spoken by some of the program participants), but the regions have a similar history, both before and after arrival of the Spanish conquistadores. More important, both regions to a major extent share sociocultural conditions of poverty and gender inequality that are found throughout Latin America.

By implementing the program, we have taken it on us to decide that the women who became program clients were in need of changes in their lives and would not be harmed by participation in the workshops. The soundness of the program transfer on psychological grounds has been argued extensively in this article. However, there is also an ethical dimension; health education programs amount to interventions that also require moral justification. We like to highlight three considerations. First, we sought the opinion of two local experts and the opinions of colleagues at ASECSA at the start of the project. Second, the involvement of local women (as health promoters)—in many respects, the foremost



experts on local needs and living conditions— has helped to filter out (culturally) inappropriate program content. Adaptations to the program were made in interaction with the local health promoters during their training for the various modules. Third, the women attended voluntarily in the workshops; note that voluntary participation probably is the closest equivalent of informed consent in rural societies. This argument is further corroborated by the high rates of attendance and positive comments. After all, the concern to improve the living conditions of the poor on one hand and concern about impositions and disruption of local cultural patterns on the other have to be considered in combination; in our view, the former concern tends to be the most compelling.

The implementation through local health promoters not only diminished the risk of cultural impositions but also greatly increased the cost effectiveness of the program. Financial investments were needed for the training of local women, for their supervision, and for program materials, but as volunteers, the women received no money for conducting the workshops. This allowed for a large number of workshops at virtually no financial expenditure. Needless to say that low costs are an important consideration when it comes to further distribution of the program.

Fieldwork of the kind reported here is inevitably subject to limitations. We already referred to possible effects of social desirability. In addition, the assignment of villages to the two conditions was not completely random to keep traveling time and costs within bounds. Moreover, there was overlap in the presamples and postsamples, and we found that more marginalized (non-Spanish speaking) women were probably overrepresented in the experimental sample. Finally, there was evidence of some impropriety in the data collection. Although some of these factors were controlled for in the statistical analyses, they limit the strength of our conclusions. However, taking into account the complete set of results, it seems implausible that the reported effects reduce to artifacts.

## CONCLUSION

The implementation of the Mexican program SYEB for indigenous women living under harsh conditions in rural Guatemala produced positive effects, most clearly in knowledge and nutrition-related behavior and less so in attitudes toward agency and sexuality-related behaviors. There were some shortcomings in the way the study was conducted, which seems inevitable with fieldwork conducted in a remote rural area. Nevertheless, the findings show that the program had a significant positive impact. The pattern of results was largely in agreement with expectations based on earlier work. All in all, the findings justify the translation and adaptation of the program materials for wider use among this population.

## NOTE

1. More detailed information about the statistical models used in this study can be obtained from the first author.

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