Research Article

An Evaluation of Mi Familia No Fuma: Family Cohesion and Impact on Secondhand Smoking

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ABSTRACT

Background: *Family cohesion may be a factor to prevent exposure of Hispanics in United States to secondhand smoke.* ***Purpose:*** *The purpose of this study was to evaluate one permutation of Mi Familia No Fuma (MFNF) and its resulting outputs or proximal client outcomes.* ***Methods:*** *MFNF is an approach to secondhand smoke prevention, using family cohesion through a family photo and one-year pledge. The intervention targets both smokers and non-smokers in the household. A cross-sectional survey was conducted after the intervention.* ***Results:*** *Of the 499 participants, 23% (N=106) self-identified as smokers. Daily smokers reported an increase in willingness to create a smoke-free home. Family cohesion did not directly influence intent to create a smoke-free home or willingness to discuss the pledge with relatives. It was associated with increased belief that smoking in the home increases health risks and plans to place the photo/pledge in the home.* ***Discussion:*** *Levels of acculturation may affect individuals' willingness to enforce a smoke-free pledge in the home.* ***Translation to Health Education Practice:*** *Family cohesion is a relevant construct, particularly when included in a comprehensive and coordinated approach to reduce tobacco use within a Hispanic community.*

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BACKGROUND

Secondhand smoke (SHS) can cause disease and premature death in individuals who do not smoke.[1,2] Children exposed to SHS are at increased risk for sudden infant death syndrome (SIDS), acute respiratory infections, ear problems and more severe asthma.[1] Exposure of adults to SHS has immediate, adverse effects on the cardiovascular system and causes coronary heart disease and lung cancer.[1,3]

Whereas a downward trend in SHS exposure emerged in the 1990s, approximately 60% of nonsmokers in the U.S. continue to have biologic evidence of SHS.[1,3-4] About 22% of U.S. children (ages 3-11 years of age) are exposed to SHS in their homes.[1] Across all groups, the percentage of nonsmokers with detectable serum cotinine was highest for those aged 4-11 years and 12-19 years.[4] Whereas SHS exposure is estimated to be higher among non-Hispanic blacks, National Health and Nutrition Examination Surveys (NHANES) report that at least 40% of all ethnic groups, including Mexican Americans, have detectable serum cotinine.[4]

Consistent with efforts to reduce smoking prevalence, SHS exposure prevention is recognized to be most effective when "clinical, regulatory, economic and social strategies" are implemented simultaneously.[5] At the state level, components of a comprehensive initiative may include: clean indoor air ordinances, smoking cessation programming, counter advertising, and excise taxes.[5] The Centers for Disease Control and Prevention (CDC) also recommend implementation of community-based programs to influence the knowledge, attitudes and practices of tobacco users and nonusers.[5]

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The home smoking ban is a specific strategy that has been demonstrated to reduce risk of SHS exposure within Mexican and Mexican-descent households, including households with residents that smoke.[6] Evidence suggests that income, education and the presence of smokers in a household have an inverse relationship with the presence of home smoking rules.[7] Among one sample of U.S. and Mexican-born Hispanics, U.S. born mothers were less likely than their Mexican born peers to have a complete smoking ban in their household.[8]

PURPOSE

This evaluation study is an analysis of one permutation of *Mi Familia, No Fuma (MFNF).* MFNF is an approach designed by the Texas Department of State Health Services (TX DSHS) to decrease exposure to secondhand smoke (SHS) and consequently reduce smoking related disease among the Hispanic/Latino population in Texas. The design of the MFNF utilizes the construct "family cohesion," the influence that the Hispanic family can have on its members to influence smoking behaviors. TX DSHS has operationalized this approach through a range of media: Spanish-language television commercials, billboards, in-store posters, theatre slides, transit ads, brochures, Quit Line cards, and other printed materials that educate Hispanic families about tobacco prevention.[9] In the permutation evaluated, the Colonias Program of the Center for Housing and Urban Development (CHUD) at Texas A&M University, a community-based unit of the university, utilized the one-year home smoking ban and family picture as an intervention to decrease exposure to SHS in El Paso County, Texas. The intent of the evaluation is to identify relationships between MFNF, the family cohesion construct, and participants', both smokers and non-smokers, intent to allow smoking in the home.

METHODS

Program Design

In various community settings (health fairs, community meetings, parent/teacher nights at schools, etc), CHUD hosts booths at which its personnel share health education materials and discuss the dangers of smoking tobacco and SHS with attendees who visit the table. Attendees are invited to sign a family pledge that they will not allow SHS in their home during the next year. If the family is willing to take the pledge, CHUD personnel take a Polaroid picture of the family. The picture is placed within a cardboard frame that includes the signed pledge. Families are encouraged to place the picture/pledge in a visible place within their home as a reminder of their year-long commitment. MFNF is one part of a comprehensive initiative in the El Paso area attempting to limit the disease impact of smoking tobacco. Other components include a mass media campaign, a clean indoor air ordinance, cessation services, and prevention programming directed toward local youth.

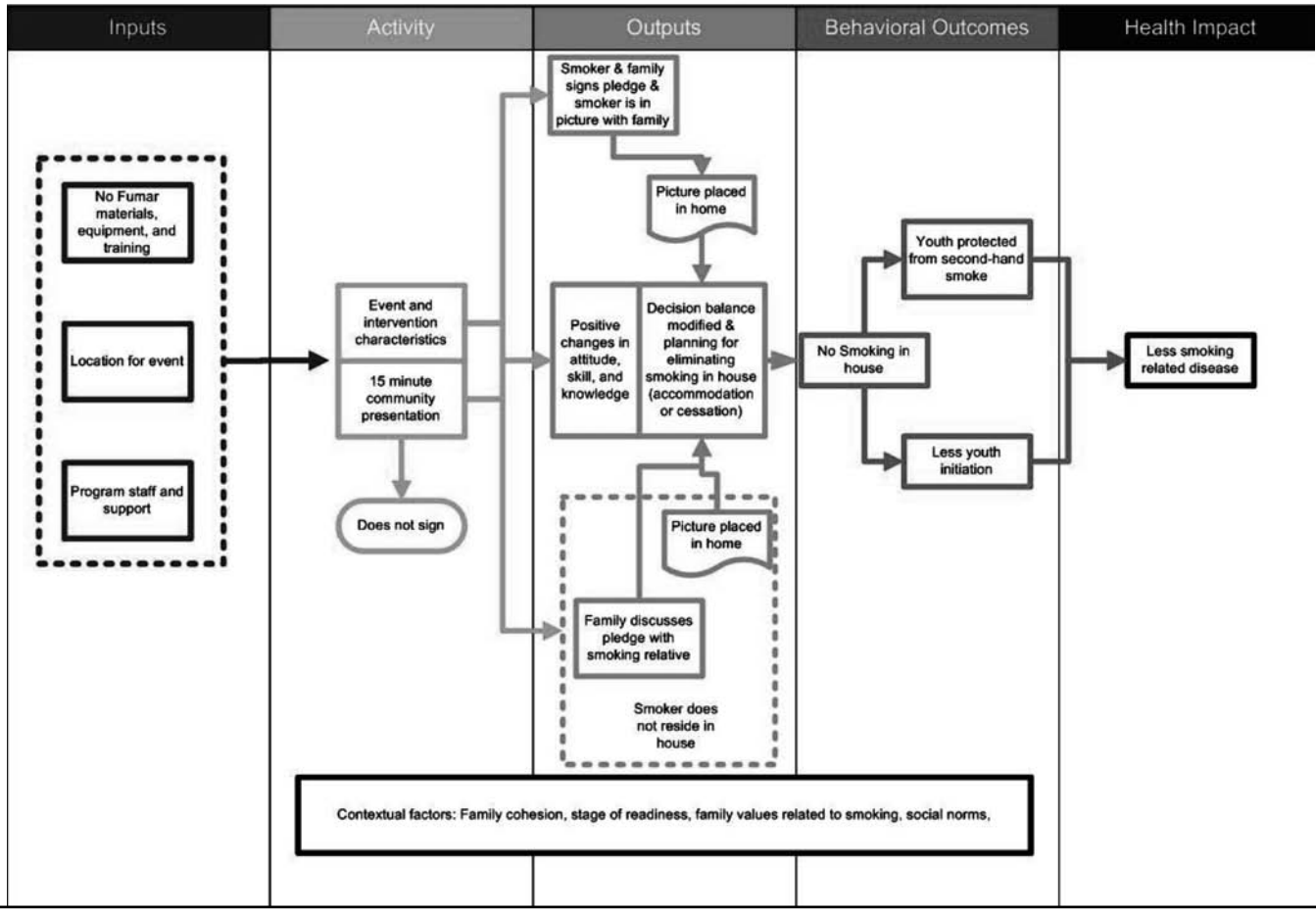
Evaluation Design

The evaluation involved a non-experimental, one-group, posttest design. We investigated the relationships between the program and the resulting outputs or proximal client outcomes. The evaluation questions, design and consequent measures are driven by a logic model (Figure 1). The logic model is considered the program's "theory of action" or how the MFNF intends to produce its desired results.[10,11] In this case, the theory of action was derived through a "user-focused approach," in which CHUD staff members were interviewed to extract their operating theory of the program.[10] One motivation for user-focused evaluation design is that the end users of the evaluation, in this case CHUD staff, are engaged in the evaluation design and consequently are more likely to utilize findings in the improvement of the program.[10] The logic model includes the program's activities, outputs, anticipated behavioral outcomes and the underlying theory behind the program's design: family cohesion, stage of readiness, and family values related to smoking.

The construct "family cohesion" is central to MFNF's design. Family cohesion is defined as the level of attachment between members of a family. Dimensions of cohesion include: emotional bonding, family boundaries, coalitions, time, space, friends, decision-making, and interest and recreation.[12] It should be noted that the level of cohesion in a family is not necessarily static. Cohesion has been found to be highest when children are younger and tends to decrease as children reach adolescence.[12] A developing body of research suggests that family cohesion can affect the health-related behaviors of Hispanics, specifically use of tobacco. The cohesion of Latino/Hispanic family units is significantly associated with smoking.[13] As cohesion increases, smoking decreases. Moreover, family cohesiveness is identified as a significant variable in the behaviors of Mexican American women during pregnancy, including smoking.[14]

After participating in the intervention, all adult participants were invited to visit a second table, physically separated from the intervention booth, at which informed consent processes and the paper/pencil survey were administered. The survey was a 41-item instrument. The first 29 items were asked to all adult participants. The last 12 questions were contingent upon participant self-identification as a "current smoker." The instrument measures the multiple concepts built into the logic model including: behavioral intent related to the intervention; changes in attitude, skill, and knowledge related to the intervention; current home rules related to smoking; family cohesion; family values related to smoking; smoking status; social norms; and smokers' readiness to change. Six demographic questions are also included. Twenty-four of the questions are validated items from the Centers for Disease Control and Prevention's (CDC) Inventory of Survey Questions on tobacco control.[15] Family cohesion items were taken from an eight-item questionnaire that has been validated and used elsewhere.[12-14] Concepts included in these eight items include: emotional bonding, family boundaries, coalitions, time, space, friends, decision-making, and recreation.[12-14] Three items related to awareness of the local quitline were developed by the investigators. The survey was available in English and Spanish. Both the intervention and the evaluation booths

Figure 1. Mi Familia No Fuma Logic Model



were staffed by bilingual (English and Spanish) program staff members. Participants in the evaluation received a magnetic frame (approximate value of $2) sized to fit the photo taken during the intervention. The intervention and evaluation were conducted at 10 different health fairs in El Paso County, Texas; a county that is mostly Hispanic (81%) and has a relatively high proportion of families below the poverty level (24%).[16] Half of the events were conducted at community centers; and three were conducted at schools, one was conducted at a church, and another at a shopping center. Data were collected between September 1, 2008 and March 1, 2009.

The data were scanned, cleaned and processed using Snap Surveys Version 9 (Portsmouth, NH). Data preparation and alpha computations were completed in STATA 10.0 (College Station, TX). All inferential analyses (path model analyses) were completed in Mplus 4.21 (Los Angeles, CA). The association of family cohesion to multiple variables of interest was assessed via path analysis considering demographic variables as exogenous factors and family cohesion as the primary endogenous explanatory variable of interest. Fit of the hypothesized and adjusted final model were assessed with both incremental and absolute model fit indices including the Comparative Fit Index (CFI), Non-Normed Fit Index (NNFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual, the values of which should be close to or exceed .95 in the case of CFI and NNFI, less than .06 for RMSEA, and less than .08 for SRMR.[17,18]

Exogenous variables thought to be relevant to both MFNF outcome variables as well as family cohesion were included in the model. These variables included the indicator variables of Hispanic ethnicity, Spanish language preference, female gender, poverty status (reporting <$15,000 annually for a household of two), and both non-daily and daily smoking (vs. non-smoking). Number of children in the household and age remained continuous exogenous covariates. All endogenous covariates were continuous in nature (range = 1 to 4). Family cohesion was the primary endogenous predictor of interest in the specified model. However, beliefs about the negative health of smoking in the home (Beliefs) and perceived knowledge gain from the activity (Learned from Event) were also of interest in predicting: (1) a plan to place the smoke free photo in the home (Plan); (2) a plan to discuss imple-

mentation of a smoking ban in the home with relatives not present at the health fair who smoke (Discuss); and (3) intention to implement a smoking ban in the home for at least 12 months (Intent). The *a priori* model specified is presented in Figure 2. "Current smoker" was defined by two criteria: having smoked 100 or more cigarettes in one's lifetime and reporting current smoking "every day" or "some days."

RESULTS

Participant Characteristics

A total of 499 surveys were completed. Participant characteristics are shown in Table 1. Most participants identified as Hispanic (88%), with more than half (56%) preferring to communicate in Spanish versus English. The sample was predominantly female (71%). Half of the sample reported an approximate household income below the minimum poverty level for a family of two. A majority of the individuals participating in the intervention (61%) reported having at least two children. Responses to Learned from Event, Discuss, Plan and Intent were reasonably high (all above the midpoint of 2.50 on a scale of 1 to 4; higher score indicates more affirmative response to item). Finally, the mean score of family cohesion was 2.57, also on a scale of 1 to 4 (higher score indicates more cohesive family).

Estimated Model Fit

The planned path analysis model (Figure 2) was of poor fit to the data. Using modification indices, the following paths were freed improve model fit: family cohesion to beliefs about smoking and perceptions about having learned from the event; the number of children in the family and willingness to discuss creation of a smoke free home with extended family members; Hispanic ethnicity, language preference, daily smoking, and having learned from the event to intention to create a smoke free home; and Hispanic ethnicity to planning to place the photo in the home.

The resulting path analysis model is presented in Figure 3 with only significant parameter estimates shown for readability. All parameter estimates for the model are presented in Table 2. As is common,[19] this model did violate goodness-of-fit to the data, χ^2 (36) = 74.65, $P < 0.01$. However, other fit indices suggest good fit of the model to the data: CFI = .97; NNFI = .94; RMSEA = .05; and SRMR = .04.

Impact of Exogenous Covariates on All Endogenous Covariates

Overall, the explanatory variance offered by exogenous demographic covariates on the central variable of interest in predicting intent (i.e., family cohesion) was relatively small (R^2 = .13) (Table 3), indicating that demographic descriptors of a family do not fully account for family cohesion. Adjusting for impact of other exogenous covariates, only the number of children in the family (γ = .01, $P < 0.01$) and daily smoking versus reporting not smoking at all (γ = .20, $P < 0.01$) appear to be associated with increased family cohesion. Non-daily smoking versus non-smoking (γ = -.23, $P < 0.01$) was associated with lesser family cohesion. Daily smokers reported an increase in willingness to create a smoke free home (γ = .18, $P < 0.01$) suggesting that daily smokers, at least those willing to attend the health fair and participate in the program, are willing to make changes for the benefit of their families. Whereas the number of children in the family was associated with a small increase in family cohesion, a larger family size appears to translate in to a decreased likelihood of discussion of a smoke free home (γ = -.03, $P < 0.01$). Hispanic ethnicity was unassociated with family cohesion, but was associated both with planning to place the smoke-free photo in the home (γ = .21, $P < 0.01$) and strongly associated with an intention to create a smoke free home (γ = 1.75, $P < 0.01$). The impact of preference for Spanish language on intent to create a smoke free home is substantially lower (γ = -.68, $P < 0.01$), relative to participants who preferred English.

Impact of Family Cohesion

Within the overall sample, family cohesion did not directly influence intent to create a smoke-free home or willingness to discuss the pledge with relatives. However, family cohesion was associated with increased belief that smoking in the home increases health risks for the family (β = .23, $P < 0.01$) and plans to place the smoke free photo in the home (β = .07, $P < 0.01$). Furthermore, family cohesion may be associated with an increase in receptivity to the messages provided from health educators given the observed positive association between family cohesion and having gained health knowledge at the event (β = .22, $P < 0.01$).

Impact of Health Beliefs and Perceptions of Knowledge Gain

Beliefs about the impact of secondhand smoke on one's family were closely tied to perceptions of having become more educated about the health impact of secondhand smoke on the family (ψ = .23, $P < 0.01$). Beliefs about the health impact of smoking in the home are associated with discussion of the pledge (β = .50, $P < 0.01$), and a plan to place the picture in the home (β = .45, $P < 0.01$), but not directly associated with an intention to create a smoke free home. Similarly, perceptions of having learned something about the health consequences of smoking in the home were positively associated with both a plan to place the photo in the home (β = .38, $P < 0.01$) and a plan to discuss the pledge with extended family members (β = .20, $P < 0.01$). Interestingly, perceived knowledge gain was significantly, but negatively related to an intention to create a smoke free home (β = -.33, $P < 0.01$).

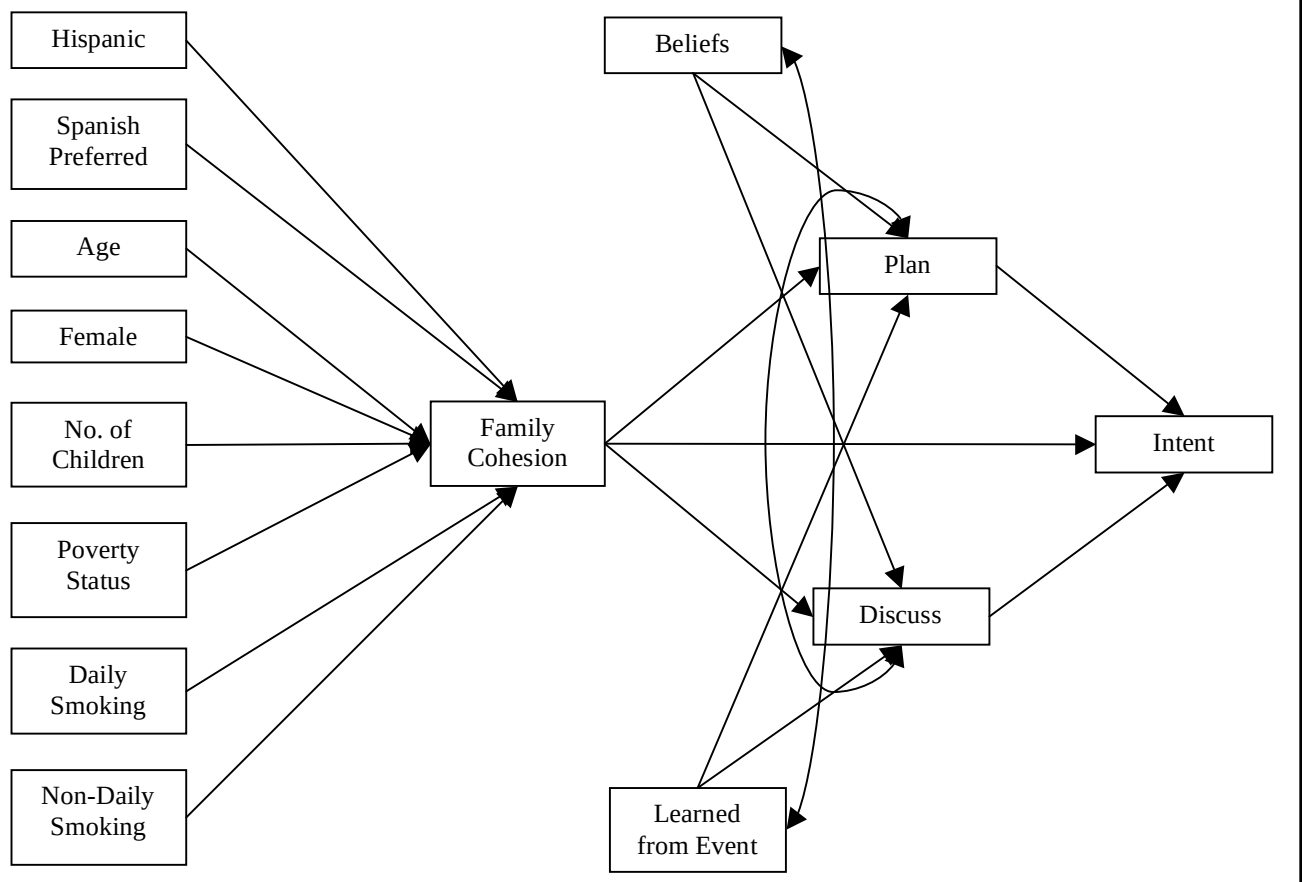
Impact of the Photo Activity and Discussion on Intent to Create a Smoke Free Home

A plan to display the photo and a plan to discuss creating a smoke-free home with extended family members who smoke were not significantly related (P>0.05). Planning to place the photo/pledge in the home was positively related to intent to create a smoke-free home (β = .70, $P < 0.01$). Yet, a plan to discuss creating a smoke-free home with extended family who smoke was unassociated with intention to create a smoke-free home (P>0.05).

DISCUSSION

Overall, the final model (Figure 3) and its directed dependencies demonstrate overlap

Figure 2. Proposed Model: Impact of Family Cohesion on Smoke Free Homes

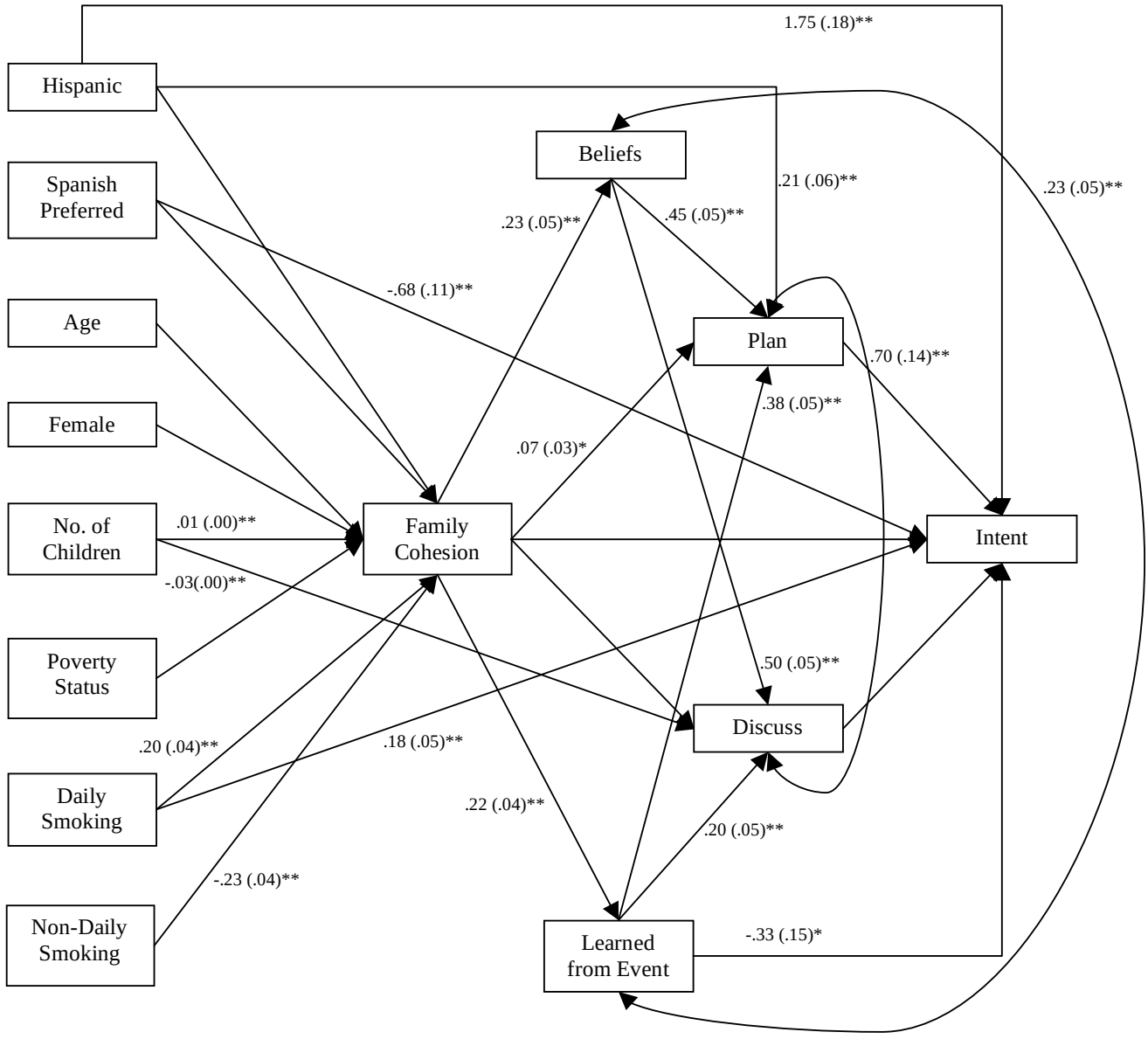


with the anticipated logic model (Figure 1). If participants planned to place the photo/pledge in the home (mean score 3.47), there was a strong positive relationship with their intent to create a smoke free home ($\beta = .70$, $P < 0.01$). The cross-sectional nature of the study does not allow any conclusions concerning behavioral outcomes. Nevertheless, if the expressed intentions are acted upon, previous research in Mexican and Mexican American populations demonstrate that home smoking bans reduce the risk of SHSE regardless of the smoking status of household residents.[6]

Family cohesion demonstrated a positive association with gained knowledge about SHS at the event ($\beta = .22$, $P < 0.01$), increased belief that SHS in the home increases health risks for the family ($\beta = .23$, $P < 0.01$), and plans to place the photo/pledge in the home ($\beta = .07$, $P < 0.01$). An association was not encountered between family cohesion and willingness to discuss the pledge with other family members. Notwithstanding the possibility that the impact of family cohesion may be limited, another possibility exists. Family cohesion may have duel, contradictory effects upon respondents' decision balance. The construct may provoke the desire to act, in order to protect the health of valued family members. Simultaneously, it may inhibit action if respondents perceive the pledge and its enforcement as threats to valued cohesion. Some individuals may perceive that enforcement of the pledge, by discussing it with smoking relatives, would decrease their receptively to regularly spending time with the family - a potentially negative consequence to valued family cohesion. This discrepancy may be a manifestation of two constructs attributed to Hispanic/Latino cultures: *simpatía* and *respeto*.[20] These cultural scripts encourage individuals to have smooth and pleasant social relationships ("simpatía") and to maintain "personal power" in interrelationships ("respeto"), particularly with one's elders.[21] Enforcing the pledge with family members may contradict these cultural scripts and consequently threaten valued family cohesion. It is recommended that this hypothesis be tested in future research.

Whereas the number of children in the family was associated with a small increase in family cohesion, a larger family size appears to translate in to a decreased likelihood of discussion of a smoke-free home. This observation may coincide with the resource dilution model, found in the sociology literature, suggesting that the availability of

Figure 3. Estimated Model: Impact of Family Cohesion and Smoke Free Homes



Note: Estimates (standardized) are presented for statistically significant paths only to promote readability; $^{*}P < 0.05$, $^{**}P < 0.01$

parental resources decreases as the size of sibship increases.[22-24] In larger families, parents/guardians may not have or perceive not to have the necessary resources to implement a new household policy.

Daily smoking (10% of sample) was positively associated with intent to create a smoke-free home. This association, without any mediators, suggests sample bias. The daily smokers in attendance, demonstrating willingness to attend a health fair and visit the table with tobacco control messaging, likely have a greater level of readiness to change their smoking behaviors than daily smokers who did not participate or were not in attendance.

Limitations

This evaluation was conducted with a convenience sample of individuals in El Paso County, Texas. The nonprobability sample design limits the external validity of these findings. It may be that family cohesion, of those who choose not to attend health fairs or those who live outside of

El Paso County, has different dimensions than exhibited by this project's participants. The risk of social desirability bias is an additional limitation to the study. The data are also self-report. As such, there is some risk of threats to reliability. Being surveyed at a health fair where the MFNF table was present may influence respondents' to underreport smoking behavior and intent.

TRANSLATION TO HEALTH EDUCATION PRACTICE

The MFNF logic model (Figure 1) appears to describe the program's outcomes and behavioral intent of participants. It may be considered, therefore, a valuable community intervention as part of a comprehensive and coordinated approach to reduce tobacco use within a Hispanic community. Future evaluations may explore how cultural values, specifically *simpatía* and *respeto*, interface with family cohesion when more assertive action is needed to prevent SHS. In addition, future study may consider the relative value and worth of the intervention compared to other approaches, and effectiveness within other cultural settings.

The Health Education Code of Ethics states that health educators promote integrity in the delivery of health education. They respect the rights, dignity, confidentiality and worth of all people by adapting strategies and methods to meet the needs of diverse populations and communities. Specifically, health educators are sensitive to social and cultural diversity when planning and implementing programs. It may be beneficial, therefore, to explore how family cohesion or similar constructs are defined differently within various cultures. A program's theory of change and the resulting evaluation model should be modified based on the operational definition of a construct offered by potential participants. Techniques for exploring potentially divergent definitions of constructs should be integrated into the professional preparation of health educators and the professional literature.

Table 1. Participant Characteristics

Categorical Variables	*N*	%
Ethnicity		
Hispanic	441	88
Other	50	10
Did not report	8	2
Spanish language preference		
English	220	44
Spanish	279	56
Did not report	0	0
Gender		
Male	136	27
Female	353	71
Did not report	10	2
Poverty level for family of 2 (~$15,000)		
Above	242	48
Below	249	50
Did not report	8	2
No. of Children		
None	68	13
One	128	26
Two	133	27
Three	103	21
Four or more	62	12
Did not report	5	1
Smoking Status		
Non-smoker	365	73
Non-daily smoker	59	12
Daily smoker	47	9
Did not report	28	6
Continuous Variables	**Mean**	**SD**
Family cohesion (α = .86) (*N* missing = 1)	2.57	0.55
Age (*N* missing = 13)	35.51	11.07
Learned from event (*N* missing = 2)	3.48	0.56
Negative home smoking beliefs (*N* missing = 4)	3.53	0.60
Plan to place photo in the home (*N* missing = 4)	3.47	0.63
Plan to discuss smoke free home (*N* missing = 4)	3.55	0.57
Intent to create a smoke free home (*N* missing = 3)	3.55	0.58

Note: Range – 1-4 for all variables except age.

Table 2. Standardized Parameter Estimates of Family Cohesion Path Model

Path	Estimate	Std. Error	*Z*	*P*
Family cohesion ON				
Number of children	0.01	0.01	2.86	0.00
Age	0.00	0.00	1.60	0.11
Hispanic cthnicity	0.08	0.08	0.92	0.36
Gender (female)	0.00	0.06	-0.05	0.96
Spanish language preferred	-0.09	0.05	-1.77	0.08
Below federal poverty level	0.06	0.05	1.27	0.20
Non-daily smoker (vs. non-smoker)	-0.23	0.04	-5.45	0.00
Daily smoker (vs. non-smoker)	0.20	0.04	5.20	0.00
Plan to display photo ON				
Family cohesion	0.07	0.03	2.21	0.03
Perceived knowledge gain	0.38	0.05	7.92	0.00
Negative home smoking beliefs	0.45	0.05	9.72	0.00
Hispanic ethnicity	0.21	0.06	3.76	0.00
Plan to discuss pledge ON				
Family cohesion	-0.02	0.04	-0.52	0.61
Perceived knowledge gain	0.20	0.05	3.61	0.00
Negative home smoking beliefs	0.50	0.05	9.72	0.00
Number of Children	-0.03	0.00	-10.03	0.00
Perceived knowledge gain ON				
Family cohesion	0.22	0.04	5.11	0.00
Negative home smoking beliefs ON				
Family cohesion	0.23	0.05	4.97	0.00
Intention to Create a Smoke Free Home ON				
Family cohesion	0.17	0.11	1.57	0.12
Plan to display photo	0.70	0.14	5.08	0.00
Plan to discuss pledge	0.12	0.11	1.06	0.29
Hispanic ethnicity	1.75	0.18	9.68	0.00
Perceived knowledge gain	-0.33	0.15	-2.12	0.03
Spanish language preferred	-0.68	0.11	-6.17	0.00
Daily smoker (vs. non-smoker)	0.18	0.05	3.38	0.00
Psi Correlation	**Estimate**	**Std. Error**	***Z***	***P***
Negative home smoking beliefs WITH				
Perceived knowledge gain	0.23	0.02	11.58	0.00
Plan to display photo WITH				
Plan to discuss pledge	0.00	0.01	-0.18	0.86

Table 3. Model Variance Explained

Endogenous Observed Factors	R^2
Family Cohesion	0.129
Plan to place photo in the home	0.562
Learned from event	0.057
Negative home smoking beliefs	0.054
Plan to discuss smoke free home	0.472
Intent to create a smoke free home	0.294

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