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Examination of the Processes of Change, Decisional Balance, Self- Efficacy for Smoking and the Stages of Change in Mexican American Women

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Abstract

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The Transtheoretical Model (TTM) provides a structure from which relationships among specific cognitive-behavioral and motivational mechanisms, and health behaviors such as smoking cessation, can be examined. Considerable empirical evidence supports the TTM as a promising model to predict smoking cessation readiness. However, the use of the processes of change have been equivocal; some processes are used more frequently at certain stages than others, and there is no evidence that certain processes *move* individuals through the stages, or that the processes are *exclusive* to certain stages. Additionally, other mediating constructs such as Self Efficacy and Decisional Balance were shown to be related to smoking behavior. The TTM has been primarily tested on white, employed populations, and the cultural

specificity and cross-economic status applicability of this theory/model has not been established. This study purpose was to determine the relationships among Self-Efficacy, Decisional Balance, and the Processes and Stages of Change in 50 Mexican American women who smoke cigarettes. The variables important to this sample of Mexican American women included those Processes of Change that indicate decision making and commitment, rewarding oneself, expressing feelings, supportive relationships, and concern for others. These findings suggest that strategies useful in enhancing these processes, such as values clarification, social support, decision-making therapy, and empathy training might be beneficial in strengthening the decision and commitment for smoking cessation in Mexican American women.

Key words: Mexican-Americans; Minority groups; Health promotion; Women's Health; Smoking; Smoking cessation

Examination of the Processes of Change, Decisional Balance, Self- Efficacy for Smoking and the Stages of Change in Mexican American Women

Introduction

¹Crespo, C.J., Loria, C.M., & Burt, V.L. (1996). Hypertension and other cardiovascular disease risk factors among Mexican Americans, Cuban Americans, and Puerto Ricans from the Hispanic Health and Nutrition Examination Survey. *Public Health Reports*, 3,(Suppl 2), 7-10.

²Caraballo, R.S., Giovino, G.A., Pechacek, T.F., Mowery, P.D., Richter, P.A., Strauss, W.J., Sharp, D.J., Eriksen, J.P., Pirkle, J.L. & Maurer, K.R. et al. (1998). Racial and ethnic differences in serum cotinine levels of cigarette smokers: The Third National Health and Nutrition Examination Survey. *Journal of the American Medical Association*, 280, 135-139.

³Freeman, H., Delgado, J.L., & Douglas, C.E. (1993). Tobacco use: An American crisis. In: *Final conference report and recommendations from America's health community*. Chicago: American Medical Association.

Nearly one-fourth of all Americans smoke, despite evidence that it increases risks for the leading causes of death: cancer and heart disease. Among Hispanic subgroups, the smoking rate of Mexican American women is 23.8%, and rates of smoking among younger Hispanic women have increased over time.¹⁻³

Differences among men and women and among ethnic subgroups may contribute to the success or failure of smoking cessation interventions. For example, women may establish more of their self-image in connection to smoking and be less

⁴Blake, J.M. (1996). Redefining smoking and the self as a nonsmoker. *Western Journal of Nursing Research*, 18(4), 414-28.

⁵ibid

⁶Marin, B.V., Perez-Stable, E.J., Marin, G., Sabogal, F., & Otero-Sabogal, R.(1990). Attitudes and behaviors of Hispanic smokers: Implications for cessation interventions. *Health Education Quarterly*, 17(3), 287-297.

⁷ibid

⁸DiClemente, C.C., Prochaska, J.O. Fairhurst, S.K., Velicer, W.F., Velasquez, M.M. & Rossi, J.S. (1991) The process of smoking cessation: An analysis of precontemplation, contemplation, and preparation stages of change. *Journal of Consulting and Clinical Psychology*, 59(2), 295-304.

⁹Prochaska, J.O., & DiClemente C.C. (1983). Stages and processes of

inclined to quit.⁴ In addition, women have different motivations, such as stress reduction and weight loss, than do men for smoking.⁵ Hispanics have different smoking patterns than do non-Hispanic whites.⁶ For example, Hispanic women begin smoking later than Hispanic men do, and report smoking fewer cigarettes than non-Hispanic white women.⁷

The Transtheoretical Model (TTM) provides a structure from which relationships among specific cognitive-behavioral and motivational mechanisms and health behaviors, such as smoking cessation, can be examined. The Transtheoretical Model, or Stages of Change, are identified with a wide variety of problems or target behaviors.⁸ The stages are used as a classification schema based on attitudes and behaviors regarding the change of a target behavior, such as smoking. The identified stages are Precontemplation, Contemplation, Preparation, Action, and Maintenance. Individuals engaging in a new behavior move through the stages of Precontemplation (not intending to make a change), Contemplation (considering change in the next 6 months), Preparation (making small changes), Action (actively engaging in a new behavior), and Maintenance (sustaining the change over time).⁹ Among non-Hispanic whites, stage classifications

self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51, 390-395.

¹⁰ *ibid*

¹¹Prochaska J.O., DiClemente C.C., Velicer.W.F., & Fava J. (1988). Measuring processes of change: Applications to the cessation of smoking. *Journal of Consulting and Clinical Psychology* 56, 520-528.

¹²Velicer, W.F., DiClemente, C.C., Prochaska, J.O., & Brandenburg, N. (1985). Decisional balance measure for assessing and predicting smoking status. *Journal of Personality and Social Psychology*. 48(5), 1279-1289.

for smoking cessation are consistently related to Self-Efficacy,¹⁰ processes of change for smoking cessation,¹¹ and Decisional Balance.¹²

Considerable empirical evidence supports the TTM as a promising model to predict smoking cessation readiness. However, actual use of experiential and behavioral processes of change has been equivocal in terms of stage specificity. Some processes are used more frequently at certain stages than others, but there is no evidence that certain processes *move* individuals through the stages, or that the processes are *exclusive* to certain stages. Additionally, the TTM has been primarily tested on white employed populations. Cultural specificity and cross-economic status applicability of this theory/model has not been established. Therefore, the exploration of the relationships among the variables associated with Stages of Change in an understudied group, Mexican-American women, was the goal of this work.

The broad objectives of this exploratory study were to examine the Transtheoretical Model for its utility as a framework for studying the smoking behavior of Mexican American women smokers, and to clarify the motivational factors that influence smoking behavior in Mexican American women. The specific aims were to: 1) examine the behavioral change processes that are associated with stages of change in smoking behavior in Mexican American women who

smoke cigarettes, and 2) determine the relationships among Self-Efficacy, Decisional Balance and the Processes and Stages of Change in Mexican American women who smoke.

The relationships among the Processes of Change, Self-Efficacy, Decisional Balance, and Stages of Change are depicted in Figure 1. The model depicts the hypothesized direct and indirect relationship of the Processes of Change to Decisional Balance, Self-Efficacy and Stages of Change. Additionally, it was hypothesized that Self-Efficacy and Decisional Balance would have a direct effect on the Stages of Change.

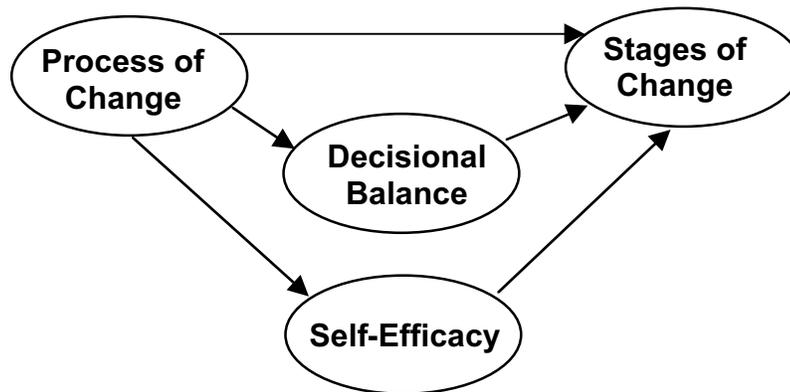


Figure 1. Theoretical Framework

Relevant Literature

The Transtheoretical Model

The Transtheoretical Model was developed over 12 years of research that focused on both addictive behaviors, including smoking cessation, and non-addictive behaviors.¹³ The

¹³Prochaska, 1983

term *transtheoretical* means that the Stage of Change is similar across populations dealing with a variety of problems such as smoking, psychological distress, and obesity. The TTM identifies five stages of change representing a temporal dimension allowing us to understand when a change in attitude toward the problem behavior occurs. Using the concepts from the TTM to address smoking cessation, the model is applied in the following way: Precontemplation (not ready to stop smoking), Contemplation (thinking about smoking cessation within the next 6 months), Preparation (planning to stop smoking in the next 30 days), Action (stop smoking), and Maintenance (sustaining smoking cessation). The Transtheoretical Model encompasses three major concepts: Stage of Change, Processes of Change, and Decisional Balance.

Stages of Change

There is strong evidence for the validity of the use of the stage classification among smokers.¹⁴ Prochaska and colleagues¹⁵ found that 10-15% of smokers are Prepared for Action, approximately 30-40% are Contemplators, and 50-60% are Precontemplators, indicating that efforts targeted towards individuals in the Contemplation stage would capture the largest number of individuals thinking about smoking cessation. Individuals progress through these stages at varying rates, and may leave and re-

¹⁴ DiClemente, C.C. & Prochaska, J.O. (1982). Self-change and therapy change of smoking behavior: A comparison of processes of change in cessation and maintenance. *Addictive Behavior*, 7, 133-142.

¹⁵ Prochaska J.O., & Goldstein, M.G. (1991). Process of smoking cessation: Implications for clinicians. *Clinics in Chest Medicine*, 12(4), 727-735.

enter the continuum of change at varying points.¹⁶ The vast majority of individuals who have relapsed, approximately 85 percent of all smokers, will cycle back to the Contemplation or Preparation stage.¹⁷

¹⁶Prochaska, J.O., Velicer, W.F., Rossi, J.S., Goldstein, M.G., Marcus, B.H., Rakowski, W., Fiore, C., Harlow, L.L., Redding, C.A., Rosenbloom, D. & Rossi, S.R. (1994) et al.(1994). Stages of change and

decisional balance for 12 problem behaviors. *Health Psychology, 13*(1), 39-46.

¹⁷Prochaska, 1983

Processes of Change

While Stages of Change represent dimensions that allow understanding of *when* changes occur, the processes of change allow understanding of *how* changes occur.¹⁸ Ten processes of change have been identified and specific processes are associated with particular stages of preparation for change (see [Table 1](#)).

¹⁸ibid

There is integration between the Processes of Change and the Stages of Change.¹⁹ Effective self-change depends on doing the right things (processes) at the right time (stages). With a mismatch in stage and processes, a successful behavioral change is unlikely to occur.²⁰ In a review of 12 problem behaviors and Stages of Change, individuals used eight of the change processes during the Precontemplation stage significantly less than in any of the other stages.²¹

¹⁹Prochaska, J.O., DiClemente, C.C., & Norcross, J.C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist, 47*(6), 1102-1114.

²⁰ibid

²¹ibid

Precontemplators processed less information about their problems, devoted less time to their problem, and experienced far fewer emotional reactions to the negative components of their problems. Individuals in the Contemplation stage

were most open to Consciousness Raising techniques, and used techniques of Dramatic Relief, a process that raised emotions and led to a lowering of the negative effect of the behavior. Movement from Precontemplation to Contemplation involved the use of increased cognitive, affective, and evaluative processes of change. Individuals in the Action stage used self-liberation, believing they had the control to change their lives in important ways. Those in the Action stage also used Counter-conditioning and Stimulus Control. Maintenance was enhanced by the continual application of processes such as Counter-Conditioning and Stimulus Control. These findings emphasize the importance of the assessment of the individual's stage of change and tailoring interventions to the specific stage, with the correct use of processes.

²²Ahijevych, K., & Wewers, M.E. (1992). Processes of change across five stages of smoking cessation. *Addictive Behavior*, 17(1), 17-25.

Ahijevych and Wewers,²² using a cross-sectional approach with 190 smokers and ex-smokers, determined the processes individuals use to modify behaviors across the five Stages of Change. In general, they found that Precontemplators reported less use of the processes of change than other groups.²³ Recent quitters reported very high use of the behavioral process of Self-Liberation; long-term quitters report most frequent use of the behavioral processes of Environmental Re-evaluation and Counter-conditioning.²⁴

²³ibid

²⁴ibid

²⁵DiClemente, 1991

DiClemente and colleagues²⁵ compared smoking history, Processes of Change, Self-Efficacy and Decisional Balance, and one and six month cessation activity among non-Hispanic white smokers who were in either Precontemplation, Contemplation, or Preparation stages. Subjects included 691 volunteers who completed the Smoking Abstinence/Self Efficacy questionnaire, the Fagerström Tolerance Questionnaire, and the Smoking Decisional Balance scale.

Precontemplators were the least active in using the processes of change, and those in the Preparation stage were the most active. The processes of change patterns supported the notion that Preparation stage subjects were actively modifying their smoking habit, Contemplation stage subjects were gathering information and evaluating their smoking habit, and Precontemplation stage subjects were doing the least across all change processes.²⁶ Those subjects considered to be in the Preparation stage had significantly higher levels of confidence (Self Efficacy) to stop smoking, while those in the Precontemplation stage were most likely to be tempted to smoke (lower Self Efficacy). The positive aspects of smoking (Decisional Balance) decreased across stages, with Precontemplative subjects reporting the pros of smoking as more important.

²⁶ibid

²⁷Fava, J.L, Velicer, W.F., & Prochaska, J.O. (1995). Applying the Transtheoretical Model to

Fava, Velicer, and Prochaska²⁷ applied the constructs of the Transtheoretical Model (stages

a representative sample of smokers. *Addictive Behavior*, 20(2), 189-203.

of Change, Processes of Change, and Decisional Balance) to a large sample of smokers. One thousand smokers were surveyed by telephone using the Measures of Smoking behavior questionnaire, the Stages of Change questionnaire, the Processes of Change inventory, the Decisional Balance inventory, and the Situational Temptation (Self Efficacy) inventory. Multivariate analysis of variance was used to test for group differences on the key constructs of the Transtheoretical Model. Precontemplators used the Processes of Change the least, while those in the Preparation stage used it the most. Differences among measured stages of change (Precontemplation, Contemplation, and Preparation) showed significant effects of Situational Temptation (from the Self-Efficacy scale) and the Cons of Smoking (from the Decisional Balance scale). Those participants in Preparation had the highest scores on the Cons of Smoking subscale. Additionally, those participants in Preparation were least tempted by Positive/Social situations and most tempted to smoke in Negative/Affective situations.

Decisional Balance

Decision-making, or the individual's evaluation of the pros and cons of a particular behavior, has been identified as a critical component in the modification of problem behaviors.²⁸ Decisional Balance is a useful predictor in the movement

²⁸Janis, I.L. & Mann, L. (1977). in *Decision making: A psychological*

analysis of conflicts, choice and commitment (pp.77-79). NY: Collier Macmillan.

²⁹Velicer, 1985

³⁰Prochaska, 1994

between stages.²⁹ Prochaska and colleagues³⁰ investigated the Stages of Change and Decisional Balance for 12 different problem behaviors, including smoking cessation, cocaine cessation, weight control, safer sex, and sunscreen use. Approximately 3,800 participants were given the Stages of Change and Decisional Balance questionnaires; the results indicated that there were clear commonalities across the problem behaviors. Relating the pros and cons of decision making to the Stages of Change resulted in highly predictable patterns. For all samples, the cons of changing the behavior outweighed the pros for subjects who were in the Precontemplation stage. The opposite was true for subjects in the Action stage in 11 of the 12 behaviors. This would suggest that to move from Precontemplation to Contemplation, there is an associated increase in the pros of changing the behavior. This idea supports the notion of designing interventions that increase the pros of changing, and decrease the cons of changing, leading to movement from Contemplation to Action.

Self-Efficacy

Self-efficacy is a construct that describes a person's perceived ability (efficacy expectations) on a given task. These perceptions are believed to influence future attempts to perform that task.³¹ An efficacy expectation is the notion that a person can successfully perform the behaviors required to produce an expected outcome.³²

³¹Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Reviews*, 84 (2), 191-205.

³²ibid

³³DiClemente, C.C., Prochaska, J.O., & Gibertini, J. (1983). Self-efficacy and the stages of self-change of smoking. *Cognitive Therapy Research*, 9(2), 181-200.

³⁴ibid

³⁵DiClemente, 1991

DiClemente, Prochaska, and Gilbertini³³ found that in individuals who smoked and were trying to quit, self-efficacy demonstrated predictive ability to differentiate those individuals who were likely to succeed in quitting, and those who were likely to experience failure.³⁴ The implications of these findings are important. Studies that use a sweeping net to recruit participants in a smoking cessation study will likely find that a large number of the participants are Precontemplators and Contemplators. If the program is intended for those in Preparation and Action, the success rates will likely be low.³⁵

Smoking Behavior in Hispanic-Latino Individuals

Initial studies of Hispanic-Latino smokers (including Mexican Americans and Central American Hispanic-Latino individuals) have shown significant differences in smoking attitudes and behaviors.^{36,37} In comparison with non-Hispanic whites, Latino smokers are significantly more influenced by situational cues for smoking, such as talking on the telephone and drinking alcohol.³⁸ Techniques used by Hispanic smokers to initiate cessation include willpower (*voluntad propia*) and the negative effects of smoking on the self and others.³⁹ These situational cues and process strategies used to aid smoking cessation result from descriptive work, and are conceptually consistent with process strategies found to be salient in

³⁶Marin, 1990

³⁷Perez-Stable, E.J., Marin, G., & Posner, S.F. (1998). Ethnic comparison of attitudes and beliefs about cigarette smoking. *Journal of General Internal Medicine*, 13(3), 167-174.

³⁸ibid

³⁹Marin, 1990

examinations of smoking attitudes and behaviors in non-Hispanic populations. Since much of the work has targeted Caucasian men, little is known about the effectiveness of the model and the mediating processes in other, more vulnerable groups, such as minority women.

Methods

Subjects

The sample for this study included 50 Mexican American women who reported current smoking and who spoke English. They ranged in age from 17 to 64 years (Mean = 24.1). Twenty-five percent were 19 years old. The age at which they began smoking ranged from 14 to 24 years (Mean = 17). The largest percentage (75%) began smoking between the ages of 14 and 18 years. Fifty-three percent reported that there were currently other smokers living with them, and 26 percent reported that there were children under the age of 14 currently residing with them in the home.

Procedure

Volunteers who were smokers were recruited from two settings: a community health clinic, which serves a largely indigent population, and a clinic that serves a largely working class population. Procedures for the protection of human subjects were followed throughout the study: the data forms were assigned a code number, informed consent was obtained, and

participants could withdraw from the study at any time. It was explained that with the completion of the six questionnaires, the participants would receive \$10.00 and a lottery ticket. Participants completed the instruments in English, which took approximately 45 minutes.

Study Variables and Instrumentation

The Stages of Change questionnaire is a forced-choice instrument that determines the category of intent related to smoking. If the participant quit smoking in the last six months, they were in the Action stage. Persons with cessation greater than six months were in the Maintenance stage. Participants who were categorized as “smokers” were asked whether they were seriously thinking about quitting in the next 30 days (Preparation stage), within the next 6 months (Contemplation), or they did not intend to quit smoking (Precontemplation).

The Processes of Change Questionnaire is a 40-item Likert-type scale. Four items for each of the 10 processes of change are answered on a scale of 1 (never) to 5 (repeatedly).⁴⁰ A panel of four experts established content validity. Construct validity through principal components factor analysis resulted in the 10-factor solution across time and geographically distinct samples.⁴¹ Internal consistency was established with alpha coefficients ranging from .69 to .92.⁴² Two scales, Social Liberation and Reinforcement

⁴⁰Prochaska, 1988

⁴¹ibid

⁴²ibid

⁴³ibid

Management, had coefficient alphas less than .80.⁴³ Each of the 10 questions in the subscale are summed and averaged with a possible range of scores for each subscale of 4-20.

⁴⁴ibid

The Self-Efficacy/Temptation Scale is a 10-item Likert-type scale with scores ranging from 1 (not at all tempted to smoke in a situation) to 5 (extremely tempted in a situation). The items are grouped into three categories: positive affect/social situations; negative affect situations; and habitual craving situations, and rates both temptations (cue strength) and self-efficacy for smoking cessation.⁴⁴ Internal consistency was established by Cronbach's alpha. Alpha coefficients were very high for the temptation measures ($\alpha = .97$) and the confidence measures ($\alpha = .98$).⁴⁵

⁴⁵Prochaska, J.O., DiClemente, C.C., Velicer, W.F., Gimpil, S., & Norcross, J.C. (1985). Predicting change in smoking status for self-changers. *Addictive Behavior, 10*(4), 395-406.

⁴⁶ibid

The Pros and Cons of Smoking scale was used to determine Decisional Balance. This instrument is a 20-item Likert-type scale describing factors about smoking ranging from 1 (not important) to 5 (extremely important).⁴⁶ Both subscales have acceptable internal consistency: pro ($\alpha = .88$) and con ($\alpha = .89$). This instrument was found to be a useful construct in predicting movement from Precontemplation to Contemplation and has also reliably differentiated smokers in different Stages

⁴⁷Velicer, 1985

of Change.⁴⁷

Data Analysis

To determine the associations among the Processes of Change related to Stages of Change, logistic regressions with single predictors were computed to determine which Process of Change was associated with movement across the Stages, from Precontemplation to Contemplation to Preparation. The dependent variable in the first regression model was Precontemplation (0), and Contemplation (1), excluding Preparation. The second model included Contemplation (0), and Preparation (1), excluding Precontemplation. These logistic regressions explained which processes of change were associated with movement from a lower stage to a more advanced stage. Three logistic regression models, by Stage of Change, acted on by 10 Processes of Change subscales, were computed. The process required that we first determine which Processes of Change to keep. A backward selection was used for a logistic regression model where each stage equals all ten processes of change subscales. The backward selection was set to drop all processes of change that had probability values greater than $p = 0.25$.

Next, logistic regression models were computed to fulfill the hierarchical model. The object was to determine the strength (influence) of the Processes of Change subscales in the model with

respect to the other predictors: the Self-Efficacy subscales and the Decisional Balance subscales. The determining factor was the Log Likelihood Chi-square value that was compared across three logistic models as follows:

1. Outcome: **Stages of Change** each level (**Precontemplation, Contemplation, and Preparation**) = Stage of Change.
2. Predictors: **Processes of Change** = **Process of Change; Self Efficacy** Subscales: (positive affect/social situations; negative affect situations; and habitual craving situations) = Self-Efficacy; **Decision Balance** Subscales (Pros & Cons) = Decisional Balance.

The Likelihood Ratio Chi- Square was compared among the six logistic regression runs (see [Table 2](#)). The Likelihood Ratio Chi-Square was the chi-square value for the predictors only, and was the difference between the -2 Log (Likelihood) Chi-Square for Intercept Only, and Intercept and Covariates (predictors).

Findings

The participants indicated their readiness to engage in a smoking cessation program by identifying the stage in which they currently considered themselves. Seventeen (34%) were in the Preparation stage; i.e., they intended to quit

within the next 30 days. Fourteen (28%) were in the Contemplation stage, considering smoking cessation in the next 60 days, and 19 (31.7 %) were in the Precontemplation stage, with no current plans to quit smoking.

The mean scores in this sample for Social Liberation were 16.47, Self-Liberation 14.90, Helping Relationships 14.3, Consciousness Raising 12.9, Counter-Conditioning 11.9, Dramatic Relief 11.3, Self-Re-evaluation 11.08, Reinforcement Management 9.68, and Stimulus Control 8.03. The Self-Efficacy Scale was divided into three scores: positive affect/social situations, negative affect/social situations, and habitual craving situations. In the “positive affect/social situations” the mean score was 20.3, with a minimum of 6.0, and a maximum of 29.0. “Negative affect situations” had a mean score of 20.1, with a minimum of 6.0, and a maximum of 30.0. The “habitual craving situations” exhibited a mean of 10.2, with a minimum of 5.0, and a maximum of 20.0. The Pros and Cons of Smoking exercise (the Decisional Balance scale) was strongly weighted in the cons of smoking. Eight participants had scores in which the “pros” outweighed the cons of smoking. One participant had equal scores. In the cons of smoking the mean score was 34.3, with a minimum score of 20.0 and a maximum score of 47.0. The “pros” of smoking exhibited a mean of 25.1, with a

minimum of 10.0 and a maximum of 38.0.

Data Reduction

For Specific Aim 1, the examination of the Processes of Change and their relationships among the Stages of Change, logistic regression models were computed among Processes of Change and Precontemplation (model 1), Contemplation (model 2), and Preparation (model 3). There were no Processes of Change associated with the Precontemplation Stage. In the Contemplation stage, Environmental Re-evaluation and Reinforcement Management showed significant associations with the stage. In the Preparation stage, only Consciousness Raising showed a significant association with forward movement across the stage.

Relationships Among Processes of Change, Self-Efficacy, Decisional Balance and Stages of Change

For Specific Aim 2, to determine the relationships among the Processes of Change, Stages of Change, Decisional Balance and Self-Efficacy, six hierarchical regression models were computed. The first model, (Precontemplation = Process of Change + Decisional Balance + Self-Efficacy) showed no significant hierarchical models associated with the Precontemplation stage. The first hierarchical model in the Contemplation stage (Contemplation = Decisional Balance + Process of Change) showed

significant associations with Self-Liberation, Dramatic Relief, Environmental Re-evaluation and Reinforcement Management. Decisional Balance showed no contribution to the model. The second model (Contemplation = Self Efficacy + Decisional Balance + Process of Change) showed significant associations with Self-Liberation, Dramatic Relief, Environmental Re-evaluation, Helping Relationships, and Reinforcement Management. Decisional Balance and Self-Efficacy showed no contribution to the model. The first and second hierarchical model in the Preparation stage (Preparation = Process of Change = Decisional Balance and Preparation = Self-Efficacy + Decisional Balance + Process of Change) showed a significant association of Consciousness Raising, without a significant contribution of Decisional Balance or Self Efficacy. [Table 3](#) displays the six hierarchical models for the Stages of Change.

Discussion

Like other investigations where subjects used few Processes of Change in the Precontemplation Stage, these women used none.⁴⁸ The use of Dramatic Relief in the Contemplation stage is consistent with the use of the process shown by other investigators.⁴⁹ For other samples, subjects in the Contemplation stage were found to gather information and evaluate their smoking habit.⁵⁰ In this sample, Environmental Re-Evaluation,

⁴⁸ibid

⁴⁹Prochaska, 1994

⁵⁰Prochaska, 1992

Reinforcement Management, and Self-Liberation were additionally associated with the movement from Contemplation to Preparation stage. These processes are most frequently associated with the Preparation and Action stages in other samples studied.⁵¹ The processes of choosing, committing to act, and assessing how one's behavior affects others were important constructs in this group of Mexican American women. The Latino sample studies by Perez-Stable and colleagues⁵² used strategies for smoking cessation similar to these processes, such as *familiaismo* (love of family), awareness of the negative effect of smoking on children and others, and setting a good example for children. Work by Marin and colleagues⁵³ showed that Hispanics (Mexican and Central Americans) used the strategy of willpower to initiate smoking cessation. This construct/process is remarkably similar to the Process of Self-Liberation, indicating that the notion of perceived ability to change one's behavior is a salient construct in this ethnic group.

⁵¹Marin, 1990

⁵²Perez-Stable, 1998

⁵³Marin, B.V., Perez-Stable, E.J., Marin, G., Sabogal, F., & Otero-Sabogal, R.(1990). Attitudes and behaviors of Hispanic smokers: Implications for cessation interventions. *Health Education Quarterly*, 17(3), 287-297.

In this study, Decisional Balance (the Pros and Cons of smoking) and Self-Efficacy did not contribute to the results of the hierarchical regressions. These findings do not correspond with other studies that examined smoking among Latinos. The cons of smoking, i.e., the negative effects of smoking behavior on others was a salient theme in motivating smoking cessation

⁵⁴Perez-Stable, E.J., Marin, G. & Posner, S.F. (1998). Ethnic comparison of attitudes and beliefs about cigarette smoking. *Journal of General Internal Medicine*, 13, 167-174.

⁵⁵ibid

among Latino individuals.⁵⁴ In other samples, those in the Preparation stage had the highest values on the con of the decisional balance scale, and were also found to be the least tempted in Situational Temptation (Self-Efficacy).⁵⁵ While the cons of smoking was a salient variable in other groups of Latino subjects, this variable did not contribute to the models in this study. The variables important to this sample of Mexican American women included those Processes of Change that indicate decision making and commitment (Self-Liberation), supportive relationships (Helping Relationships), awareness of the problem behavior (Consciousness Raising), and concern for others (Environmental Re-evaluation). These findings suggest that strategies useful in enhancing these processes such as values clarification, social support, decision-making therapy, and empathy training might be beneficial in strengthening the decision and commitment for smoking cessation in Mexican American women.

⁵⁶Brown, J. M. (1996). Redefining smoking and the self as a nonsmoker. *Western Journal of Nursing Research*, 18(4), 414-428.

Recent work by Brown⁵⁶ shows that adults who quit smoking demonstrate a distinct psychosocial process during the quitting phase. Using a grounded theory method, Brown described the major theoretical categories used as individuals redefine smoking and the self as nonsmokers: recognizing the need to quit, making the decision, learning to be a nonsmoker, and sustaining the quit. Brown's substantive theory is

conceptually congruent with the findings from this study. The initial step in the process of redefining oneself as a non-smoker is the recognition of the need to quit. The processes of Self-Liberation, Environmental Re-evaluation and Dramatic Relief were important concepts/strategies in this study, and are similar to constructs used in studies by Marin and others⁵⁷ and Perez-Stable and colleagues.⁵⁸ Clearly, the processes described by Prochaska and colleagues⁵⁹ of thinking about the negative effects of smoking and coming to some conclusion are salient mediators in decision-making for smoking cessation across study and ethnic groups.

⁵⁷Marin, 1990

⁵⁸Perez-Stable, 1998

⁵⁹Prochaska, 1985

Three important limitations of our study should be noted. First, the complete model of the TTM was not explored. Information about the full model might be obtained by including women who are actively attempting to quit smoking and women who are maintaining smoking cessation. Second, the sample size precluded a complete path analysis, so while our regression analyses showed no direct effects of Self-Efficacy on Stages of Change, these variables may have mediated the effects of the Processes of Change. Last, we did not assess the acculturation of these Mexican American women. These results indicated that this sample of Mexican American women use different Processes of Change than do other samples of Caucasian subjects; this might

be due to cultural assimilation, rather than ethnic differences.

Clinical Implications

The largest portion of the smokers in this study (31.7%) was in the Precontemplation stage (no intention of initiating a quit attempt in the near future). Most smoking cessation interventions are aimed at those individuals in the Preparation or Action stage, composed of those people who have made the decision to quit. With a large number of smokers in the Precontemplation stage, the majority of interventions designed for individuals in the Action stage will unlikely prove successful. It is important that interventions be designed that target the majority of smokers who are not in the Preparation or Action stage. Because the majority of smokers move to the next adjacent stage, interventions must be designed that would move smokers in the early stages to the adjacent stage. Increasing the use of the Processes of Change among those in Precontemplation may be a useful tool. Increasing the sense of mastery, i.e., the smoker's self-efficacy, may also prove helpful in encouraging the individual to progress to the next stage. Thus, an important area for research would be the investigation of increasing the self-efficacy and use of the processes of change among smokers in the Precontemplation stage. Movement to the next stage, that of Contemplation, would be consistent with

previous research findings and would allow interventions to be tailored to the right stage at the right time.

In Mexican American participants, such as the sample recruited for this study, the context of smoking behavior may be more complex and different than in other samples. The context of the problem of smoking behavior should be examined for the intrapersonal, interpersonal, organizational, community, public policy, and cultural factors affecting this behavior. Additionally, the individual beliefs and attitudes related to smoking cessation are developed and maintained within social and organizational contexts. Interventions might be more innovative if developed within these contexts. The problem of smoking cessation has been examined extensively using the TTM as a guide for the prediction of individual's stages of readiness to change. However, the majority of the multiple variations of the model have not been derived from participants who are ethnically and socio-economically diverse.

Smoking behavior is a significant health problem that presents with variety in the nature, manifestation, causative factors, level of severity, and under different conditions and among different persons.⁶⁰ The multiple facets of a health behavior has been termed the *theory of the problem*, whereby theory is used to

⁶⁰Sidani, S., & Braden C. J. Chapter 3: The Theory-Drive Approach to Effectiveness Research, in *Evaluating nursing interventions: A theory driven approach* (Sage,

Thousand Oaks, CA), p. 43.

⁶¹Sidani, S. (1996). Methodological issues in outcomes research. *Canadian Journal of Nursing Research, 28*(3), 87-94.

understand how a specific health problem is socially produced and maintained.⁶¹ The results of this study showed that the processes of change for readiness to quit smoking are not inclusive to particular Stages of Change. More work is needed in describing the mediators salient to each stage of change before an intervention can be developed.

More work needs to be done in determining the application of the TTM to groups with diverse cultural and economic backgrounds. What little has been done has demonstrated that smoking behavior has a wide variety of meanings within cultural and economic groups. Future investigations should include the selection of appropriate theoretical constructs. This would provide the investigator with a number of advantages in designing an effective intervention: it would help to identify the target population, identify the study variables, specify the appropriate times for measuring outcome variables, and clarify the relationships among the treatment, and mediating, moderating, and outcome variables.⁶²

⁶²Chen, H., & Rossi, P.H. (1983). Evaluating with sense: a theory-driven approach. *Evaluation Reviews, 7*, 283-302.

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Table 1 Processes of Change

Process of Change	Description
Consciousness Raising	Increasing information about the problem
Self Re-evaluation	Assessing how one thinks about oneself with respect to the problem behavior
Self-Liberation	Choosing or committing to act
Counter-Conditioning	Substituting alternatives
Stimulus Control	Avoiding the behavior
Reinforcement Management	Rewarding oneself
Helping Relationships	Being open about problems with people who care
Dramatic Relief	Expressing feelings about one's problems
Environmental Re-evaluation	How one's problem affects others
Social Liberation	Increasing alternatives for problem behaviors

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Table 2 Summary of Hypothesized Models

Stage =	Process of Change + Decisional Balance + Self Efficacy	(Full Model)
Stage =	Process of Change + Decisional Balance	(POC, DB only model)
Stage =	Process of Change	(POC only model)

Note: POC = Process of Change; DB = Decisional Balance

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Table 3 Model Hierarchy for Stages of Change

Pre- Contemplation Stage of Change		X ²	df	p	O. R.	95% CL	
PRE = SE + DB+ POC	Model – 2LL	13.39	8	0.0992			
Self Efficacy Subscales	REPOS	0.42	1	0.7247	1.042	0.828	- 1.313
	NAST	-0.40	1	0.5114	0.820	0.453	- 1.484
	HCST	0.09	1	0.733	1.094	0.652	- 1.836
Decisional Balance Subscales	PROS	0.01	1	0.8928	1.009	0.880	- 1.157
	CONS	0.07	1	0.2753	1.070	0.948	- 1.208
Process of Change Subscales	CR	-0.17	1	0.1357	0.846	0.678	- 1.054
	SL	0.10	1	0.4293	1.105	0.863	- 1.415
	SR	0.15	1	0.2081	1.164	0.919	- 1.476
PRE = DB + POC	Model – 2LL	10.39	5	0.0650			
Decisional Balance Subscales	PROS	-0.05	1	0.2768	0.947	0.859	- 1.045
	CONS	0.07	1	0.2470	1.070	0.954	- 1.200
Process of Change Subscales	CR	-0.18	1	0.0826	0.836	0.682	- 1.023
	SL	0.14	1	0.2257	1.152	0.917	- 1.447
	SR	0.11	1	0.3072	1.120	0.901	- 1.392
PRE = POC	Model – 2LL	7.94	3	0.0473			-
	CR	-0.16	1	0.1132	0.855	0.704	- 1.038
	SL	0.19	1	0.0886	1.211	0.972	- 1.502
	SR	0.13	1	0.1661	1.141	0.947	- 1.374
Contemplation Stage of Change		X ²	Df	p	O. R.	95% CL	
CONT = SE + DB+ POC	Model – 2LL	24.70	10	0.0059			
Self Efficacy Subscales	REPOS	-0.62	1	0.1323	0.54	0.242	- 1.206
	NAST	0.30	1	0.5525	1.354	0.498	- 3.685
	HCST	0.31	1	0.2416	1.362	0.812	- 2.284
Decisional Balance Subscales	PROS	0.16	1	0.0799	1.178	0.981	- 1.415
	CONS	-0.02	1	0.8150	0.983	0.853	- 1.134
Process of Change Subscales	SL	0.52	1	0.0185	1.680	1.091	- 2.586
	DR	-0.57	1	0.0040	0.566	0.384	- 0.834
	HR	0.39	1	0.0418	1.474	1.014	- 2.142
	ER	0.50	1	0.0112	1.657	1.122	- 2.447
	RM	-0.52	1	0.0068	0.596	0.410	- 0.867
CONT = DB + POC	Model – 2LL	19.14	7	0.0078			
Decisional Balance Subscales	PROS	0.11	1	0.1184	1.111	0.974	- 1.267
	CONS	-0.02	1	0.7876	0.982	0.862	- 1.119
Process of Change Subscales	SL	0.35	1	0.0337	1.417	1.027	- 1.955
	DR	-0.42	1	0.0061	0.656	0.485	- 0.886
	HR	0.29	1	0.0719	1.331	0.975	- 1.817
	ER	0.41	1	0.0176	1.508	1.074	- 2.116
	RM	-0.41	1	0.0087	0.661	0.486	- 0.901
CONT = POC	Model – 2LL	16.47	5	0.0056			
	SL	0.27	1	0.548	1.312	0.994	- 1.731
	DR	-0.37	1	0.1453	0.688	0.518	- 0.915
	HR	0.27	1	0.0716	1.305	0.977	- 1.745
	ER	0.33	1	0.0282	1.392	1.036	- 1.872
	RM	-0.33	1	0.0175	0.717	0.545	- 0.944

Preparation Stage of Change		χ^2	Df	p	O. R.	95% CL	
PREP = SE + DB+ POC	Model – 2LL	10.20	11	0.5124			
Self Efficacy Subscales	REPOS	0.03	1	0.8195	1.029	0.804	- 1.318
	NAST	0.08	1	0.8286	1.078	0.545	- 2.136
	HCST	-0.10	1	0.7418	0.902	0.490	- 1.662
Decisional Balance Subscales	PROS	0.000	1	0.9978	1.000	0.867	- 1.154
	2						
Process of Change Subscales	CONS	0.01	1	0.8622	1.012	0.888	- 1.152
	CR	0.22	1	0.0801	1.249	0.974	- 1.602
	DR	0.15	1	0.1980	1.159	0.925	- 1.450
	CC	-0.014	1	0.2802	0.872	0.681	- 1.118
	HR	-0.11	1	0.2979	0.900	0.738	- 1.098
	ER	-0.14	1	0.3013	0.879	0.674	- 1.130
	SR	-0.18	1	0.2265	0.838	0.629	- 1.116
PREP = DB + POC	Model – 2LL	10.21	8	0.2641			
Decisional Balance Subscales	PROS	0.001	1	0.9880	1.001	0.897	- 1.117
	CONS	0.01	1	0.9076	1.008	0.886	- 1.146
Process of Change Subscales	CR	0.22	1	0.0592	1.252	0.991	- 1.582
	DR	0.15	1	0.1763	1.162	0.935	- 1.444
	CC	-0.14	1	0.2237	0.872	0.700	- 1.087
	HR	-0.11	1	0.2866	0.900	0.741	- 1.092
	ER	-0.14	1	0.2668	0.867	0.675	- 1.115
	SR	-0.17	1	0.2227	0.848	0.650	- 1.106
	PREP = POC	Model – 2LL	9.99	6	0.1247		
Process of Change Subscales	CR	0.23	1	0.0495	1.256	1.001	- 1.577
	DR	0.15	1	0.1763	1.160	0.935	- 1.439
	CC	-0.14	1	0.2166	0.871	0.700	- 1.084
	HR	-0.11	1	0.2527	0.897	0.745	- 1.081
	ER	-0.14	1	0.2377	0.869	0.688	- 1.097
	SR	-0.16	1	0.1921	0.854	0.673	- 1.083

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Keys to abbreviations:

PRE = Precontemplation
 SE = Self Efficacy
 DB = Decisional Balance
 POC = Process of Change
 REPOS = Positive Affect Situations
 NAST = Negative Affect Situations
 SL = Self Liberation
 HCST = Habitual Craving Situations
 PROS = Pros of Smoking
 CONS = Cons of Smoking
 CC = Counter Conditioning
 CR = Consciousness Raising
 DR = Dramatic Relief
 HR = Helping Relationships
 ER = Environmental Re-evaluation
 SR = Self Re-evaluation
 PREP = Preparation

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