

Influence of Self-Efficacy on Fat-Related Dietary Behavior in Chinese Americans

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Abstract

English:

The purpose of this study was to describe the relationship between self-efficacy and fat-related dietary behavior among a sample of first and second generation Chinese Americans living in New York City. A survey questionnaire was administered to a purposive sample of 743 Chinese Americans, ranging from ages 21 to 73. The questionnaire measured self-efficacy, fat-related dietary behaviors, demographic factors, and variables from social psychological theories. In the U.S.-born sample, self-efficacy was the premier variable contributing to 33% of the variability of behavioral intention. In the foreign-born sample, attitude, overall health concern, and self-efficacy contributed to a total variance of 58% for behavioral intention. In this group, attitude, perceived barriers and self-efficacy contributed to 19% of the variance of a combined index of fat reduction behaviors. For the entire sample, self-efficacy was significantly related to this dietary index ($r = .36, p < .001$). First generation individuals scored higher on behaviors related to replacing high-fat foods with fruit and vegetables, and self-efficacy items related to low-fat food purchase. Second generation individuals scored higher on self-efficacy items related to using less oil in food preparation. Nutrition educators need to acknowledge the role of self-efficacy as a salient predictor of dietary behavior in Chinese Americans.

Spanish:

El propósito de este estudio es describir la relación entre eficacia personal (capacidad para hacer algo) y comportamiento nutricional relacionado al consumo de grasa entre una muestra de primera y segunda generación de personas Estadounidenses de descendencia China viviendo en la ciudad de Nueva York. Una encuesta fue administrada a una muestra específica de 743 Chinos-Estadounidenses de 21 a 73 años de edad. La encuesta mide eficacia personal, comportamiento relacionado al consumo de grasa en la dieta, y variables de teorías psicosociales. De las personas nacidas en Estados Unidos, eficacia personal era la variable principal, contribuyendo a 33% de la variabilidad de la intención de comportarse de alguna manera. Del grupo de personas nacidos en el extranjero, actitud, preocupación general de salud, y eficacia personal contribuyen a una variancia total de 58% para la intención de comportamiento. De éste grupo, actitud, barreras percibidas, y eficacia personal contribuyen con 19% de la variancia de un índice combinado de comportamiento de reducción de consumo de grasa. Para todo el muestreo, eficacia persona era significativamente relacionada al índice nutricional ($r = .36, p < .001$). Individuos de la primera generación sacaron una puntuación más elevada en comportamientos relacionados a reemplazar comidas altas en grasa con frutas y vegetales, y factores de eficacia personal relacionados a la compra de comida baja en grasa. Individuos de segunda generación sacaron mayor puntaje de factores de eficacia personal relacionados la utilización de menos grasa en la preparación de alimentos. Educadores de nutrición deben considerar factores de eficacia personal en la predicción del comportamiento nutricional de Chinos Estadounidenses.

Key Words: Self-efficacy, Chinese Americans, psychosocial theory, dietary behavior

Introduction

Coronary heart disease is the number one national health problem in the United States (American Heart Association, 1998). Although the risk of heart disease

is lower among Asian Americans than among Caucasian Americans, cardiovascular disease is still the leading cause of mortality for all Asian/Pacific Islander American groups in this country. The more acculturated Asian groups, notably the Chinese and Japanese, have higher incidences of heart disease than

more recent Asian immigrant groups (U.S. Department of Health and Human Services, 1998). This health concern deserves much attention among researchers and health care professionals, especially since a major growth in the Chinese American population is evident in large cities across the United States.

A number of social psychological theories have significantly related to many health behaviors including the cessation of smoking (Pehacek & Danaher, 1979; Prochaska & DiClemente, 1984), weight loss and nutrition (Weinberg, Hughes, Critelli & England, 1984; Bernier & Avard, 1986), and exercise (Desharnais, Bouillon & Gordin, 1986).

Social Cognitive Theory has been widely used in health behavior research. Important aspects of this theory are captured in major concepts as outcome expectancies, incentives, role modeling, and self-efficacy which influence and determine behavior. Bandura (1986) posited that "efficacy involves a generative capability in which cognitive, social, and behavioral subskills must be organized into integrated courses of action to serve innumerable purposes...it is concerned not with the skills one has, but with the judgments of what one can do with whatever skills one possesses" (p.391). Self-efficacy reflects an individual's belief in his or her ability to perform a specific task in a particular situation by overcoming difficulties and barriers. According to Bandura, one's judgments of self-efficacy influences choices of behavior undertaken. In general, individuals tend to pursue tasks they know they can accomplish and avoid those they perceive as exceeding their capabilities. Research has shown that high dietary efficacy predicts increased ability to lose weight (Weinberg et al., 1984) and decreased attrition from weight loss programs (Bernier & Avard, 1986). Self-confident clients of health and nutrition programs were less likely than other clients to relapse into previous unhealthy diets (Bagozzi & Edwards, 1998; Gollwitzer & Oettingen, 1998).

According to Bandura, individuals who doubt their ability to perform a specific task are more likely to avoid difficult tasks, set low aspirations, and produce minimal commitment to goals. Other models of behavior change, including the Health Belief Model, Theory of Reasoned Action, and Theory of Planned Behavior have incorporated self-efficacy in their models to increase their explanatory power. These theoretical frameworks explicate the impact of self-efficacy in terms of initiation, attribution, and

been developed in an attempt to understand the beliefs and motivations of individuals for adopting preventive health behaviors (Rosenstock, 1990; Ajzen, 1991). The importance of dietary behavior in the reduction of chronic disease risk cannot be undermined. Self-efficacy has been implicated to be a powerful predictor of health-related behavior (Bandura, 1995). It is maintenance of health behaviors. Individuals with high compared to low self-efficacy are more likely to initiate challenging behaviors (Bandura, 1995). Those with high self-efficacy construe the enactment of healthy behaviors as part of their volitional control and are thus more likely to attempt behavior change (Ajzen & Fishbein, 1980). Other important variables in the Theory of Planned Behavior include behavioral intention, attitude toward the behavior, subjective norm, and perceived behavioral control (Ajzen, 1985; Ajzen, 1991). The Theory of Planned Behavior postulates that behavioral intention is the best predictor of behavior. Attitude, subjective norm, and perceived behavioral control are independent determinants of behavioral intention. Attitude represents the degree to which an individual has a positive or negative evaluation of a targeted behavior. Subjective norm reflects the social pressure perceived by an individual to perform or not to perform a behavior. Perceived behavioral control refers to the degree of ease or difficulty that is perceived by an individual for taking action. Thus, internal control factors (skills, personal deficiencies) and external control factors (opportunities, obstacles) are incorporated in this construct. Some researchers have demonstrated that notions of perceived behavioral control and self-efficacy can be empirically distinguished (Litt, 1988; Terry & O'Leary, 1995).

According to the Health Belief Model, behavior change efforts tend to be inhibited by individuals' perceived barriers. Individuals who perceive themselves as efficacious, despite the existence of barriers, are significantly more likely to initiate behavior change compared to those who feel hindered by their barriers (Rosenstock, 1990). The four major dimensions of the HBM include (a) the perceived susceptibility of the individual to a condition, (b) the perceived severity of the condition if contracted, (c) the perceived benefits of taking a action to prevent the condition, and (d) the perceived barriers to effective action. The HBM was later modified by the inclusion of self-efficacy in the theoretical framework (Rosenstock, Strecher & Becker, 1988). Since the behavioral focus of the early model was focused on

fairly simple circumscribed behaviors, an individual's perceived self-efficacy was not highly salient. However, recent uses of the model have incorporated complex behaviors requiring lifelong modifications.

In a review of studies measuring the impact of self-efficacy on a range of dietary behaviors, self-efficacy predicted about 10-35% of the variability in behavior (Parcel et al., 1995; Oka & Chaboyer, 2001). Oka & Chaboyer (2001) used Bandura's theory of self-efficacy to test a prediction model of dietary behavior in hemodialysis patients residing in Japan. A total of 325 individuals completed a self-administered survey containing nine scales reflecting six constructs of the model. Using multiple regression analyses, 24% of the variance on a dietary behavior scale was accounted for by self-efficacy, family support, and self-repressive behavior.

Sun & Wu (1997) examined the relationship between self-efficacy and dietary behavior among a sample of 239 Chinese adolescents living in New York and China. The survey consisted of demographic information, dietary behavior, and self-efficacy of dietary behavior. Native Chinese students had the lowest scores in total fat and cholesterol intake followed by foreign-born and U.S.-born Chinese American students. Dietary self-efficacy for consumption of complex carbohydrates and fiber intake was highest among the native Chinese students followed by foreign-born and U.S.-born students, respectively. Self-efficacy was positively correlated with dietary behavior. The age of immigration of overseas-born students was also positively correlated with scores of dietary behavior and self-efficacy to enact specific dietary actions. According to the researchers, differences in self-efficacy among these students were reflected by differences in environmental and cultural influences on dietary behavior.

Due to a limitation of empirical studies explicating the role of self-efficacy and dietary behavior among Chinese Americans, additional studies are mandated to describe the critical role of this psychosocial construct and its impact on the adoption of health behaviors related to heart disease prevention. Heart disease has emerged as a prominent health concern for all Americans, including the Asian American population group. As a substantial growth of Chinese Americans is seen in large U.S. cities such as New York, research studies explicating the relationship between self-efficacy and dietary behavior would prove beneficial for health researchers and practitioners.

The purpose of this study is to describe the relationship between self-efficacy and fat-related dietary behaviors among a sample of first and second generation Chinese American adults residing in the New York City metropolitan area. As for this study, first generation is defined as individuals born in mainland China and second generation as those born in the United States. It is hypothesized that significant differences would be detected in self-efficacy scores and fat-related dietary behaviors between first and second generation Chinese Americans.

Methods

Chinese individuals, with and without U.S. citizenship, participated in this cross-sectional survey research by completing a questionnaire soliciting dietary behavior and measures of self-efficacy. A purposive sample of 743 healthy male and female adults residing in the New York City metropolitan area participated in this research study. The subjects ranged from 21 to 73 years of age. IRB approval was obtained before the study was initiated and confidentiality in the reporting of individual results was granted to each respondent. A variety of social, civic, and cultural organizations were targeted to reflect the diverse socio-economic and educational backgrounds of the volunteers who participated in the study. Surveys were distributed in person by the researcher and given to administrators or members of various organizations to be given to potential respondents. A choice between English or Chinese versions of the questionnaire was provided to all respondents depending on their fluency. A self-addressed, stamped envelope was incorporated to facilitate ease of return. Out of 1,350 surveys that were distributed, a total of 743 surveys were completed and returned, reflecting a response rate of 55%.

Survey Instrument

A survey questionnaire targeting fat-related dietary behavior, measures of dietary self-efficacy, and demographic information was developed via qualitative pilot studies of Chinese Americans and a comprehensive review of the literature. A dietary instrument developed by Kristal, Shattuck, and Henry (1990) was modified for its applicability to Chinese American dietary habits and culinary practices. The instrument consisted of 21 questions related to the respondents' general food behavior over the previous month. Five relevant dimensions of dietary habits were assessed: (a) avoiding fat or frying of foods; (b) modifying meat to make it lower in fat; (c) substituting manufactured low-fat foods for their higher-fat

counterparts; (d) replacing high-fat foods with fruits and vegetables; and (e) replacing high-fat foods with low-fat alternatives (Table 1). For each behavior,

respondents indicated whether they practiced the behavior (yes or no). If yes, then they indicated on a scale from 1 to 4, with response options as rarely/never,

Table 1. Survey questionnaire items measuring self-efficacy and dietary behaviors

Scale	Survey Questions
Self-Efficacy	1. How confident are you that if you wanted to, you could regularly prepare meals with little oil? 2. How confident do you feel about you ability to choose fresh fruit for dessert instead of ice cream? 3. If you went to a restaurant, how confident do you feel about selecting foods that are not fried? 4. How confident do you feel about your ability to buy foods that are low in fat? 5. If you were given a recipe for one of your favorite foods, how confident that you could change the ingredients to reduce the amount of fat? 6. How confident are you that you could prepare tasty and low-fat dishes?
<u>Fat-Related Dietary Behavior</u>	
Avoiding Fat/Avoid Frying (6 questions)	1. How often did you have fried chicken? 2. How often did you have fried fish? 3. How often did you have fried seafood? 4. How often did you use only small amounts of oil? 5. How often did you eat the sauce at the bottom of the dish? 6. How often did you choose fried dim sum?
Modifying Meat (4 questions)	1. How often did you take the skin off the chicken? 2. How often did you remove skin of duck? 3. How often did you trim the visible fat on meat? 4. How often did you eat small portions of red meat?
Substituting Manufactured Low-Fat Foods for their Higher-Fat Counterparts (4 questions)	1. How often did you drink 1% low-fat or skim milk? 2. How often did you choose low-fat cheeses? 3. How often did you choose low-fat frozen desserts? 4. How often did you use reduced-fat or low-fat butter or margarine?
Replacing High-Fat Foods with Fruit and Vegetables (2 questions)	1. How often did you eat only fruit for dessert? 2. How often did you eat raw vegetables or fresh fruit for snacks?
Replacing High-Fat Foods with Alternatives Lower in Fat (3 questions)	1. How often did you choose steamed dim sum? 2. How often did you choose vegetarian dim sum? 3. How often did you choose salads at American fast-food restaurants?

sometimes, often, and always/usually. A dietary index score was calculated to reflect an average score on all five dimensions of the dietary behaviors related to fat reduction.

Dietary self-efficacy was measured via a series of six statements in which respondents ranked their degree of confidence in enacting specific dietary behaviors. These statements included regularly preparing meals with little oil, choosing fresh fruit for dessert, selecting foods at restaurants that are not fried, buying foods low in fat, altering the recipe to reduce fat, and preparing tasty, low-fat dishes (Table 1). Response options ranged from “1” (not at all confident) to “5” (extremely confident).

Psychosocial variables were derived from multiple theories of health behavior. Five variables were used from the Theory of Planned Behavior: behavioral intention to reduce dietary fat, attitude towards eating reduced-fat foods, normative beliefs, motivation to comply, and perceived behavioral control. Behavioral intention was measured on one’s likelihood to modify dietary fat in the upcoming week. Examples of this questionnaire item include choosing reduced fat dairy products, removing visible fats in red meat and poultry, and using less oil in cooking. Six variables derived from the Health Belief Model consisted of perceived susceptibility and severity of heart disease, perceived benefits, perceived barriers (e.g.: loss of taste, inconvenience), overall health concern, and cues to action. Another variable such as habit was incorporated from Triandis’ (1977) model of health behavior. Lastly, preference for high-fat foods, although not a psychosocial construct, was measured. A total of 88 statements were addressed reflecting these all variables. Response options ranged from “strongly agree” to “strongly disagree” on a 5 point Likert-type scale.

Demographic data were solicited which included birthplace, years of U.S. residence, gender, age, educational attainment, working and marital status. Respondents’ degree of acculturation to mainstream American society was measured via nine questions adopted and modified from Suinn-Lew’s Asian Self-identity Acculturation Scale (1987) which assessed language and media usage, social interactions, and food-related preferences. A pilot study sample consisting of 30 individuals completed all of the items assessed in the Suinn-Lew Asian Self-identity Scale. The acculturation scale was validated by comparing the mean of the shortened version used in this study with the mean of all items used in the original acculturation

scale. A correlation coefficient of 0.90 ($p < .01$) was reported, supporting the use of the shortened version of the acculturation scale (Table 3).

Validity and Reliability of Survey Instrument

The survey instrument used was systematically developed using qualitative pilot studies of Chinese Americans to ensure clarity, validity, and reliability of the measured constructs. Qualitative research involving extensive interviews on Chinese Americans were conducted to ascertain their health and nutrition-related beliefs concerning dietary fat and risk of heart disease. Content analyses were implemented to interpret all verbal responses generated, thus, deriving the content of the survey instrument.

Face validity of the instrument was assessed via a pretest with 30 Chinese Americans. Participants were debriefed to provide feedback about the clarity and meaning of each questionnaire item. Content validity was established from an expert panel of nutrition faculty and health behavior researchers that extensively reviewed the instrument for its accurate reflection of the psychosocial models. Construct validity was established via a consistency in the operationalization and use of these variables in previous research.

Survey reliability was assessed via Cronbach alpha coefficients and test-retest scores on another group of 30 individuals using the final resultant questionnaire. Cronbach’s alpha coefficients were derived for all variables with outcome measures ranging from 0.60 to .84 (Table 2). Test-retest correlation scores reflected excellent reliability of the psychosocial variables (0.76) and dietary behavioral components (0.69). Overall, the scales demonstrated acceptable psychometric properties.

Data Analysis

All survey data were coded and entered for computer analysis using an SPSS program package (version 10.0). Frequency distributions were calculated to describe the demographic data, ranges of dietary behavior, and psychosocial factors. Stepwise multiple regression analyses were conducted to determine the subset of variables that best predicted the behavioral outcomes. Pearson’s correlations were used to examine the associations between self-efficacy and dietary behaviors. Independent sample t-tests were conducted to detect differences in the mean values between generational and gender groups on self-efficacy and dietary behavior.

Results

A purposive sample of 743 Chinese Americans

Table 2. Cronbach's Alpha Internal Consistency Coefficients and Test-Retest Coefficients for Scales Measuring Psychosocial Variables and Fat-Related Behaviors

Scale	Number of Items (n = 600)	Alpha	Test-Retest (n = 30)
A. Psychosocial Factors			
<i>Health Belief Model</i>			
Perceived Benefits	7	0.60	0.86
Perceived Barriers	8	0.73	0.81
Perceived Susceptibility	5	0.60	0.64
Perceived Severity	7	0.77	0.88
Overall Health Concern	6	0.77	0.83
Cues to Action	4	0.73	0.94
<i>Theory of Planned Behavior</i>			
Behavioral Intention	8	0.76	0.81
Attitude Toward the Behavior	8	0.67	0.81
Normative Beliefs	5	0.79	0.67
Motivation to Comply	7	0.68	0.66
Perceived Behavioral Control	5	0.75	0.85
<i>Social Cognitive Theory</i>			
Self-Efficacy	6	0.84	0.72
<i>Triandis' Model</i>			
Habit	6	0.60	0.50
Preference for High-Fat Foods	6	0.64	0.80
B. Dietary Fat Reduction Behaviors			
Avoiding fat or frying of foods	6	0.60	0.69
Modifying meat to make it lower in fat	4	0.70	0.89
Substituting specially manufactured low-fat foods for their higher-fat counterparts	4	0.80	0.77
Replacing high-fat foods with fruits and vegetables	2	0.66	0.84
Replacing high-fat foods with low-fat alternatives	3	0.63	0.69

completed a survey questionnaire of which 40% were male respondents. Six hundred participants were born in mainland China and 143 respondents were born in the U.S. The mean age of the entire sample was $36.0 \pm$

11.2 years with an average of 21.0 ± 9.7 years of U.S. residence. As for educational attainment, 18% claimed to have a high school diploma, 16% indicated the completion of some college, 31% reported a college

degree, and 22% received a post graduate degree. In regards to marital status, a majority of the subjects weremarried (67%) as compared to 26% of the sample who were single or never married. As for working status, 63% of the sample was currently employed; eleven percent of the respondents labeled themselves as homemakers, 8% as retired/disabled, and 12% as students enrolled in higher education. On the acculturation scale, first and second generation Chinese individuals had mean scores of 2.0 and 3.7, respectively (scale 1 to 5, from least to most acculturated).

T-tests were conducted on measures of dietary behavior, self-efficacy, and behavioral intention between the foreign and U.S.-born samples. A number of salient differences were noted between the first and second generation groups. As for specific dietary behaviors, the U.S.-born sample scored significantly higher on behaviors such as avoiding frying of fish, choosing 1% low-fat or skim milk, using small amounts of oil when preparing food, and choosing steamed dim

sum at Chinese restaurants. On the contrary, the foreign-born sample scored significantly higher on measures related to using small portions of red meat, limiting consumption of sauces at the bottom of dishes, avoiding fried dim sum, and instead choosing vegetarian dim sum items at Chinese restaurants. Other specific behaviors practiced in the foreign-born sample included eating only vegetables or fruit for dessert and choosing low-fat butter or margarines.

Independent sample t-tests were also conducted on measures of dietary self-efficacy and behavioral intention. Dietary self-efficacy scores were markedly higher for the U.S.-born group on confidence in preparing meals with little oil, in selecting non-fried foods at restaurants, and purchasing low-fat food products. On the other hand, dietary self-efficacy scores were greater in the foreign-born sample on confidence in preparing tasty, low-fat dishes, and modifying favorite recipes to make it lower in fat (Table 3).

Table 3. T-tests of mean self-efficacy scores between first and second generation Chinese Americans

Self-efficacy Questionnaire Item	Mean Score First Generation Sample (n=600) (Scale of 1-5)	Mean Score Second Generation Sample (n=143) (Scale 1-5)	p-value
1. How confident are you that if you wanted to, you could regularly prepare meals with little oil?	3.48	3.67	p < .05
2. How confident do you feel about your ability to choose fresh fruit for dessert instead of ice cream?	3.72	3.24	p < .001
3. If you went to a restaurant, how confident do you feel about selecting foods that are not fried?	3.26	3.52	p < .05
4. How confident do you feel about your ability to buy foods that are low in fat?	3.31	3.36	p = .60
5. If you were given a recipe for one of your favorite foods, how confident that you could change the ingredients to reduce the amount of fat?	3.02	2.69	p < .01
6. How confident are you that you could prepare tasty and low-fat dishes?	3.28	2.96	p < .01

Differences in mean scores on behavioral intention to implement certain dietary behavior in the upcoming week were also detected. In each case, the foreign-born sample scored significantly higher in the intention to consume chicken without the skin, to remove visible fats from red meat, to limit consumption of highly sweetened foods, and to order non-fried food items at restaurants ($p < .001$).

In particular, gender effects were demonstrated between male and female subjects on dietary behavior and self-efficacy scores for the entire sample. In general, female individuals displayed higher dietary self-efficacy scores along with greater adoption of fat reduction behaviors than their male counterparts. In the first generation sample, these behaviors included a greater reported frequency of replacing high-fat foods with fruits and vegetables ($p < .01$) and modifying meat to make it lower in fat ($p < .05$). Most notably were the significant differences seen in the second generation

group, in which all reported dimensions of fat reduction behaviors were highest in female respondents ($p < .01$). In this subgroup, females also scored higher on self-efficacy scores related to preparing low-fat dishes and meals with less oil ($p < .05$).

Pearson Correlations

Pearson correlations were conducted between self-efficacy and each of the five categories of fat reduction behaviors. For the entire group, all the correlations measured resulted in statistically significant outcomes. In particular, higher correlation coefficients were detected between self-efficacy and replacing high-fat foods with fruit and vegetables ($r = .30, p < .001$) and self-efficacy and substituting manufactured low-fat foods for their higher-fat counterparts ($r = .24, p < .001$). For the entire group, dietary self-efficacy was most importantly related to the combined dietary index resulting in a correlation coefficient of 0.36 ($p < .001$) (Table 4).

Table 4. Pearson correlation coefficients compared between self-efficacy and fat-related dietary behavior among first and second generation Chinese Americans

Correlated Scales Between Self-Efficacy and Dietary Behavior	Correlation Coefficient First Generation Sample (n=600)	Correlation Coefficient Second Generation Sample (n=143)
Avoiding Fat/Avoid Frying	$r = .21$ $p < .001$	$r = .26$ $p < .01$
Modifying Meat	$r = .11$ $p < .01$	$r = .21$ $p < .05$
Substituting Manufactured Low-Fat Foods for their Higher-Fat Counterparts	$r = .22$ $p < .001$	$r = .26$ $p < .01$
Replacing High-Fat Foods with Fruit and Vegetables	$r = .29$ $p < .001$	$r = .31$ $p < .001$
Replacing High-Fat Foods with Alternatives Lower in Fat	$r = .17$ $p < .001$	$r = .18$ $p < .05$
Dietary Index of Fat Reduction Behaviors	$r = .32$ $p < .001$	$r = .40$ $p < .001$

Dietary self-efficacy was significantly related to acculturation to mainstream American culture ($r = .11, p < .01$) for the foreign-born sample. As acculturation increased, a positive relationship was detected, resulting in enhanced self-efficacy levels to reduce dietary fat. Self-efficacy also appeared to be significantly related to education ($r = .10, p < .05$) with higher education levels impacting an increase in self-

efficacy levels. A slight, positive correlation between self-efficacy and age was found ($r = .07, p < .05$), implicating older age as related to higher self-efficacy levels among individuals.

Multiple Regression Analyses

Stepwise multiple regression analyses were conducted to determine the subset of variables that best predicted behavioral intention and a combined index of fat reduction behaviors. In the U.S.-born sample, self-

efficacy was the premier variable contributing to 33% of the variability of behavioral intention. Attitude toward fat reduction behavior, cues to action, and habit also contributed to the model by resulting in an overall variability of 49%. In the foreign-born sample, attitude, overall health concern, and self-efficacy were the most salient variables, contributing to a total variance of 58% for behavioral intention. Self-efficacy also played a key role in the prediction of the combined dietary index, appearing third after attitude and perceived barriers, combining for a total variance of 19%.

Discussion and Conclusion

Dietary self-efficacy has been explicated as a salient and powerful predictor of a health and nutrition-related behaviors (AbuSabha & Achterberg, 1997). This study provided a unique examination of the role of self-efficacy in the prediction of fat-related dietary behavior among a sample of first and second generation Chinese Americans. It served to elucidate the relationships between key psychosocial factors and dietary behavior among a sample of adult individuals living in the New York City metropolitan area.

In a review of studies measuring the impact of self-efficacy on a range of dietary behaviors, self-efficacy predicted about 10-35% of the variability in behavior (Parcel et al., 1995; Oka & Chaboyer, 2001). In this study of Chinese Americans, the degree of prediction of behavioral outcomes falls within the range of that reported in the literature (Baranowski Cullen & Baranowski, 1999; Stafleu, de Graaf & van Staveren, 1991).

The salience of self-efficacy as a leading predictor of fat-related dietary behavior and behavioral intention is noteworthy. Self-efficacy was the premier variable contributing to 33% of the variability of behavioral intention in the U.S.-born sample. A total variability of 49% was achieved by other psychosocial variables such as attitude, cues to action, and habit. In the foreign-born sample, self-efficacy appeared third highest in the prediction of behavioral intention, amounting to a combined total variance of 58%, along with the addition of attitude and overall health concern. Likewise for the foreign-born sample, 19% of the variance of the combined behavioral index was accounted for by self-efficacy, attitude, and perceived barriers. Furthermore, Pearson correlation coefficients between self-efficacy and each of the category of fat reduction behaviors were all statistically significant and positive for both generations of Chinese Americans. These findings support the importance of self-efficacy

as an important predictor of dietary behavior.

In this study of Chinese American adults, self-efficacy scores varied among the first and second generation individuals, dependent on the nature of the dietary behavior. First generation Chinese who adhered more to traditional Chinese values and practices scored higher on self-efficacy items related to preparing tasty, low-fat dishes, and modifying recipes to make them lower in fat. These items can be categorized as relating to confidence in food preparation. This finding is also supported in the study on Chinese adolescents conducted by Sun & Wu (1997), in which native Chinese students may have learned to prepare, cook, and store foods at an early age. Thus, their dietary self-efficacy may be affected and reinforced by these experiences and skills learned from family members and friends.

Second generation Chinese indicated greater confidence in preparing meals with little oil, ordering non-fried items at restaurants, and purchasing reduced fat or low-fat food products. In general, these behaviors reflect a greater awareness and exposure of American food products and their availability at dining facilities and supermarkets. Overall, a slight but significant positive correlation between self-efficacy and acculturation was found. This further supports the notion that the highly acculturated Chinese tends to be more cognizant of mainstream media and its promotion of American food products, thus impacting self-efficacy to choose and purchase reduced-fat products. Also, a slight positive correlation was found between education and self-efficacy. Although one needs to exercise caution in the interpretation of this statistical finding, a general trend seems to be evident in which increased education is related positively to enhanced self-efficacy in individuals.

Significant differences in mean scores for the adoption of fat reduction behaviors and levels of self-efficacy were noted between male and female subjects, regardless of a generation effect. Lower levels of efficacy characterized in males can be attributed to the hindrance of barriers in dietary fat reduction. These barriers included inconvenience and the perceived loss of taste. Also, in traditional Chinese culture, female individuals are the main food purveyors and cooks among households. A greater familiarity and confidence can be attributed to their ability to perform tasks related to food purchase and preparation.

Limitations

A number of limitations need to be addressed in

this study. First, a random sample of individuals was not attempted in the selection process. Thus, the results cannot be generalized to the entire Chinese American population at large. Instead, a wide range of social, cultural, and civic organizations were targeted for potential recruitment of participants. The response rate obtained may also pose a concern since volunteers who completed the survey may be inherently more health-conscious than non-volunteers. Second, measurement of dietary self-efficacy could have been expanded to include other forms of inquiry besides targeting confidence in enacting specific behaviors. Additional measurements of self-efficacy would encompass having behaviors ordered or ranked according to their level of difficulty and measuring different domains of functioning in which individuals' judge themselves as efficacious. By including these dimensions of magnitude and generality, the self-efficacy construct would be more comprehensive.

Recommendations

Additional studies of Chinese American adults living in other large U.S. cities are implicated to elicit a greater understanding of dietary behavior and perceptions in self-efficacy. Chinese adult males would benefit from nutrition education to incorporate knowledge and skills to modify dietary fat. First generation Chinese can benefit from increased awareness of the American media and food industry. Understanding how to select appropriate foods from the vast array of American food products can be a daunting challenge. Nevertheless, nutrition education can have a prominent role in increasing knowledge and skills in food purchase. Second generation Chinese can benefit from hands-on workshops targeting motivation and confidence in preparing tasty, nutritious and low-fat meals.

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