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Cultural Beliefs and Self-Efficacy in Diet Adherence among Type 2 Diabetics

Sonika Kravann Ung

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LOMA LINDA UNIVERSITY
School of Behavioral Health
in conjunction with the
Faculty of Graduate Studies

Cultural Beliefs and Self-Efficacy in Diet Adherence among Type 2
Diabetics

by

Sonika Kravann Ung

A Thesis submitted in partial satisfaction of
the requirements for the degree
Doctor of Philosophy in Clinical Psychology

June 2015

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Each person whose signature appears below certifies that this thesis in his/her opinion is adequate, in scope and quality, as a thesis for the degree Doctor of Philosophy.

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CONTENT

Approval Page.....	iii
Acknowledgements.....	iv
List of Figures.....	vii
List of Tables.....	viii
List of Abbreviations.....	ix
Abstract.....	x
Chapter	
1. Introduction.....	1
The Epidemic of Type 2 Diabetes.....	1
Health Behavior and Adherence among Type 2 Diabetics.....	1
The Present Study.....	2
Sources of Culture.....	4
Cultural Beliefs about Diet.....	5
Psychological Factors.....	6
Hypotheses.....	7
2. Methods.....	9
Participants and Procedures.....	9
Measures.....	11
Ethnicity.....	11
Socioeconomic Status.....	11
Cultural Beliefs about Susceptibility to Social Pressure.....	11
Self-Efficacy for Diet Treatment Adherence.....	11
Diet Treatment Adherence.....	12
Statistical Analyses.....	12
3. Results.....	14

4. Discussion.....19

 Discussion.....19

 Conclusions and Future Directions.....23

References.....25

Appendices

 A. Cultural Beliefs about Susceptibility to Social Pressure Scale.....30

 B. Diet Self-Efficacy Scale.....31

FIGURES

Figures	Page
1. Betancourt's Integrative Model of Culture, Psychological Factors and Health Behavior	4
2. Final Structural Equation Model for Mapuches and mainstream Chileans	18

TABLES

Tables	Page
1. Demographic Characteristics of Participants.....	15
2. Intercorrelation Table of Study Variables.....	16

ABBREVIATIONS

CFI	Comparative Fit Index
CONICYT	Commission for Scientific and Technological Research, Government of Chile
EQS 6.1	Structural Equation Modeling Software 6.1
FONDECYT	Fondo Nacional de Desarrollo Científico y Tecnológico
HbA1c	Hemoglobin A1c
LM	Lagrange Multiplier
ML	Maximum Likelihood
RMSEA	Root Mean Square Error of Approximation
SDSCA	Summary of Diabetes Self-Care Activities scale
SEREMI	Seremi de Gobierno
SES	Socioeconomic Status
SEM	Structural Equation Models
SRMR	Standardized Root Mean Square Residual
T2D	Type 2 Diabetes
WHO	World Health Organization

ABSTRACT OF THE DISSERTATION

Cultural Beliefs and Self-Efficacy in Diet Adherence among Type 2 Diabetics

by

Sonika Kravann Ung

Doctor of Philosophy, Graduate Program in Psychology
Loma Linda University, June 2015
Dr. Hector Betancourt, Chairperson

Type 2 Diabetes (T2D) is a global epidemic that disproportionately affects socioeconomic and ethnic minority populations (International Diabetes Federation, 2013). Mapuches, the largest Native American population in Chile, shifted from the lowest incidence of T2D to equal rates in comparison to mainstream Chileans within a decade (King & Rewers, 1991; Perez-Bravo et al., 2001). This may be due to economic growth and rapid nutritional shifts (Yu & Zinman, 2007). Previous research has identified the importance of cultural beliefs in explaining health behavior (Betancourt, Flynn, & Ormseth, 2011). This study, guided by Betancourt's Integrative Model for Culture, Psychological Factors and Behavior Adapted for the Study of Health Behavior (Betancourt & Flynn, 2009), examined the influence of cultural beliefs and self-efficacy on diet adherence. It was hypothesized that cultural beliefs about susceptibility to social pressure would be negatively associated with diet adherence directly and/or indirectly through diet self-efficacy. Multi-group structural equation modeling tested the impact of cultural beliefs and self-efficacy on diet adherence among Mapuches ($n = 146$) and mainstream Chileans ($n = 244$) with T2D. Both hypothesized models demonstrated an excellent fit to the data [Mapuches: CFI = .98, $\chi^2(12, n = 146) = 17.613$, $\chi^2/df = 1.47$, SRMR = .06, RMSEA = .06, 90% CI (.00, .11); mainstream Chileans: CFI = 1.00, $\chi^2(12,$

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$n = 244$) = 10.32, $\chi^2/df = .86$, SRMR = .03, RMSEA = .00, 90% CI (.00, .06)]. The indirect effect of cultural beliefs was significant for mainstream Chileans ($\beta_{\text{Indirect}} = -.084$, $p < .05$) and had a similar effect for Mapuches ($\beta_{\text{Indirect}} = -.045$, $p = .12$). A test of invariance was performed and demonstrated that the effect of any single variable on another variable did not differ due to ethnicity. This study highlighted the importance of examining indirect effects of cultural beliefs on health behaviors through psychological factors. Interventions would benefit from considering cultural beliefs about temptation and social norms surrounding food refusal as well as feelings of capability toward adherence. Future research should consider the role of other cultural and psychological factors on diet adherence, such as fatalism and social support.

CHAPTER 1
CULTURAL BELIEFS AND SELF-EFFICACY IN DIET
ADHERENCE AMONG TYPE 2 DIABETICS

The Epidemic of Type 2 Diabetes

Type 2 diabetes (T2D) is a global epidemic affecting 366 million people worldwide (International Diabetes Federation, 2013; World Health Organization: Diabetes Fact Sheet, 2013). The incidence of T2D in South America has been predicted to become the highest in comparison to Europe, the United States and Canada by 2025, as a result of rapid environmental changes in diet and exercise (Aschner, 2002; Yu & Zinman, 2007). The changes amongst the largest Native American population in Chile, Mapuches, highlight the possibility of rapidly changing diet. At less than 1%, Mapuches were reported to have the lowest global incidence of diabetes in 1991 (King & Rewers, 1991). In a decade, diabetes incidence was reported to have increased to 3.2% for women and 4.5% for men (Perez-Bravo et al., 2001). Among Chileans in general, the incidence is predicted to become one of the highest in the world, at rates between 6.1 and 8% (Barceló, 2001; King, Aubert, & Herman, 1998). These findings highlight the importance of examining how complications caused by T2D can be controlled through behavior, particularly among Chileans due to the high rates of diabetes. The current study examined data collected from both Mapuches and mainstream Chileans with type 2 diabetes.

Health Behavior and Adherence Among Type 2 Diabetics

The primary causes of death in Latin American countries, heart disease and diabetes, are associated with behaviorally controllable nutritional factors. Uncontrolled

diabetes can result in severe health consequences such as nerve death (neuropathy), blindness (retinopathy), kidney disease, kidney failure, heart disease, stroke, and limb amputations. Modifying nutritional intake has been shown to effectively control complications that may result from T2D, such as consuming a healthy diet of approximately three to five servings of fruit and vegetables per day, reducing sugar intake, and the intake of saturated fat (WHO Diabetes Fact Sheet, 2011). Unfortunately, adherence to recommended diet plans have been one of the most cited patient-management challenges among type 2 diabetics (Stewart et al., 2007). Non-adherence is often measured through glucose levels, with high glucose levels indicating non-adherence. Current research indicated that of the 33% of diabetics in Latin America being treated, 84% did not have their glucose under control (Silva et al., 2010). Latin America has experienced major epidemiological and nutritional transitions in the past four decades (Albala, Vio, Kain, & Uauy, 2001). In Chile specifically, diet has shifted from high levels of under-diet and low obesity in 1975 to high rates of obesity by 1995, which is continuing to increase over time.

The Present Study

The aim of the present study was to examine the role of cultural beliefs and self-efficacy in adherence to diet recommendations among type 2 diabetics, which may clarify variables important to addressing the major health behavior shifts among Mapuche and mainstream Chileans. This study was guided by Betancourt's Integrative Model for the Study of Culture, Psychological Factors, and Behavior Adapted for the Study of Health Behavior (Betancourt & Flynn, 2009; Betancourt, Flynn, Riggs, & Garberoglio, 2010;

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Betancourt & Lopez, 1993; Flynn, Betancourt, & Ormseth, 2011). Within this theoretical framework, both the direct and indirect effects of cultural beliefs that may inhibit diet adherence can be examined (see Figure 1). This model specifies the contribution of factors that influence health behavior. Population categories and socio-structural factors (A), such as socioeconomic status (SES) or ethnicity, are considered the most distal determinants of behavior and also serve as sources of culture. Cultural factors (B) that are unique to the population of interest are more proximal to psychological factors (C), which are the most proximal to health behavior (D). The current study examined diet treatment adherence among a sample of culturally diverse Chileans in an effort to specify cultural and psychological factors that may curb the negative health consequences of type 2 diabetes.

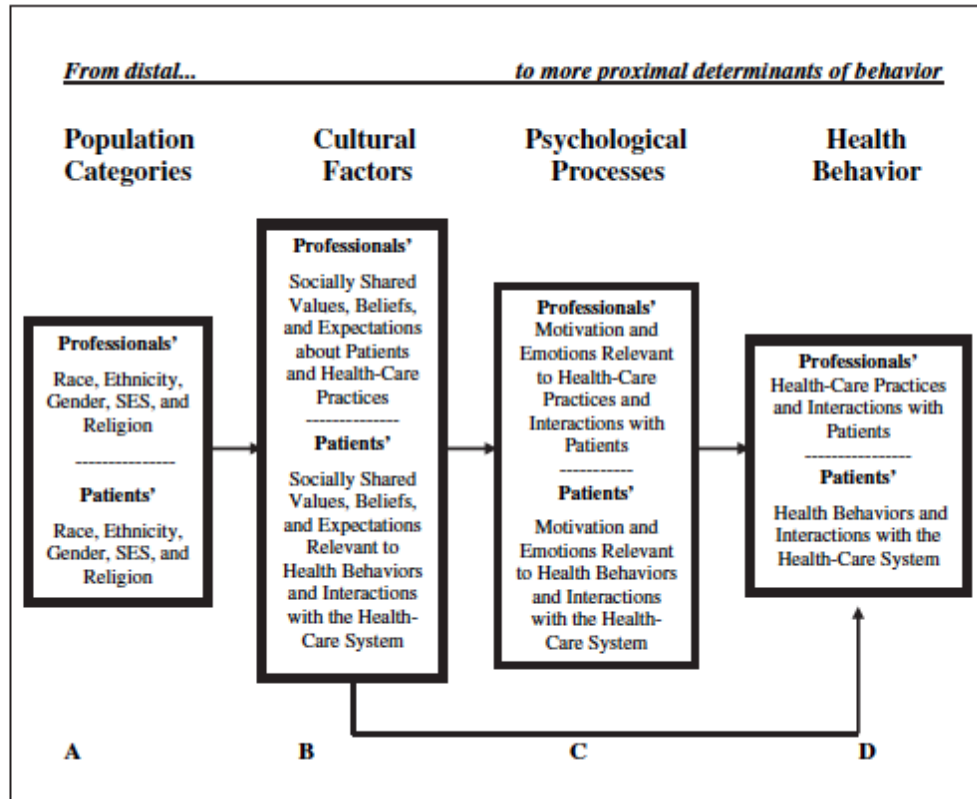


Figure 1. Betancourt’s Integrative Model of Culture, Psychological Factors and Behavior Adapted for the Study of Health Behavior.

Sources of Culture

Diabetes in Chile is associated with both socioeconomic change and obesity (Albala et al., 2001). Two primary components of socioeconomic status (SES) are education and income. Those who are low SES in Chile have higher rates of obesity and chronic illness. Similarly, among populations in the U.S., type 2 diabetics are overrepresented at low education and income levels (Cusi & Ocampo, 2011; Misra & Lager, 2007). In Valparaíso, Chile, low SES individuals are significantly more sedentary and have higher rates of obesity in comparison to other SES groups, contributing further to type 2 diabetes complications (Albala et al., 2001).

Ethnic minority status has been associated with worse health outcomes overall (Braveman, Cubbin, Egerter, Williams, & Pamuk, 2010). Mapuches, the largest ethnic minority group in Chile, have an overall lower life expectancy, level of education, and income compared to mainstream Chileans. This places them at higher risk for physical and mental health problems; particularly when they perceive discrimination (Mellor, Merino, Saiz, & Quilaqueo, 2008). Mapuches' rates of obesity and type 2 diabetes have also disproportionately increased over the past fifteen years (Perez-Bravo et al., 2001), but there are less specific data on nutritional habits. Examining diet adherence among Mapuche type 2 diabetics may more clearly explain how to address diet adherence changes within this population.

Cultural Beliefs about Diet

Population factors, such as ethnicity and income, are a proxy for culture. This study defines culture as social norms, roles, beliefs and values that are shared within a group (Betancourt & López, 1993). The current study will explore one cultural factor specific to diet adherence: susceptibility to social pressure.

Diet adherence significantly lowers the onset and probability of complications from type 2 diabetes. Diet adherence refers to a healthy diet and involves closely monitoring the amount of food consumed, timing meals consistently throughout the day, and monitoring snacks (Julien, Senecal, & Guay, 2009). Those who are non-adherent with their recommended diet become high-risk for complications (Julien et al., 2009). Increasing rates of type 2 diabetes and obesity stem from a "Westernized" diet (Salas-Salvado et al., 2011). Only 33% of all diabetics adhere to their recommended diet

frequently (Albright, Parchman, & Burge, 2001). Glycemic control is central to preventing diabetes-caused complications, and proper diet adherence is considered the cornerstone for maintaining glycemic control (Lim, Park, Choi, Huh, & Kim, 2009).

Diet non-adherence among diabetics may be related to socially shared norms, values and expectations. Some diabetics noted that it was difficult to adhere to their diet when their children offered them restricted foods (Laroche et al., 2009). Similarly, among a Latino population in the United States, adhering to diet was perceived to be difficult if it affected the family and extended family (Ramal, Petersen, Ingram, & Champlin, 2009). Taking this information into account, some socially shared norms may be a significant barrier for diet adherence among diabetics. Marcy, Britton, and Harrison (2011) delineated additional barriers to diet adherence, including stress, temptation to eat unhealthy food, eating out, feeling deprived, time pressures, social events, and the pressure of refusing offered food . Of these barriers, stress, and the temptation to eat unhealthy food were the most frequently reported barriers to diet adherence.

Psychological Factors

According to the theory guiding this research, beliefs, norms and expectations about social pressure may influence diet adherence directly and/or indirectly through psychological factors. The current study examined how perceived diet self-efficacy affected diet adherence.

Self-efficacy may be linked to diet adherence due to its relation to self-management as a solution to diabetes complications (Bandura, 2004). Self-efficacy is defined as having enough confidence to reach a desired goal, and is becoming

increasingly relevant to chronic illnesses such as type 2 diabetes (Heisler, Piette, Spencer, Kieffer, & Vijan, 2005). Self-efficacy has been positively associated with diet adherence and may act as a protective factor for overall treatment adherence (Julien et al., 2009). High self-efficacy has been found to be a protective factor among Puerto-Ricans in the U.S. against barriers such as medication access, forgetfulness and food-insecurity (Kollannoor-Samuel et al., 2011). Along with diet, Sarkar, Fisher and Schillinger (2006) found self-efficacy to improve exercise, self-monitoring glucose levels, and foot care among ethnic minorities with limited health literacy. However, being of low socioeconomic status may hinder self-efficacy among minorities. Low education and income specifically have been found to be related to worse diet adherence and low overall treatment adherence (Mansyur, Pavlik, Hyman, Taylor, & Goodrick, 2012).

Taking all proposed variables into consideration and using Betancourt's Integrative Model for Culture, Psychological Factors, and Behavior Adapted for the Study of Health Behavior as a guiding theoretical framework, it is expected that diet adherence will be influenced by cultural beliefs about susceptibility to social pressure. Cultural factors may directly or indirectly affect diet adherence through perceived diet self-efficacy. Gaining an understanding of diet-specific cultural and psychological factors may contribute to knowledge concerning treatment adherence, and ultimately, to what factors may reduce the consequences and cost of type 2 diabetes with culturally-sensitive interventions.

Hypotheses

Based on theory and previous research (Betancourt et al., 2011; Flynn et al.,

2011) it was hypothesized that for both Mapuche and mainstream Chilean diabetics, cultural beliefs about susceptibility to social pressure would be negatively associated with diet adherence directly and/or indirectly through diet self-efficacy.

CHAPTER 2

METHODS

Participants and Procedures

As part of a larger research program investigating cultural and psychological factors relevant to diabetes management, multi-stage stratified sampling was used to obtain participants from demographic backgrounds conceived as sources of cultural variation (e.g. SES) from both public and private health clinics in the Araucanía region of Chile. This study was funded by CONICYT (National Commission for Scientific and Technological Research, Government of Chile; FONDECYT Project #1090660 to Dr. H. Betancourt, P.I.), and approval for the study was obtained from the public university ethics committee for research and the regional office of the Chilean Ministry of Health (SEREMI de Salud, Region de La Araucanía).

A total of 394 type 2 diabetics were recruited (Mapuche; $n = 146$, mainstream Chilean; $n = 254$). Potential participants were contacted by phone with the support of clinic directors to explain the purpose of the study, including the inclusion/exclusion criteria (≥ 18 years of age, diagnosed with diabetes for over one year, and non-insulin dependent diabetics). Participants were contacted between September 2011 and February 2012 through private and public health centers in Temuco, Chile and rural areas of the region. Each participant selected received a phone call to explain the purpose of the research: to gain information about beliefs regarding diabetes management. If participants stated that they were interested, they were informed that participation included answering a questionnaire in Spanish that took 30-45 minutes to complete. Participants were informed that they would receive a free analysis of HbA1c levels and

be compensated 5,000 Chilean pesos (US \$10.61) as compensation for their time. If the patient agreed to participate, he/she was scheduled to report to a research facility at the Universidad de la Frontera, School of Medicine, where data collection was conducted.

In order to identify the cultural beliefs associated with adherence to diet recommendations for type 2 diabetics in Chile, the Cultural Beliefs about Diet Compliance Scale was developed using a mixed-methods, bottom-up methodological approach (Betancourt, Flynn, Riggs, & Garberoglio, 2010). In the first stage of instrument development, comprehensive interviews were conducted. Samples included representative proportions of the population in the Araucanía region across SES, ethnicity, age, income and other demographics. To this end, 50 (male = 16, female = 34) qualitative interviews were conducted and content analyzed with Mapuche and mainstream Chilean type 2 diabetics. In the second stage, a measure was formed based on items developed from content analyses of qualitative interviews using factor analysis. Consequently, specific cultural factors central to treatment adherence among type 2 diabetics were identified. Lastly, the instrument was refined in order to collect data to measure differences on cultural factors specific to Mapuche and mainstream Chileans in relation to demographics and psychological factors. The present study was part of the third phase of research, in which cultural instruments developed in the first two phases were used to measure cultural factors, such as cultural beliefs about susceptibility to social pressure for diet.

Measures

Ethnicity

Ethnicity was self-reported by participants and confirmed by comparing responses with family names of previous generations.

Socioeconomic Status (SES)

SES was assessed using self-report measures of income and education. Participants indicated their income based on five income categories. Education was reported in total years obtained.

Cultural Beliefs about Susceptibility to Social Pressure

The susceptibility to social pressure scale included two items concerning a person's susceptibility to consume prohibited food or drinks, or difficulty refusing food or drinks offered as a sign of affection due to social pressure. Exploratory factor analysis with primary axis factoring and direct oblimin rotation revealed four cultural factors relevant to diet adherence. The susceptibility to social pressure factor demonstrated fair to good reliability ($\alpha_{\text{Mapuche}} = .59$, $\alpha_{\text{mainstream Chilean}} = .69$). Item responses were on a Likert scale that ranged from 1 (never) to 7 (always). (see Appendix A)

Self-Efficacy for Diet Treatment Adherence

The diet self-efficacy scale was developed in Spanish with type 2 diabetics in Mexico (De Castillo, 2010), but was adapted for the present study. Psychometric properties were established during phase two of the research in Chile. The scale consisted

of six items designed to assess how diabetics felt about their disease. A sample item includes, “how capable do you feel about following the suggested diet to control diabetes?” This scale demonstrated good reliability ($\alpha_{\text{Total}} = .88$, $\alpha_{\text{Mapuche}} = .89$, $\alpha_{\text{mainstream Chilean}} = .88$). Item responses were on a Likert scale that ranged from 1 (never) to 7 (always). (see Appendix B)

Diet Treatment Adherence

Diet adherence was measured with a single item from the Summary of Diabetes Self-Care Activities scale (SDSCA), which is considered a brief, reliable and valid self-report measure of diabetes management (Toobert, Hampson, & Glasgow, 2000).

Participants were asked, “on average, over the past month, how many days per week have you followed your eating plan?” Item responses were on a Likert scale that ranged from 0 to 7 days per week.

Statistical Analyses

All hypotheses were tested using Bentler’s structural equation modeling software (EQS 6.1; Bentler, 2005) with the maximum likelihood (ML) of estimation. Data were screened for multivariate outliers and met assumptions of normality. Due to theoretical considerations, education and income were included as sources of cultural variation in the structural equation models. Due to the conceptual relatedness of social desirability to the cultural factor examined, it was not covaried from study variables. Fit index criteria included non-significant χ^2 goodness-of-fit statistic, a ratio of less than 2.0 for the χ^2/df ratio (Tabachnick & Fidell, 2007), a Comparative Fit Index (CFI) of .95 or greater, a

Standardized Root Mean Square Residual (SRMR) of less than .08 (Hu & Bentler, 1998), Root Mean Square Error of Approximation (RMSEA) of less than .08 (Browne & Cudeck, 1993), or with a high number of confidence intervals below .10 (Kline, 2011). Covariance residuals were checked for absolute values below .10 to ensure explanatory power of the models for specific observations (Kline, 2011).

CHAPTER 3

RESULTS

There were a total of 394 participants (36% Mapuche, 64% mainstream Chilean; 62.7% female, 37.3% male). Nineteen participants were excluded due to missing data and one participant was determined to be a multivariate outlier with a Mahalanobis distance test, resulting in a sample of 374 participants total. See Table 1 and 2 for preliminary analyses.

Data screening revealed no violations of multivariate normality, therefore, standard test statistics were used to evaluate model fit. A two-step modeling approach was used for structural equation models (Kline, 2011). First, the fit of the measurement model was tested and then necessary changes were made. Second, the fit for the full structural regression model was tested and then needed changes were made. Lastly, a test of invariance was performed to test the equivalence between models. Alternative models that would be theoretically plausible include models that further examine the effect of different cultural variables on self-efficacy for diet adherence. Because this study utilized archival data, there may be specification error due to the omission of relevant variables. Within all structural equation models performed, metric was set to the highest loading indicator for diet self-efficacy, which was Parcel 2 for both the Mapuche and mainstream Chilean models.

The Mapuche model demonstrated an excellent fit to the data, with the exception of the upper-bound for the RMSEA confidence interval: CFI = .98, χ^2 (12, $n = 146$) = 17.613, $\chi^2/df = 1.47$, SRMR = .06, RMSEA = .06, 90% CI (.00, .11). The model converged in seven iterations. The positive relationship between diet self-efficacy and

Table 1.

Demographic characteristics of participants.

	Mapuche <i>n</i> =142	Mainstream Chilean <i>n</i> =242
Monthly Income		
\$0-\$150	111(78.7)	106(42.2)
\$151-\$250	17(12.1)	63(25.1)
\$251-\$500	12(8.5)	57(22.7)
\$501-\$1000	1(.7)	21(8.4)
\$1000.001-\$1500	0(0)	2(.8)
> \$1500	0(0)	2(.8)
Education		
Less than high school	124(87.3)	136(54.4)
High school	10(7)	63(25.2)
1-2 years of college	4(2.8)	12(4.8)
3-4 years of college	4(2.8)	23(9.2)
4 years of college or more	0(0)	16(6.4)
Marital Status		
Single	18(12.8)	44(17.7)
Married	92(55.2)	136(54.6)
Divorced	4(2.8)	15(6)
Separated	3(2.1)	11(4.4)
Cohabiting	9(6.4)	13(5.2)
Widow(er)	15(10.6)	30(12)
Years Diagnosed with T2D		
< 5	83(60.1)	130(52.2)
5.01-10	38(27.5)	50(20.1)
10.01-15	8(5.8)	40(16.1)
15.01-20	6(4.3)	18(7.2)
20.01-25	1(.7)	5(2)
>25.01	2(1.4)	6(2.4)
Gender		
Female	99(69.7)	148(58.7)
Male	43(30.3)	104(41.3)
Location		
Rural	138(97.2)	89(35.3)
Urban	4(2.8)	163(64.7)
<i>Age Mean (SD)</i>	58.88(13.09)	57.95(13.74)

diet adherence was significant ($\beta = .290, p < .001$). The negative relationship between cultural beliefs about susceptibility to social pressure and diet self-efficacy was also significant ($\beta = -.156, p < .05$).

The indirect effect of cultural beliefs about susceptibility to social pressure on diet adherence reflected an expected negative effect ($\beta_{\text{Indirect}} = -.045, p = .12$), which was larger than the direct effect ($\beta = -.086, p > .05$). In a test of direct and indirect mediation, diet self-efficacy did not significantly mediate the effect between cultural beliefs about susceptibility to social pressure and diet adherence for Mapuches ($p = .18, 95\% \text{ CI } (-.117, .009)$).

Table 2.

Intercorrelation table of study variables.

	1.	2.	3.	4.	5.	6.	7.
1. Education	—						
2. Income	.579** (.545**)	—					
3. Cultural Beliefs about Diet: Susceptibility to social pressure	-.264** (-.096)	-.209* (-.067)	—				
4. Diet Self- Efficacy: Parcel 1	-.024 (.149*)	.028 (.100)	-.046 (-.137*)	—			
5. Diet Self- Efficacy: Parcel 2	-.103 (.129*)	-.082 (.064)	-.140 (-.142*)	.710** (.729**)	—		
6. Diet Self- Efficacy: Parcel 3	.040 (.057)	-.007 (-.003)	-.163 (-.114)	.597** (.744**)	.720** (.710**)	—	
7. DietAdherence	.097 (.132*)	.154 (.025)	-.152 (-.168**)	.253** (.393**)	.272** (.397**)	.275** (.380**)	—
Mean (SD)							
Mapuche	5.64(4.37)	N/A	4.87(2.03)	3.21(.91)	2.85(.95)	3.09(.93)	4.21(2.09)
Mainstream Chilean	10.03(4.34)		3.96(2.01)	3.11(.81)	2.86(.88)	3.16(.83)	4.65(1.89)

* $p < .05$, ** $p < .01$, *** $p < .001$.

The mainstream Chilean model also demonstrated an excellent fit to the data: CFI = 1.00, χ^2 (12, $n = 244$) = 10.32, $\chi^2/df = .86$, SRMR = .03, RMSEA = .00, 90% CI (.00, .06). The model converged in seven iterations. The positive relationship between diet self-efficacy and diet adherence was significant ($\beta = .290, p < .001$). The negative relationship between cultural beliefs about susceptibility to social pressure and diet self-efficacy was also significant ($\beta = -.156, p < .05$). The indirect effect of cultural beliefs about susceptibility to social pressure on diet adherence was significant ($\beta_{\text{Indirect}} = -.084, p < .05$), whereas the direct effect was non-significant ($\beta = -.115, p > .05$), suggesting that self-efficacy mediated the relationship between cultural beliefs and diet adherence. Diet self-efficacy significantly mediated the effect between cultural beliefs about susceptibility to social pressure and diet adherence for mainstream Chileans ($p < .05$, 95% CI (-.127, -.009)).

A test of invariance was performed to examine the equivalence between the hypothesized structure of relationships between Mapuches and mainstream Chileans (see Figure 2). Configural invariance was first established demonstrating an excellent fit to the data (CFI = .995, χ^2 (24, $n = 390$) = 27.93, $\chi^2/df = 1.16$, SRMR = .045, RMSEA = .021, 90% CI (.00, .049)). Secondly, there was not a significant decrement in fit after constraining factor loadings to be equal across groups, therefore measurement equivalence was confirmed (CFI = .994, χ^2 (24, $n = 390$) = 31.13, $\chi^2/df = 1.20$, SRMR = .049, RMSEA = .023, 90% CI (.00, .049)). Lastly, after constraining structural paths to be equal, between groups no decrement in fit was observed (CFI = .994, χ^2 (24, $n = 390$) = 35.66, $\chi^2/df = 1.15$, SRMR = .056, RMSEA = .020, 90% CI (.00, .045)), suggesting that the effect of any single variable on another variable did not differ due to ethnicity.

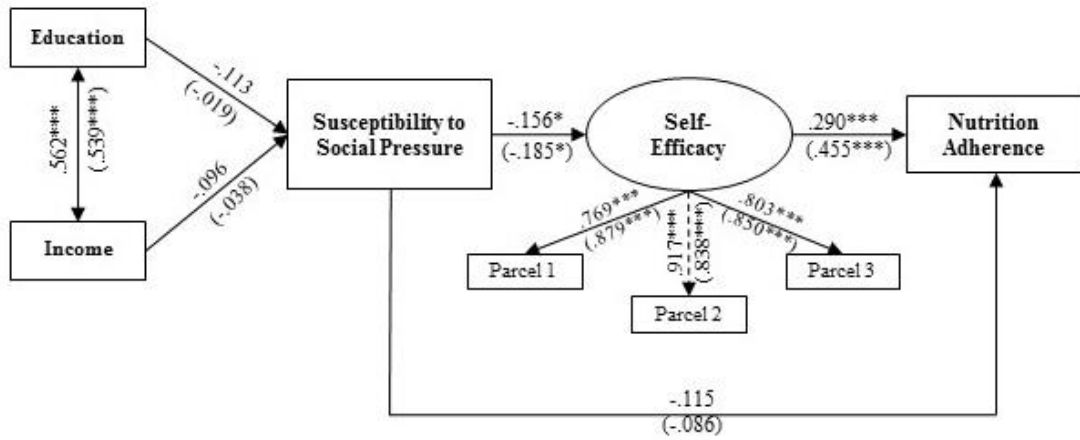


Figure 2. Structural Test of Invariance for Mapuches and (mainstream Chileans).

$^\dagger p < .10$, $*p < .05$, $**p < .01$, $***p < .001$

CHAPTER 4

DISCUSSION

Overall, this study reflected that Mapuche and mainstream Chileans who had lower scores on cultural beliefs about susceptibility to social pressure also had higher scores on a measure of diet self-efficacy. Higher scores on diet self-efficacy were directly related to diet adherence for both groups. Consistent with the theoretical model guiding this study, diet self-efficacy mediated the relationship between cultural beliefs about susceptibility to social pressure and diet adherence for mainstream Chilean type 2 diabetics. Indirect effects suggest a similar effect for Mapuche type 2 diabetics. This study provides further support for programmatic research that defines the role of culture in health behavior (Betancourt et al., 2010; Betancourt, Flynn, & Ormseth, 2011; Flynn, Betancourt, & Ormseth, 2011). This study highlights the importance of considering both cultural and psychological factors among culturally diverse populations.

Examining diet adherence as a single item may have refined the relationship between cultural and psychological factors. Previous literature has not established a one-to-one relationship between adherence and the control of diabetes because diabetes is a multidimensional construct (Johnson, 1992; Toobert et al., 2000). For this reason, composite scores of adherence become problematic because they degrade the complexity of T2D adherence. Composite adherence scores may mask differences between specific adherence behaviors and health outcomes (Johnson, 1992). For example, questions span across dietary habits, exercise, and medication adherence. Therefore, making a composite score of various behaviors (exercise and diet) may not capture specific behaviors like diet accurately. For this reason, diet adherence was measured with the single item “On

average, over the past month, how many days per week have you followed your eating plan?” rather than with a composite score. Other items only inquired about behavior over the past week. For example, how many days out of the past week did the participant consume “five or more servings of fruits and vegetables,” “high fat foods,” or “follow a healthful eating plan.” By focusing on behavior over the past month, a more accurate overall picture of dietary behavior may be captured.

The role of diet self-efficacy may be crucial to diet adherence, as evidenced by the strong relationship between both variables across Mapuches and mainstream Chileans. Self-efficacy has been found to be important for other factors, such as glucose monitoring, exercise adherence, food insecurity, medication access, and foot care among ethnic minorities in the U.S. (Julien et al., 2009; Kollannoor-Samuel et al., 2011; Sarkar et al., 2006). Better overall self-management of type 2 diabetes has also been associated with self-efficacy (King et al., 2010). This study furthered evidence for the importance of self-efficacy in predicting adherence to a healthy diet. Self-efficacy may also be indicative of other important predictive factors, such as locus of control and health outcome expectancy (O’Hea et al., 2009). In contrast to previous studies which measured overall self-efficacy, this study uniquely utilized a measure of self-efficacy specific to diet behavior. Furthermore, this study provides evidence for the positive association between diet self-efficacy and diet behavior over the past month across both an ethnic minority and mainstream population in Chile. Diet self-efficacy may be more generalizable than other psychological factors across ethnic groups, making it a valuable entrance point for intervention. Future interventions should focus on developing procedures to foster feelings of capability for specific health behaviors, such as diet, that are relevant to type 2

diabetes treatment adherence. These interventions may want to differentiate between diet adherence in the context of others (when at a party or when watching others consume prohibited foods) and in the context of individual factors (following the suggested diet, following the suggested diet when worried, and avoiding prohibited foods). Future interventions should also consider other psychological factors that have been found to be relevant to diet adherence, such as social support (Stephens et al., 2012).

The importance of diet self-efficacy for diet adherence was explained in the current study by also considering the role of cultural factors. Susceptibility to social pressure was negatively associated with diet self-efficacy for both Mapuches and mainstream Chileans. Although previous studies have examined the difficulty that type 2 diabetics have resisting the temptation to eat unhealthy foods at social events, particularly when this influences family and/or extended family, this study examined shared norms in relation to psychological factors among Latinos (Marcy et al., 2011; Ramal et al., 2009). Cultural beliefs about susceptibility to social pressure for diet and diet adherence were mediated by diet self-efficacy for mainstream Chileans in the current study. Culture did not have a direct effect on diet adherence for either Mapuches or mainstream Chileans. This study highlights the importance of examining both indirect and direct effects of cultural factors, otherwise the conclusion that culture does not play a role in health adherence behavior could be incorrectly made. Interventions among Mapuche and mainstream Chileans should consider sociocultural factors that negatively influence adherence, such as being tempted by watching other people consume prohibited foods and having difficulty refusing food offered as a sign of affection. Other studies should

test the influence of these factors among other ethnic minority and mainstream populations, or among Latino populations in different countries.

Interestingly, education and income did not significantly contribute to beliefs about susceptibility to social pressure for diet adherence. This finding does not discount the importance of socioeconomic status as a source of cultural variation. Other cultural factors obtained from the bottom-up approach may be significantly associated with education and income, such as diabetes fatalism and/or beliefs about the controllability of diabetes. Higher rates of fatalism, or the belief that events (or diseases such as diabetes) are due to fate, has been associated with low socioeconomic status among Mexican-American women with cardiovascular disease (de los Monteros & Gallo, 2013). Fatalism is negatively associated with adhering to recommended health guidelines. Conceptually counter to fatalism is the belief that diabetes can be controlled. Beliefs that diabetes is controllable may be associated with higher socioeconomic status. Fatalism and beliefs of controllability should be explored in relation to socioeconomic status in future studies.

In addition to providing evidence for the role of cultural and psychological factors in relation to diet adherence, these findings also have important implications for health care and diet interventions for diabetics. Cultural variables bear significance, particularly for not following the prescribed diet because one feels tempted by watching others consume prohibited foods or unable to refuse foods offered as a sign of affection. Due to the influence of social pressure, this study may reflect that Mapuche and mainstream Chileans are more field-dependent. Field-dependence is defined as perceiving oneself as an integral part of the surrounding environment, rather than independent from the environment (Witkin, Moore, Goodenough, & Cox, 1977). Cultures that are more field-

dependent tend to be more interpersonally skilled, rely on others, and define their identity from the people surrounding them (Hansen, 1984). For Chileans, involvement with other people may be more important for decision making than making decisions as an individual. Therefore, susceptibility to social pressure may be more important for other field-dependent cultures such as those found in Malaysia and Russia (Kühnen et al., 2001). Because this cultural factor was indirectly related to diet adherence, interventions for type 2 diabetics should focus on beliefs about temptation and social norms surrounding food refusal. Susceptibility to social pressure plays an important role in diet adherence and would contribute to more culturally specific nutritional interventions for type 2 diabetics in Chile, or other field-dependent cultures.

This study also contributed findings specific to Mapuches, a population that is rarely examined across cultural and psychological factors for type 2 diabetes. Findings suggest that interventions addressing susceptibility to social pressure and diet self-efficacy can be generalized across Mapuche and mainstream Chileans for diet adherence interventions. However, more research needs to be conducted on other possible cultural and psychological factors that play a role in diet adherence.

Conclusion and Future Directions

This study highlighted the role of culture and psychology in diet adherence; however, certain limitations are important to discuss. First, data collection was cross-sectional. Hence, caution should be exercised concerning generalization towards other populations as well as making causal inferences based on this study's findings. However, the strong conceptual foundation and similarity between the models conducted

demonstrated that susceptibility to social pressure may function similarly for Mapuche and mainstream Chileans. Future research should examine whether susceptibility to social pressure and diet self-efficacy are consistent over time and throughout the progression of type 2 diabetes. Second, there may be some degree of social acceptability bias due to the use of self-report measures. However, social acceptability bias conceptually overlaps with cultural beliefs regarding susceptibility to social pressure. This may provide further support to the importance of designing culturally specific interventions that also consider the role of psychological factors such as self-efficacy for type 2 diabetics in Chile. Thirdly, this study did not utilize biological measures of adherence such as HbA1c. However, this study did use a reliable and valid measure of diet adherence that examined diet behavior over a month.

The results of this study emerged from a test of theory-based hypotheses and reflected that self-efficacy is a mediating factor for cultural beliefs and diet adherence among Chilean type 2 diabetics. These findings contribute to the body of knowledge that can be used to educate health professionals and type 2 diabetics about the importance of *both* cultural beliefs and self-efficacy regarding diet adherence. Such education efforts may reduce complications that occur among diet non-adherent type 2 diabetics. Efforts to educate people with diabetes on the effects of poor nutritional choices may reduce the diabetes-related health care costs, strain on health care providers, and severe individual health complications.

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APPENDIX A

CULTURAL BELIEFS ABOUT SUSCEPTIBILITY TO SOCIAL PRESSURE

When the diabetic does NOT follow their diet it is because:

1. They are tempted by watching other people consume prohibited food or drinks.
2. It is hard to refuse food or drinks that are offered as a sign of affection.

APPENDIX B

PSYCHOLOGICAL FACTOR: DIET SELF-EFFICACY

How capable do you feel about:

1. Following the suggested diet to control diabetes.
2. Avoiding food that is not part of your diet.
3. Following the diet when others eat food or consume drinks not a part of the diet.
4. Following the diet when at a party with different foods.
5. Following the diet when others insist that you eat other things.
6. Following the diet when you are worried.

Parcel 1

Following the suggested diet to control diabetes/Following the diet when others insist that you eat other things.

Parcel 2

Avoiding food that is not part of your diet/Following the diet when at a party with different foods.

Parcel 3

Following the diet when others eat food or consume drinks not a part of the diet/Following the diet when you are worried.