The Latino Lifestyles Study: Preventing Diabetes Among Latino Adults

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Learning Objectives

1. To examine the associations of ***cultural*** and ***psychological factors***: ***acculturation status, diabetes concerns, dietary behaviors***, and of a key biological risk factor: ***fasting blood glucose levels***, on the ***perceived risk*** of developing ***type 2 diabetes***

2. To explore ***familial barriers*** and ***facilitators*** of ***dietary*** and ***exercise behaviors,*** for preventing the onset of ***type 2 diabetes***

3. To examine personal ***psychological*** and ***cultural familial factors*** as these may affect ***preparedness*** for ***engaging in actions*** to prevent the onset of ***type 2 diabetes***

I

Psychological and Cultural Factors in Diabetes Prevention

Background on Diet and Diabetes Prevention

* In 2000 an estimated ***171 million*** persons had ***diabetes worldwide***. This number is estimated to increase to ***370 million*** by the year 2030 (Wild et al., 2004)

* Conditions that ***promote diabetes*** include the consumption of ***high calories*** and ***high fat foods,*** while practicing an ***inactive lifestyle*** (Schulze & Hu, 2005)

* Ways of ***preventing type 2 diabetes*** include a ***healthy diet, consistent exercise, avoiding tobacco use*** and ***maintaining a healthy weight*** (World Health Organization, 2013)

* Schulze, M. B., & Hu, F. B. (2005). Primary prevention of diabetes: what can be done and how much can be prevented?. *Annual Review of Public Health*, *26*, 445-467.
* World Health Organization. (2013). Diabetes fact sheet. http://www.who.int/mediacentre/factsheets/fs312/en/index.html
* Wild S, Roglic G, Green A, Sicree R, King H. (2004). Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care* 27, 1047–1053

Background on Diabetes, Obesity and Latinos

* Generally, Latinos have a ***1 in 2*** chance of developing type 2 diabetes (World Health Organization, 2013)

* ***Obesity*** is the strongest ***risk factor*** for ***type 2 diabetes*** (Schulze & Hu, 2005)

* In 2010, Latinos were ***1.2 times*** as likely to be ***obese*** when compared with non-Hispanic Whites (U.S. Department of Health and Human Services, 2012)

* World Health Organization. (2013). Diabetes fact sheet. http://www.who.int/mediacentre/factsheets/fs312/en/index.html
* U.S. Department of Health and Human Services. (2012). Obesity and Hispanic Americans. http://minorityhealth.hhs.gov/templates/content.aspx?ID=6459

Background on Cultural Factors

* Among Latinos, ***cultural factors*** that can ***motivate health decisions*** include ***level of acculturation***, ***machismo, fatalismo*** (a sense of ***fatalism***) and ***susto*** (a folk belief that ***anxiety*** or ***stress*** cause disease or illness (Caballero, 2011)

* Among Latinos, there exist conflicting findings regarding the effects of ***level of acculturation*** on ***health decisions*** and ***health behaviors*** (Lara, Gamboa, Kahramanian, Morales, Hayes Bautista, 2006)

* Caballero, A. E. (2011). Understanding the Hispanic/Latino patient. *The American Journal of Medicine*, *124* (10), S10-S15.
* Lara M, Gamboa C, Kahramanian MI, Morales LS, Hayes Bautista DE.(2005). Acculturation and Latino Health in the United States: a review of the literature and its sociopolitical context. *Annual Review of Public Health, 26*, 367–397.

Preventing Type 2 Diabetes

* *"**Obesity** is the strongest **risk factor** for **diabetes**, and maintenance of a **healthy weight** by **avoiding energy overconsumption** and engaging in **regular physical activity** is clearly the key to **diabetes prevention**."* (Shulze & Hu, 2005, p. 459)

* *"A **healthy diet** together with **regular physical activity**, maintenance of a **healthy body weight**, consumption of **moderate amounts of alcohol**, and **avoidance of sedentary behaviors** and **smoking**, is likely to **prevent** most **type 2 diabetes** cases."* (Shulze & Hu, 2005, p. 459)

* Schulze, M. B. & Hu, F. B. (2005). Primary prevention of diabetes: What can be done and how much can be prevented? *Annual Review of Public Health, 26,* 445-467.

II

Acculturation and Cultural Change

The Process of Acculturation

* At the level of the ***person*** or of the ***cultural group***, ***acculturation*** refers to the ***process of cultural change*** upon entry into a new ***cultural environment***

* For Spanish-speaking Latino and Latina immigrants, ***acculturation change*** involves acquiring aspects of the ***American culture***, that include:
  * ***English-language*** acquisition and mastery
  * Changes towards adopting ***American values***, ***beliefs*** and ***behaviors***, and
    * These include ***dietary*** and other ***lifestyle changes***, both ***healthy*** and ***unhealthy***

Fig. 1 - Model of the Acculturation Process

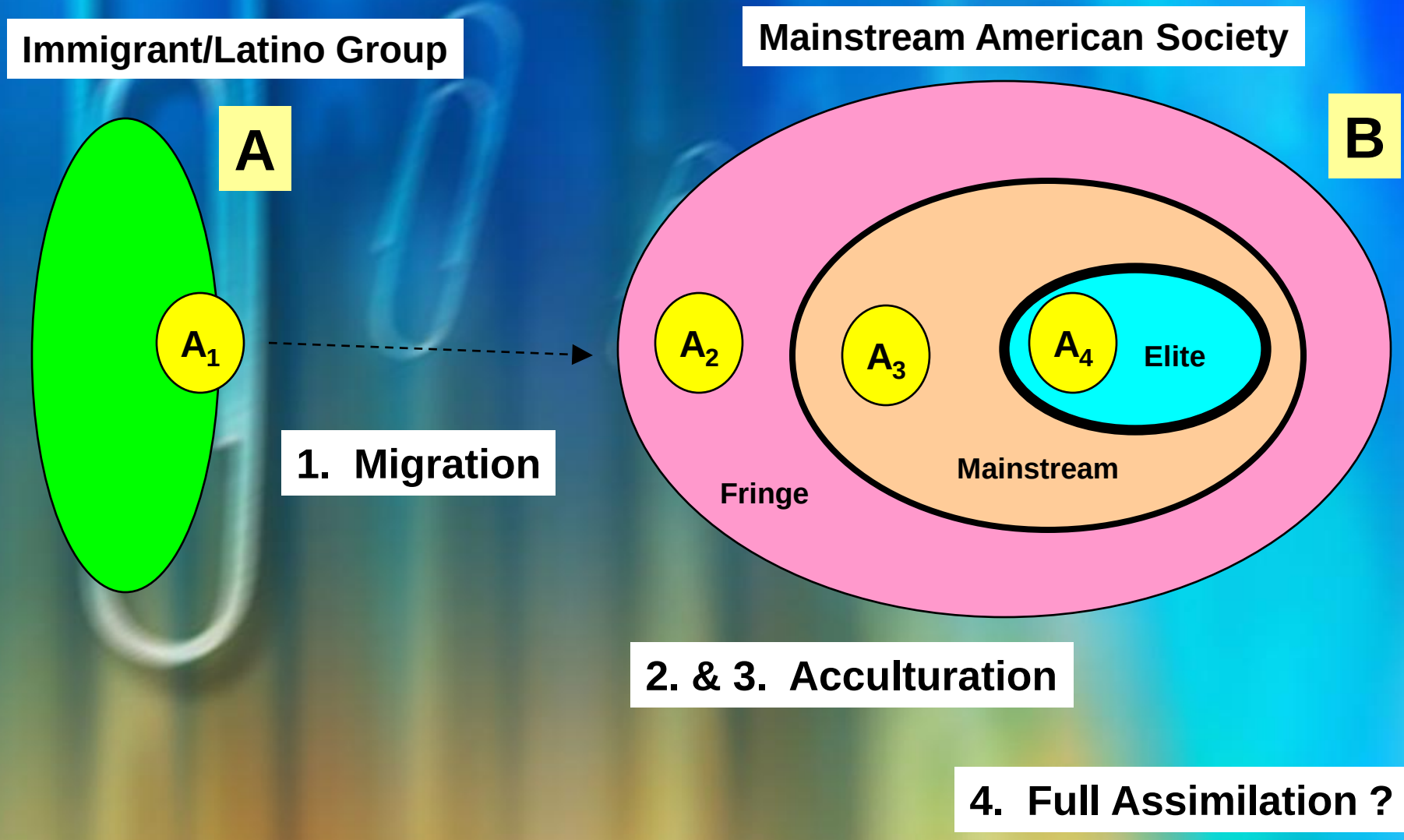
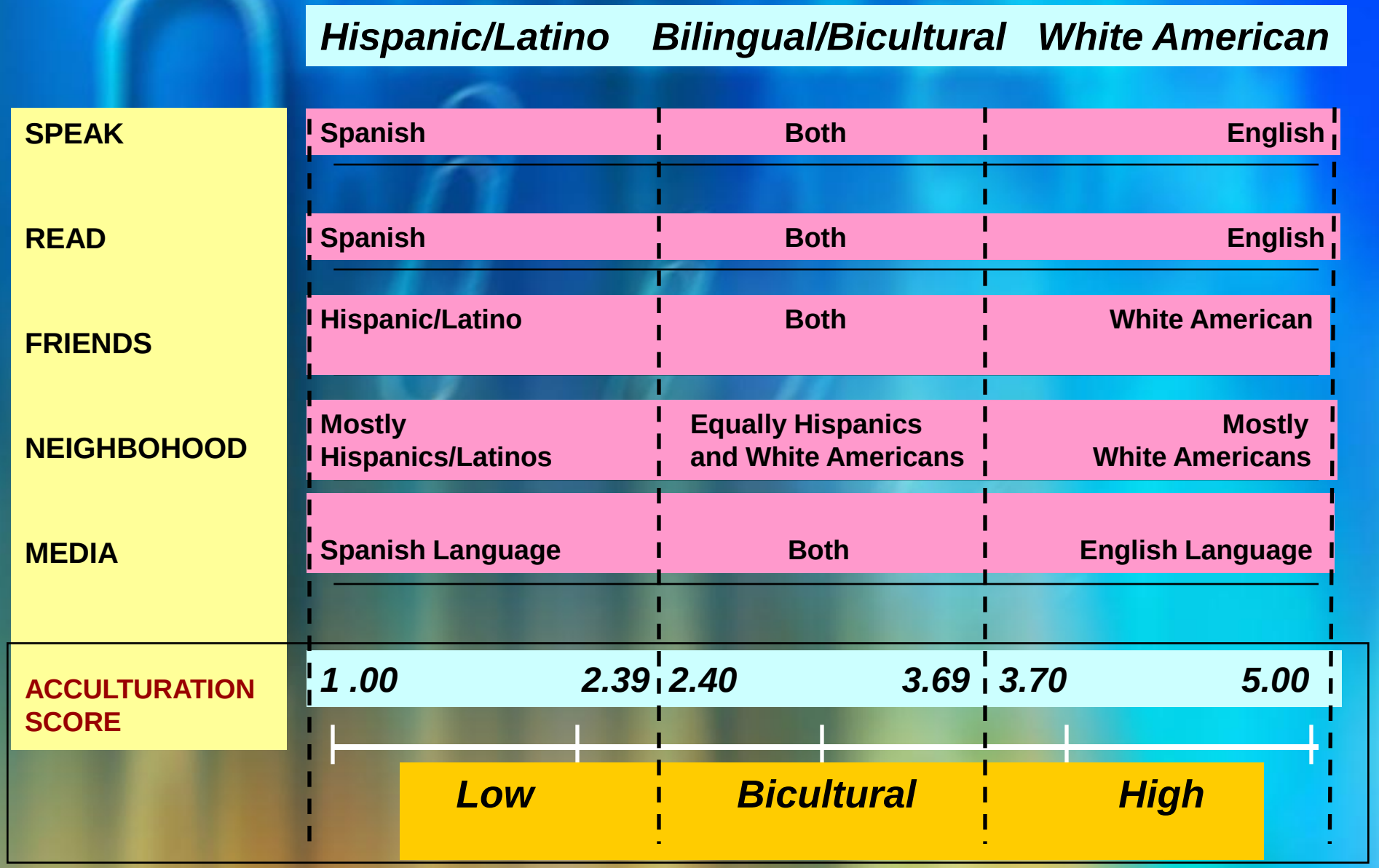


Fig. 2 - Acculturation Framework & Measurement



III

Prevention of Type 2 Diabetes

Perceived Risk and Diabetes in Latinos

* Changes in ***dietary*** and ***exercise behaviors*** likely occur at ***high*** levels of ***risk knowledge*** and ***low*** levels of ***optimistic bias*** (Shreck, Gonzalez, Cohen, & Walker, 2013) (and perhaps also under ***high*** levels of ***diabetes concern***)

- Even with prior knowledge of ***type 2 diabetes*** and ***knowledge*** of existing ***risk factors***, the ***perceived risk*** of developing type 2 diabetes is often ***low*** (Adriaanse, et al., 2003)

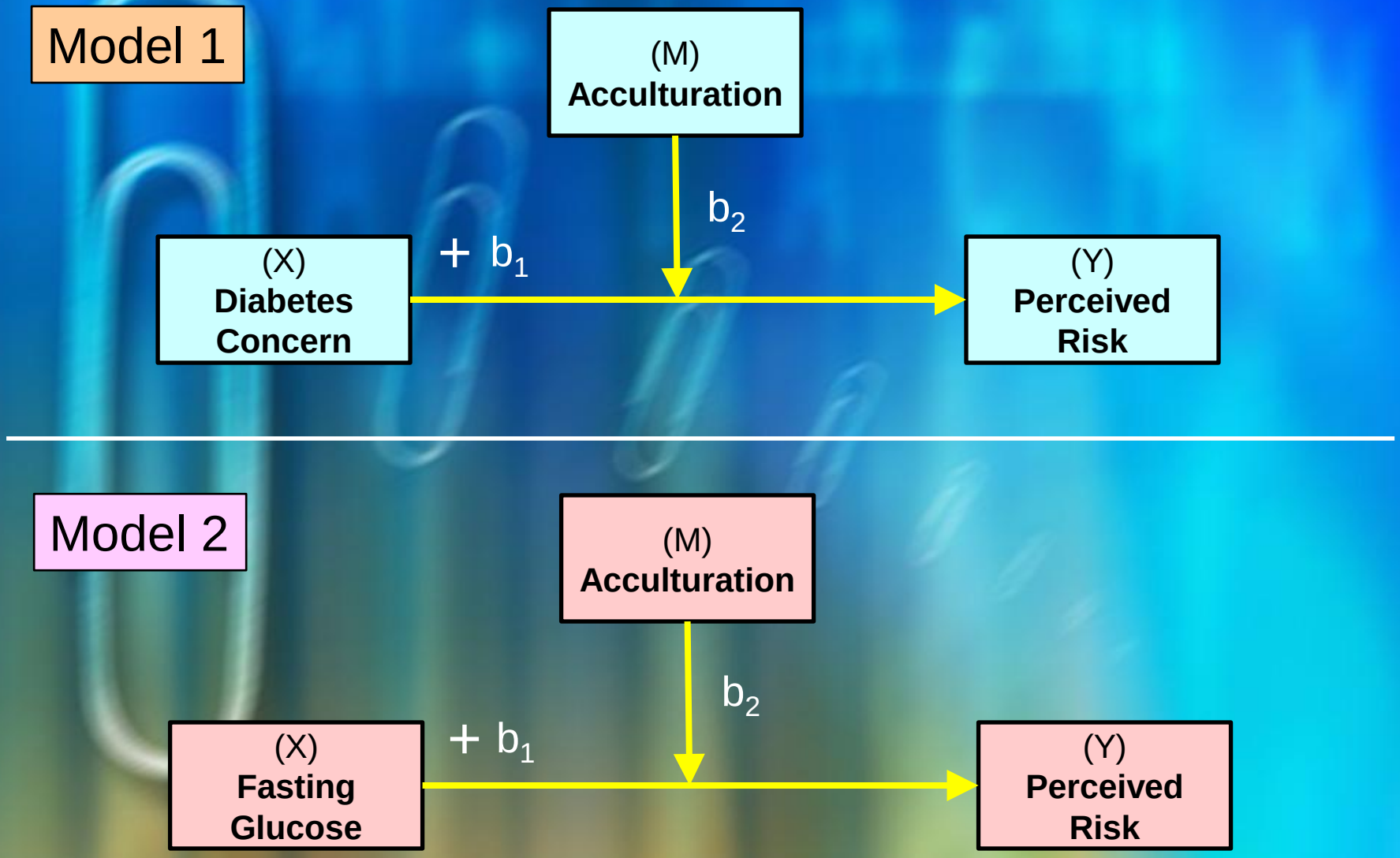
* Shreck, Gonzalez, Cohen, & Walker. (2013). Risk Perception and Self-Management in Urban, Diverse Adults with Type 2 Diabetes: The Improving Diabetes Outcomes Study. *International journal of behavioral medicine*, 1-11.
* Adriaanse, Snoek, Dekker, Spijkerman, Nijpels, Van der Ploeg, & Heine.(2003). Perceived risk for Type 2 diabetes in participants in a stepwise population-screening programme. Diabetic *Medicine*, *20*(3), 210-215.

Hypotheses

* ***H1*** - ***Diabetes concern*** will be ***positively correlated*** with the ***perceived risk*** of developing ***type 2 diabetes***. This relationship will be ***moderated*** by level of ***acculturation***

* ***H2*** - ***Fasting glucose*** will be ***positively associated*** with ***perceived risk*** of developing type 2 diabetes. This relationship will also be ***moderated*** by level of ***acculturation***

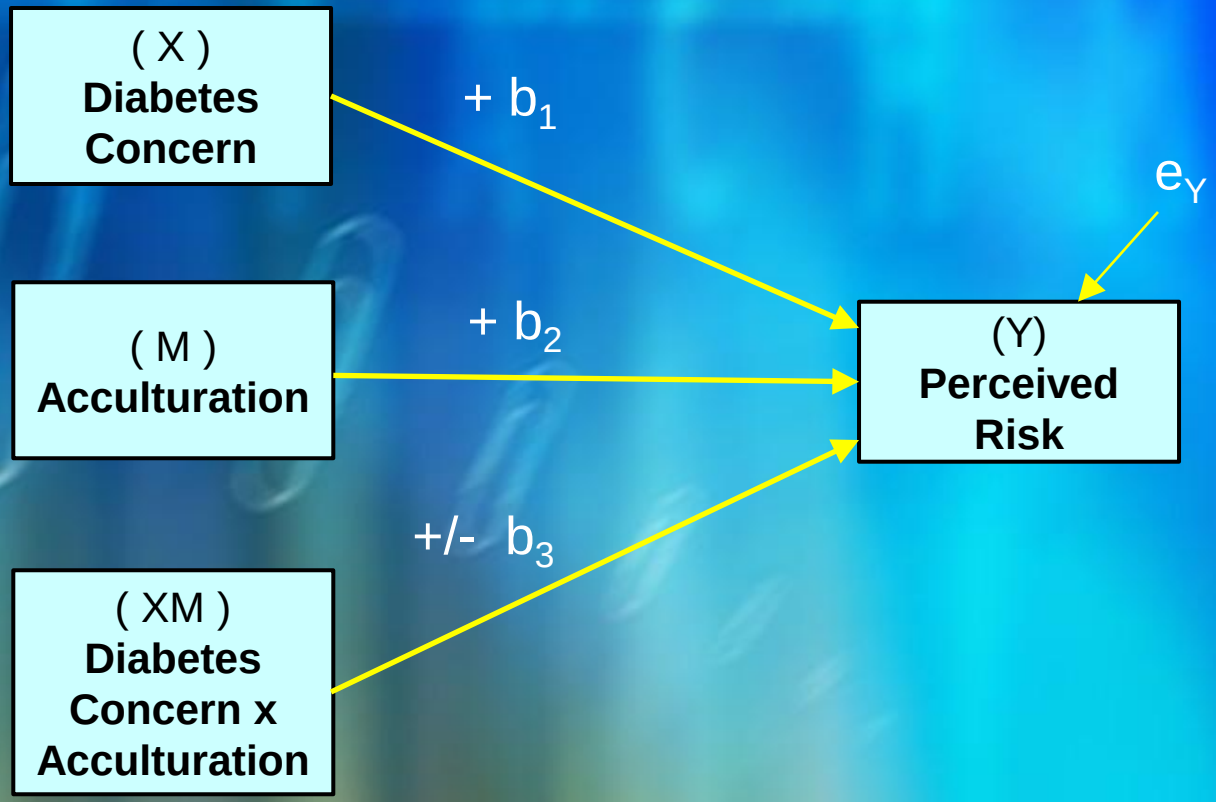
Fig. 3 - *Conceptual* Models: Predictors of *Perceived Risk*



Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford.

Fig. 4 - ***Statistical*** Models: Predictors of ***Perceived Risk***

Model 1

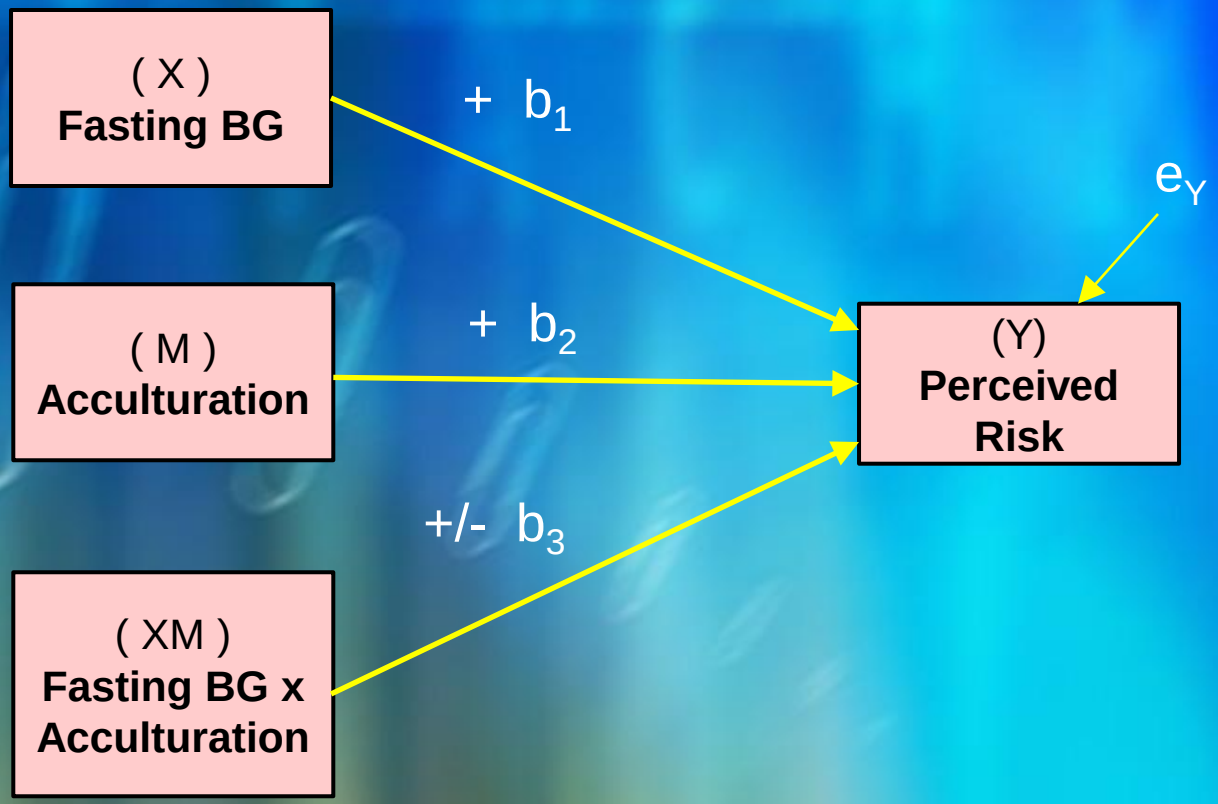


$$Y = i_1 + b_1 X + b_2 X + b_3 XM + e_Y$$

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford.

Fig. 5 - *Statistical* Models: Predictors of *Perceived Risk*

Model 2



$$Y = i_1 + b_1 X + b_2 X + b_3 XM + e_Y$$

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford.

What These Models will Test

* ***H1*** - For ***Model 1***, we ***hypothesize*** that ***greater diabetes concern*** will prompt (***predict***) higher ***perceived risk*** of developing type 2 diabetes. However, the strength of this association will be modified (***moderated)*** by levels of ***acculturation***

* ***H2*** - For ***Model 2***, we ***hypothesize*** that higher ***fasting blood glucose*** will prompt ***higher perceived risk*** of developing type 2 diabetes. The strength of this relationship will also be moderated by levels of ***acculturation***

IV

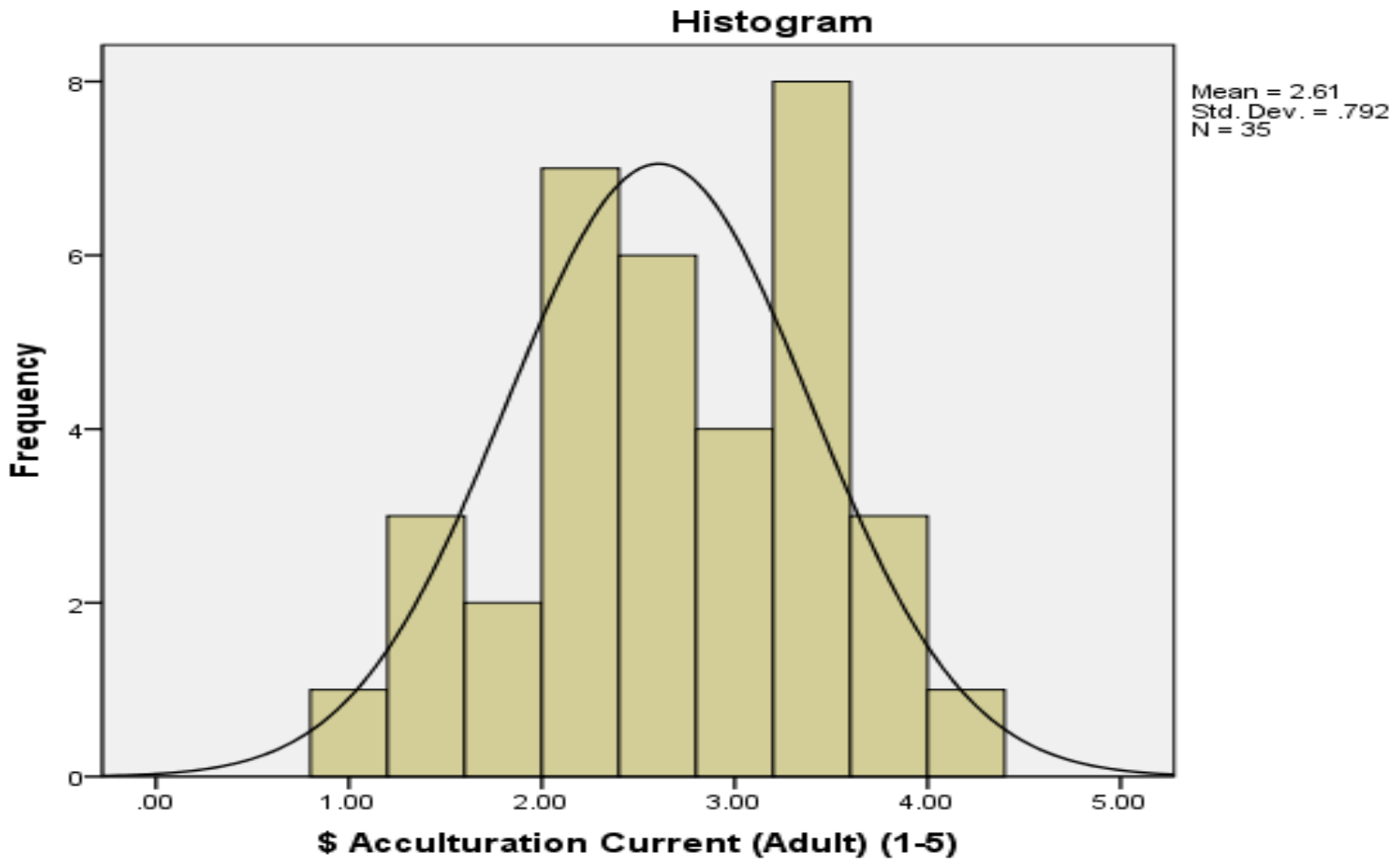
Lifestyle Factors and Measures in the Latino Lifestyles Study

Table 1 - Sample Demographics

Latino Pre-Diabetic Males and Females (N= 35)					
	Freq	**%**	**Mean**	**SD**	**(Min, Max)**
Age	---	---	37.57	11.194	(22 to 65)
Level of Acculturation	---	---	2.58	.791	(1.00 to 4.20)
Education	---	---	3.69	1.508	(1 to 7)
* 1= < 9th grade	1	2.9	---	---	---
* 2= 9th-11th	8	22.9	---	---	---
* 3=Completed High School	10	28.6	---	---	---
* 4=Some College	2	5.7	---	---	---
* 5=Complete College	10	28.6	---	---	---
* 6=Some Grad training	3	8.6	---	---	---
* 7=Complete Grad Degree	1	2.9	---	---	---
Income	---	---	8.03	4.246 ($8,000 - 11,000)	1(<$4,000) to 16 ($90,000 - $119,999)

Fig. 6 - Distribution of Acculturation Scores

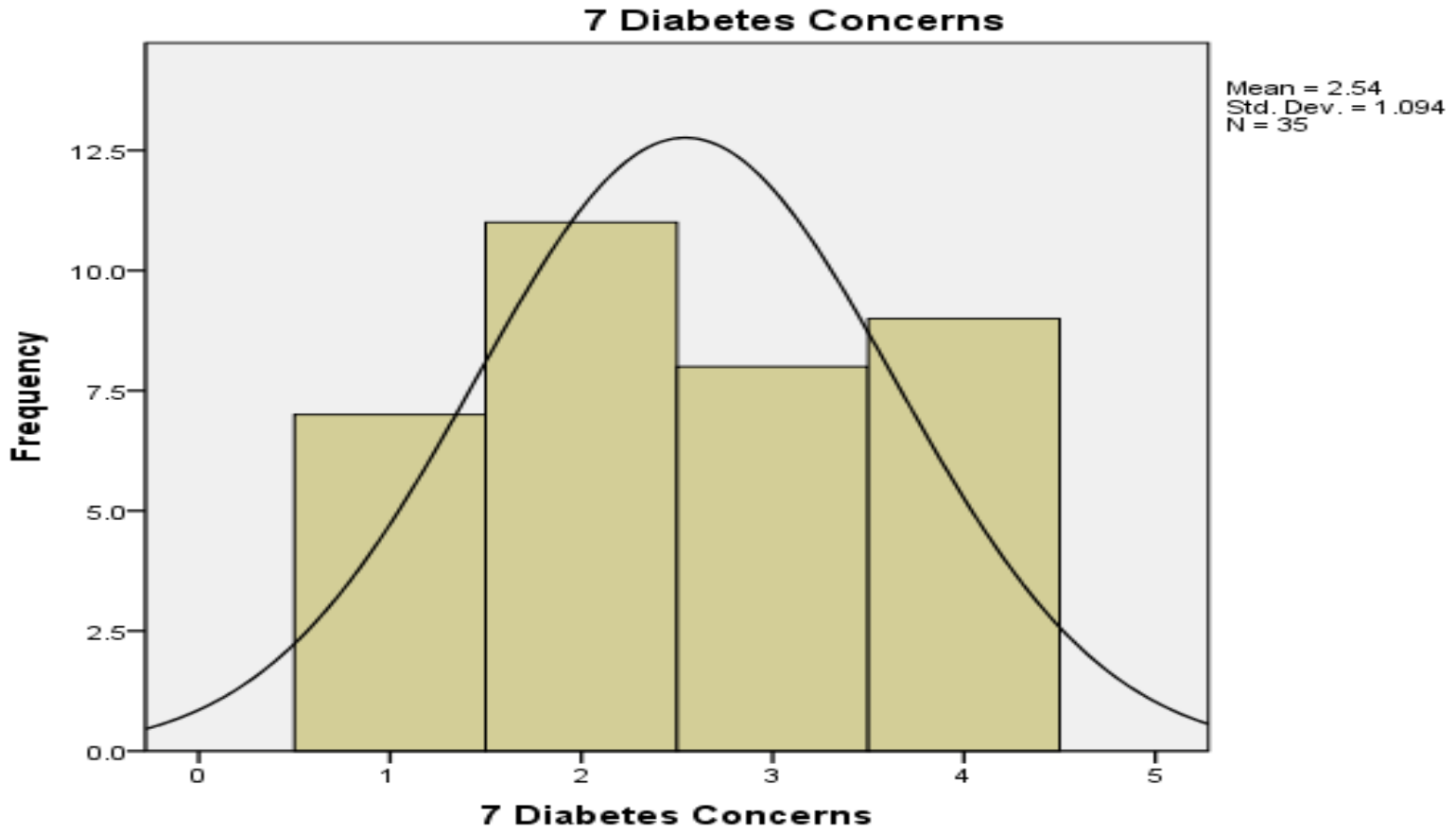
Self-reported scores from the 5-point Acculturation Scale



Low (n=13) (1.00 to 2.39)	**Bicultural** (n=22) (2.40 to 4.20)	**High** (n=0) (No Cases)

Fig. 7 - Distribution of Diabetes Concern

Diabetes Concern as rated by the interviewer in their post-interview report



1= ***No concern***
2= ***Low concern*** **–** minor concerns expressed
3= ***Moderate concern*** **–** some concerns expressed
4= ***High concerns*** **–** expressed several concerns
5= ***Excessive concerns*** **–** expressed great concerns and fears

Fig. 8 - Distribution of Fasting Blood Glucose Values

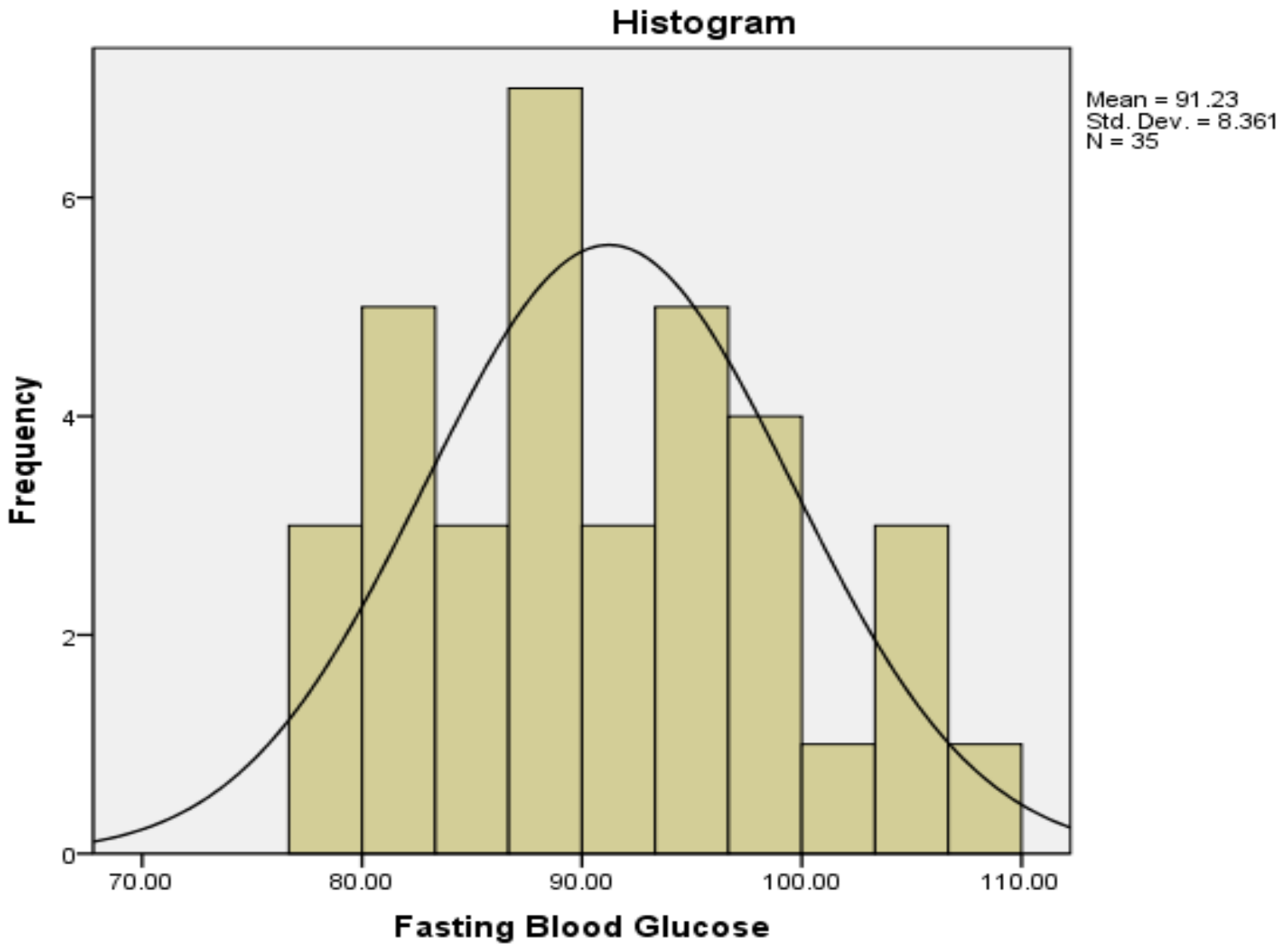
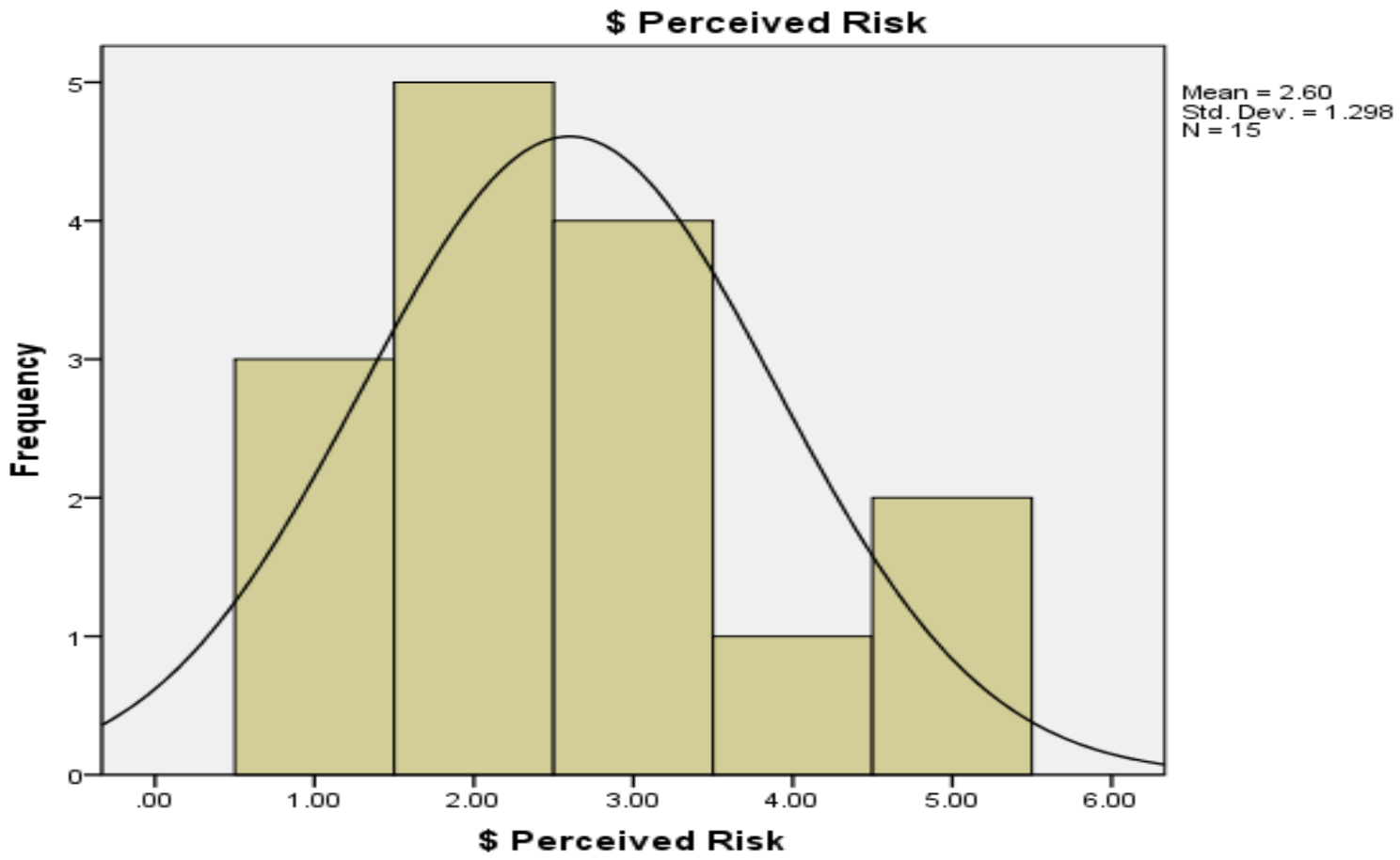


Fig. 9 - Perceived Risk of Developing Type 2 Diabetes in the Next Five Years



(1)	0%	***None.*** This won't happen!
(2)	10%	***Very little.*** It is possible, but not likely.
(3)	25%	***A bit.*** A small chance that it will happen.
(4)	50%	***Equally likely as not.*** About the same chance of happening than not.
(5)	75%	***More likely.*** More likely to happen than not.
(6)	90%	***Almost surely.*** Very likely to happen.
(7)	100%	***Absolutely or already diabetic.*** A physician has made the diagnosis.

Table 2 - *Perceived Risk* of Developing Type 2 Diabetes

Perceived 5-Year Risk

		Freq	Percent	Valid %	Cum %
1	None - 0%	9	25.7	25.7	25.7
2	Very little - 10%	9	25.7	25.7	51.4
3	A bit - 25%	7	20.0	20.0	71.4
4	Equally likely - 50%	4	11.4	11.4	82.9
5	More likely - 75%	5	14.3	14.3	97.1
6	Almost surely - 90%	1	2.9	2.9	100.0
	Total	35		100.0	100.0

V

Approach, Method & Model Analysis Plans

Major Research Questions

* Is the there a significant ***correlation*** for:
  * ***Diabetes Concern*** (Model 1) (***predictor 1***), with ***Perceived Risk*** (***outcome***) of developing ***Type 2 Diabetes***?
  * Is this association modified by ***Acculturation*** (a ***moderator***); is ***cultural involvement*** a factor?

* Stated alternately,
  * Is the effect of ***Diabetes Concern*** on ***Perceived Risk*** of ***developing type 2 diabetes***, different for ***two subgroups of Latinos*** (***low acculturated*** and ***bicultural***), who differ in their levels of ***Acculturation***?
  * Does this overall effect occur similarly for the variable of ***Fasting Blood Glucose***?

Study and Sample

* Conducted an ***Integrative Mixed Methods*** (Castro, Kellison, Boyd & Kopak, 2010) ***(QUAL + QUAN)*** study of factors that affect ***motivation to prevent*** the onset of ***type 2 diabetes*** among ***adult Hispanics*** (Latinos and Latinas) who are ***at-risk*** of developing type 2 diabetes?

* A ***purposive sample*** with factorial ***balanced sampling frame*** to obtain a diverse sample in the domains of:
  1. ***Gender*** (males, females)
  2. ***Age Group*** (under 40 years old, 40 and over
  3. ***Community*** (local community, university community)

Castro, F. G., Kellison, J. G., Boyd, S. & Kopak, A. (2010). A methodology for conducting integrative mixed methods research and data analyses. *Journal of Mixed Methods Research, 4* (4), 342-360.

Study and Sample

* Re-contacted and consented participants ***previously enrolled*** in a large diabetes study. Participants were from the ***Maricopa County Diabetes Registry*** (greater Phoenix area of Arizona)
  * Entry criteria: ***fasting blood glucose*** – ***FBC < 110 mg/dl***
* Recruited 36 cases, but one had FBC > 110 so final sample consisted of 35 cases
* Conducted ***in-depth audio-recorded interviews***
  1. ***"Your Health: A Chat"*** (Una Platica) (qualitative, open-ended ***focus questions***
  2. ***"You and Your Health – Lifestyle Interview"*** (quantitative, closed ended, numeric data

Data Analysis Plan

1. ***Descriptive analysis*** of key variable
2. Examination of ***psychometric properties*** of items and scales
3. ***Thematic analysis*** of ***text narratives*** for responses to ***focus questions*** on:
   * ***Your Own Diet*** – *"What **barriers** if any, do you encounter that make it hard for you to eat healthy foods?"*
   * ***Family and Lifestyle*** – *"Who in your family **helps you** to eat a healthy diet?"*
4. ***Multiple regression model analyses*** to test ***acculturation***-related ***moderator effects***

VI

Results

VI- A

Qualitative Narratives: Familial Influences On Healthy Eating

Dietary Behaviors Pertaining to Location and Price

* *"**Healthy food** is **expensive**, and people don't take the **time** needed in order to **cook healthy food**."* (D105)

* *"The **meat** here (in the USA) is unhealthy. Good **quality meat** here is **expensive**. I buy my food in Sonora and it's **cheaper** and it's better quality."* (D107)

Family and Dietary Behaviors

* *"As a family we're used to a **different kind of diet**. Making the **change is hard** and [family members are] **not motivated to change** since they **don't feel at risk**. I ration their **intake of sweets** and I give them [the sweets] early on in the day so that they can **burn the calories**. I talk to them and explain to them **what diabetes is** so that they can **understand why** they need to **change their diet and habits**."* (D114)

* *"Our **customs**, the way we were raised, our **culture** [the Mexican culture] doesn't take the **time to explain** to us **what's healthy**. My mom would cook and we'd eat it, but **she never taught us** how to eat a **balanced diet**. And now it's **hard to stop** eating what we're **used to eat**. It **can be done though**."* (D113)

Barriers to Healthy Eating

* *"**No one** [helps me in **eating healthy**], it's just me and my kids. I cook and I plan the meals."* (D113)

* *"**My wife** can help me. I **just have to ask her** to cook certain foods in a certain way."* (D106)

* *"I have **loads of barriers**. **TIME**. I may eat until 3 pm and **I eat too much**. I end up eating **processed foods** because that's what [is] **closest to me**."* (D117)

Emergent Themes from Participant Narratives

* ***Cost***, ***cultural customs*** and ***personal preferences*** influence the ***choice of foods*** consumed

* ***Low perceived risk*** is associated with ***low motivation*** for ***healthy behavior change***; ***change is difficult***

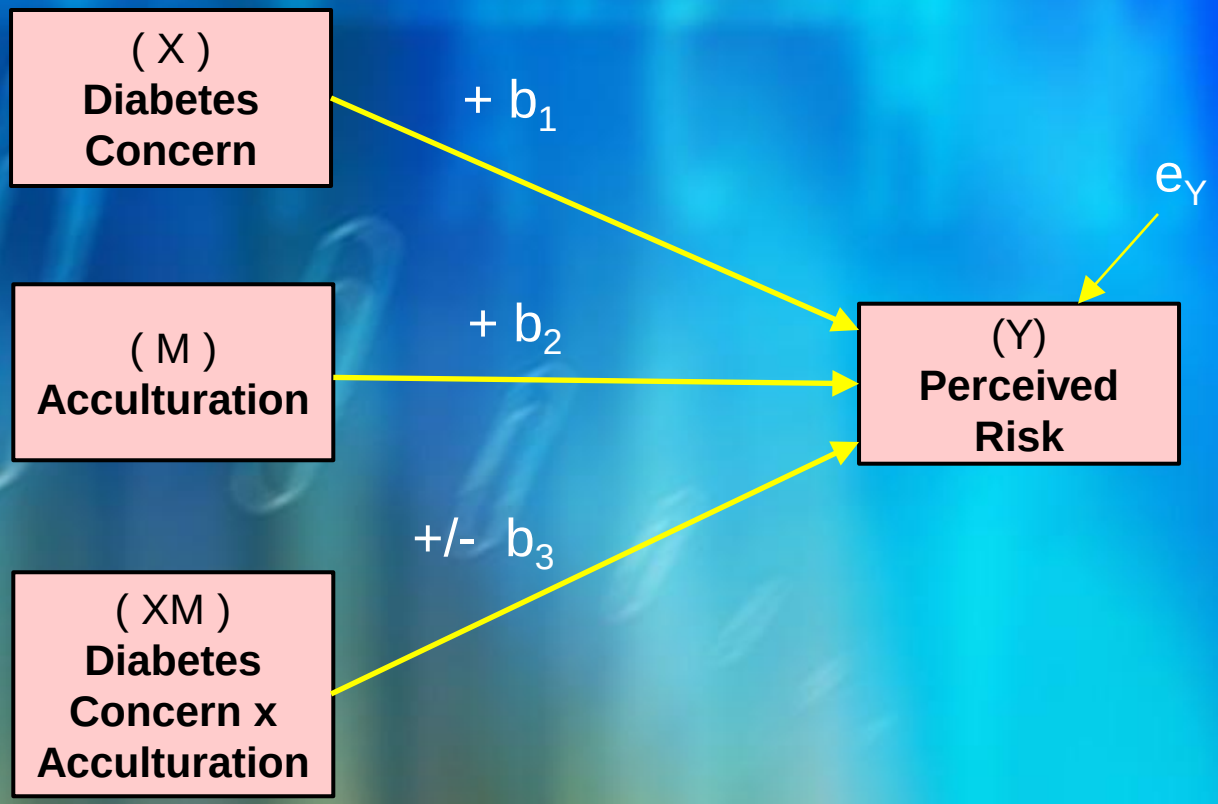
* Some persons have ***no one to help*** them in their efforts at ***healthy behavior change***; other face ***many barriers*** that ***impede healthy behavior change***

VI- B

Quantitative Model Testing: Results & Analysis

Fig. 10 - *Statistical* Models: Predictors of ***Perceived Risk***

Models 1



$$Y = i_1 + b_1 X + b_2 X + b_3 XM + e_Y$$

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford.

Table 3 - Results for Model # 1

	Perceived Risk			
Predictor	**Δ R^2**	**β**	**t**	**sig.**
Step 1	**.312**			
• **Diabetes Concerns**		**.541 *****	**3.67**	**.001**
• **Acculturation**		**.098**	**0.67**	**.510**
Step 2	**.055**			
• **Diabetes Concerns**		**.498 ****	**3.41**	**.002**
• **Acculturation**		**.077**	**0.53**	**.598**
• **Diabetes Concerns x Acculturation**		**-.241 +**	**-1.65**	**.109**
Total R^2	**.368**			
N	**35**			

+ p = .10. * p < .05. ** p < .01. *** p < .001.

Final Model: F (3, 31) = 6.01, p= .002.

Fig. 11 - Effect of ***Diabetes Concern*** on ***Perceived Risk of Diabetes***, Moderated by ***Levels of Acculturation***

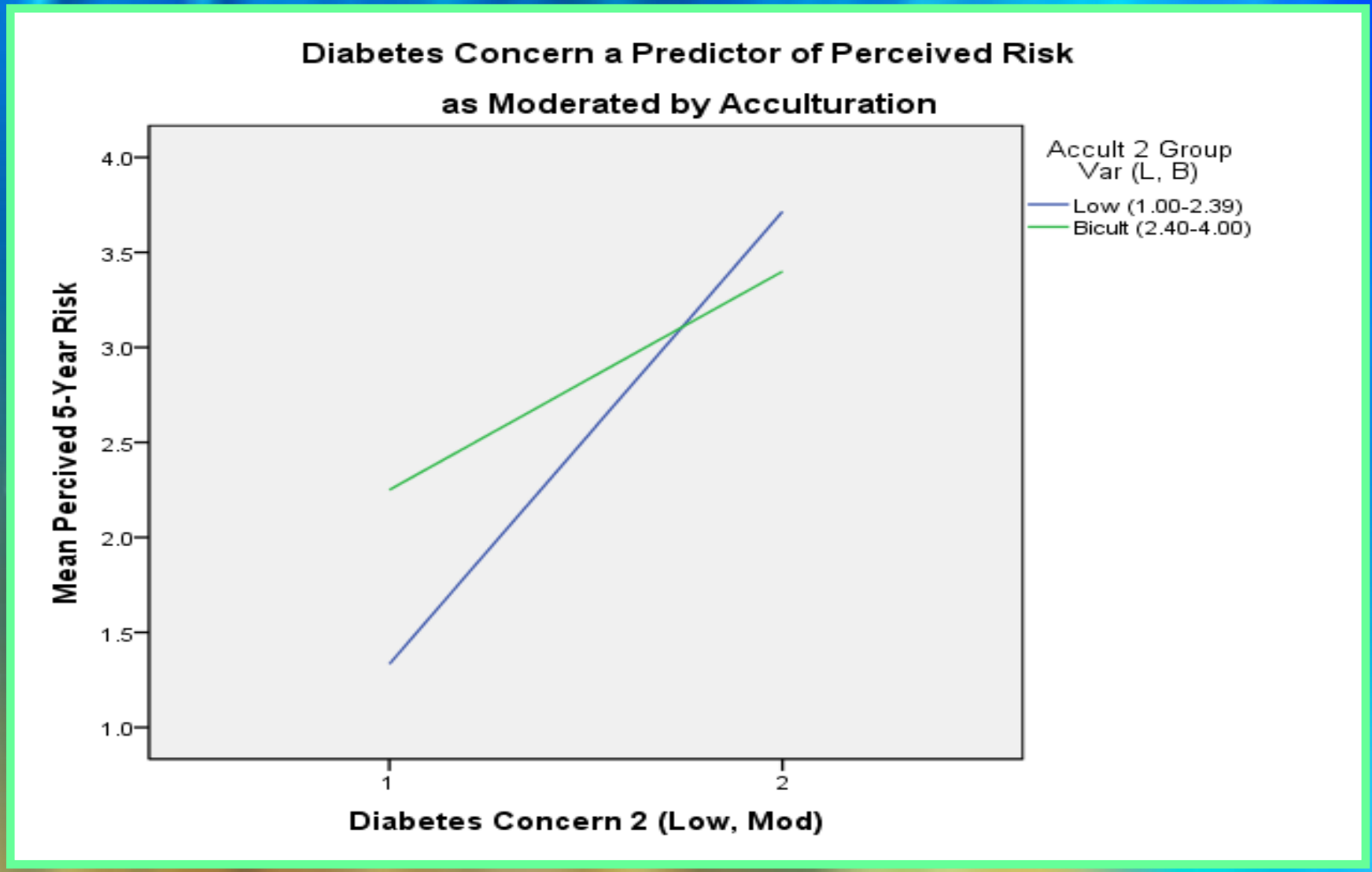
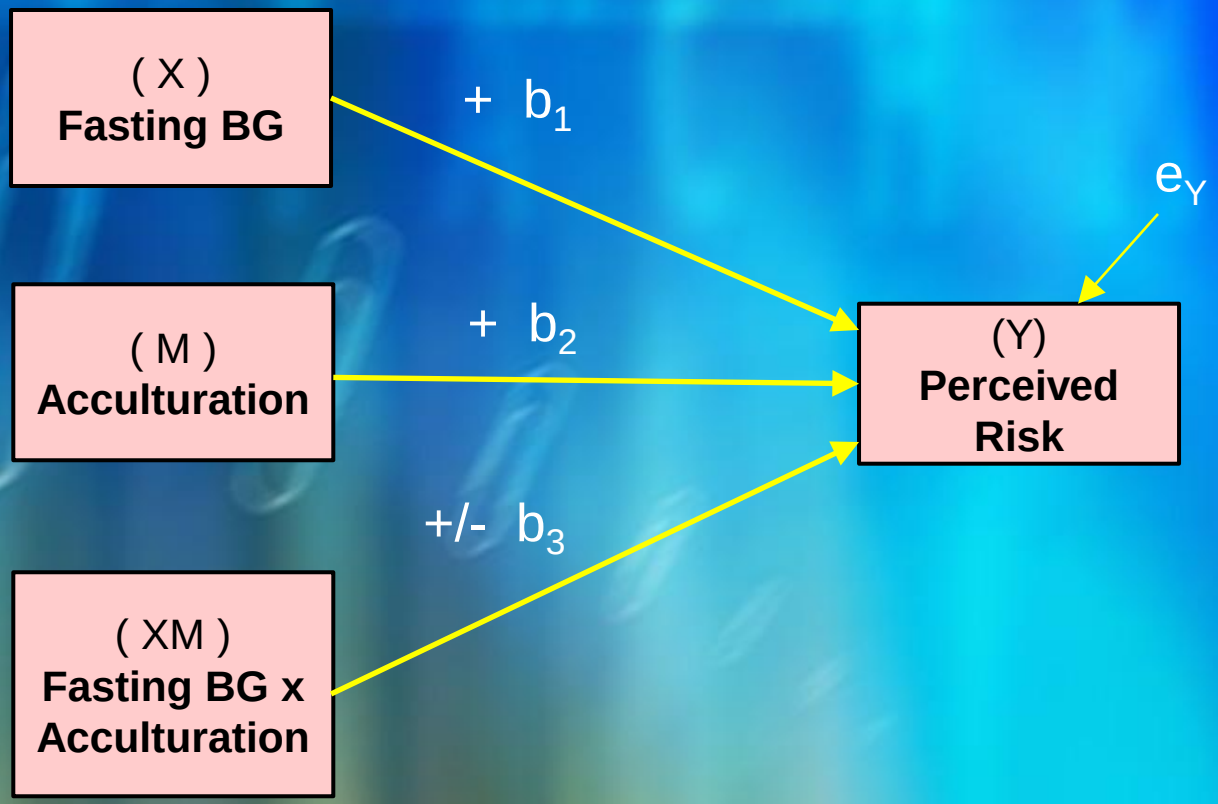


Fig. 12 - ***Statistical*** Models: Predictors of ***Perceived Risk***

Model 2



$$Y = i_1 + b_1 X + b_2 X + b_3 XM + e_Y$$

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford.

Table 4 - Results for Model # 2

	Perceived Risk			
Predictor	**Δ R^2**	**β**	**t**	**sig.**
Step 1	**.072**			
• **Fasting Blood Glucose**		**.331+**	**1.95**	**.060**
• **Acculturation**		**.078**	**0.46**	**.649**
Step 2	**.044**			
• **Fasting Blood Glucose**		**.336+**	**1.93**	**.062**
• **Acculturation**		**.085**	**0.48**	**.633**
• **Fasting Blood Glucose x Acculturation**		**.035**	**0.20**	**.840**
Total R^2	**.128**			
N	**35**			

+ p = .10. * p < .05. ** p < .01. *** p < .001.

Final Model: F (3, 31) = 1.52, p= .229.

Summary of Major Results

1. In support of ***Hypothesis 1***, ***diabetes concern*** about developing diabetes in the next five years was a ***predictor*** of ***perceived risk*** of developing diabetes
2. Its effect appears ***moderated*** by ***acculturation***, whereby this effect is ***stronger*** among ***low-acculturated Latinos***, relative to the ***bicultural Latinos***
3. However, the ***absolute levels*** of ***diabetes concern*** solely range from ***low*** to ***moderate***
4. ***Fasting blood glucose*** levels may be a ***weak predictor*** of ***perceived risk***
5. However, ***acculturation*** is <u>not</u> a ***moderator*** of this effect
6. There was <u>no</u> or limited support for ***Hypothesis 2***

Limitations and Major Conclusions

* The ***major limitation*** is the ***small sized sample*** (n= 35)

* ***Perceived risk*** of ***developing type 2 diabetes*** is a significant but ***minor source*** of ***health motivation***, although other more ***proximal*** and ***salient factors*** may exert ***stronger*** and ***direct effects***

* ***More salient*** and ***rewarding factors*** are likely to exert stronger effects, e.g., ***social support*** in the form of ***encouragement*** from a ***family member***, ***friend***, or ***health professional***

VII

Exploring Associations for Future Analyses

Table 5 – Correlations among Key Variables in the Latino Lifestyles Study

Factor	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	---												
2. Gender	.009	---											
3. Acculturation	-.166	-.204	---										
4. Health Motivation	.026	.118	.001	---									
5. Perceived Risk	.075	.07	.128	-.213	---								
6. Resilience (Self-Report)	.279	.163	.246	.499[b]	-.211	---							
7. Resilience (Clinical Rating)	.218	.095	.369[a]	.303	.004	.501[b]	---						
8. Diabetes Awareness	.268	.111	.433[b]	.262	.024	.338[a]	.772[b]	---					
9. Diabetes Concerns	-.019	-.147	.060	-.134	.550[b]	-.242	-.354[a]	-.232	---				
10. BMI	.025	.349[a]	.035	-.176	.148	.042	-.087	-.057	.264	---			
11. Fasting Blood Glucose	.208	.064	.178	-.079	.348[a]	.227	.100	.104	.341[a]	.129	---		
12. 2-Hour Blood Glucose	.291[a]	.230	-.430[b]	-.107	.233	-.038	.014	.039	.194	.074	.442[b]	---	
13. HbA1c	.414[b]	.288[a]	-.497[b]	.400	-.173	.319[a]	.112	-.015	-.106	.229	.029	.416[b]	---

[a] p < .05, [b] < .01, [c] <.001. For Gender, 1= Male, 2= Female.

For Future Study: Significant Correlations and Future Directions

* Greater ***age*** – higher ***2-hour blood glucose*** and ***HbA1c***
* Being a ***Latino woman*** - higher ***BMI*** and ***HbA1c***
* Higher ***acculturation*** – higher ***resilience***, ***diabetes awareness***, lower ***2-hour glucose***, ***HbA1c***
* Higher ***health motivation*** – higher ***resilience***
* Higher ***perceived risk*** – higher ***diabetes concern***, ***fasting blood glucose***
* Higher ***resilience*** (self-reported) – higher ***diabetes awareness***, ***HbA1c***
* Higher ***resilience*** (clinical ratings) – higher ***diabetes awareness***, ***diabetes concern***
* Higher ***diabetes concern*** – higher ***fasting blood glucose***
* Higher ***fasting blood glucose*** – higher ***2-hour blood glucose***
* Higher ***2-hour blood glucose*** – higher ***HbA1c***

For Future Study: Platica Sections

I. Your Health Habits

A. Diet in General

* Foods you should eat for a “healthy diet”
* Latino/Mexican foods that are healthy or unhealthy

B. Your Own Diet

* Foods you consume to eat healthy; how often?
* Barriers to eating healthy

C. Exercise in General

* What makes a person fit?
* Best exercises for fitness

D. Your Exercise Behaviors

* Exercises you do to be fit; how often?
* Barriers to exercise and fitness

For Future Study: Platica Sections

II. **Family Influences**
   * Family members who ***help you eat healthy***; how?
   * Family member who ***helps you be physically fit***; how?

III. **Preventing Diabetes**
   * What do you ***believe causes diabetes***?
   * Your ***perceived risks*** of developing type 2 diabetes in the next five years
     (Perceived risk: 1= None (0%) to 7= Absolutely (100%)
   * ***Beliefs***: That "causes" you to have this ***level of risk***
   * ***Feelings***: How do you ***feel about*** this level of risk
   * ***Behaviors***: What have you done in the past 6 months to ***reduce your risks*** of ***developing diabetes***?

IV. **A Diabetes Prevention Program**
   * What ***would you like*** in ***such a prevention program***?

VIII

Discussion