University of Massachusetts Medical School

eScholarship@UMMS

Language Proficiency, Citizenship, and Food Insecurity among Predominantly Immigrant Caribbean Latinos in Massachusetts: A Masters Thesis

Tariana V. Little
University of Massachusetts Medical School

Let us know how access to this document benefits you.

LANGUAGE PROFICIENCY, CITIZENSHIP, AND FOOD INSECURITY AMONG

PREDOMINANTLY IMMIGRANT CARIBBEAN LATINOS IN MASSACHUSETTS

A Masters Thesis Presented

By

Tariana V. Little, BA

Submitted to the Faculty of the

University of Massachusetts Graduate School of Biomedical Sciences, Worcester

in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

April 30, 2015

CLINICAL INVESTIGATION

LANGUAGE PROFICIENCY, CITIZENSHIP, AND FOOD INSECURITY AMONG PREDOMINANTLY IMMIGRANT
CARIBBEAN LATINOS IN MASSACHUSETTS

A Masters Thesis Presented

By

Tariana V. Little, BA

The signatures of the Master's Thesis Committee signify completion and approval as to style and
content of the Thesis

Kate Lapane, Chair of Committee
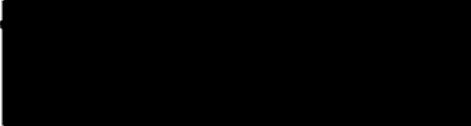
William Jesdale, Member of Committee
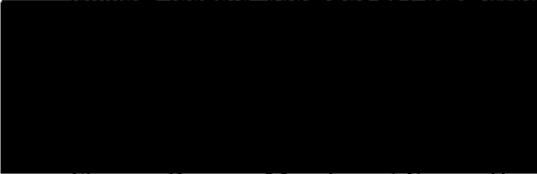
Sharina Person, Member of Committee

Jane Saczynski, Member of Committee

The signature of the Dean of the Graduate School of Biomedical Sciences signifies that the student has
met all master's degree graduation requirements of the school.

Anthony Carruthers, Ph.D.
Dean of the Graduate School of Biomedical Sciences

MSCI Program
April 23, 2015

DEDICATION

This thesis reflects my research interests and familial experiences. I dedicate this work to immigrants everywhere, specifically to: my mother (Mamí) Santa Montes De Oca, my first teacher in justice and fairness; my grandmother Ana (Vela) Cassó for bravely uprooting her children from the Dominican Republic to an uncertain future in the United States; my deceased stepfather (Papí) Raul Garcia; my deceased aunt Jocelyn Montes De Oca; my father Jan C. Little; my life partner Jonas Meyer; and my uncle (Papí) William Cassó for fatherly love and introducing me to the wisdom of Roman philosopher Seneca: "we learn not in school, but in life". I also dedicate this work to my sisters Gloriana and Tatiana Garcia for allowing me to be their role model; my second set of parents, Liz and Gary Little; and Ester, Idalí, Lorna, and many other educators for seeing in me what could and shall be. *This achievement is for and because of you.*

ACKNOWLEDGEMENTS

ABSTRACT

BACKGROUND: Latinos report higher food insecurity than the national average, and food insecurity has been associated with adverse health outcomes wherein Latinos experience disparities. This study quantified the independent effects of language-speaking proficiency and citizenship on increased food insecurity among a predominantly immigrant Caribbean Latino sample in Lawrence, Massachusetts.

METHODS: The analytic sample comprised 574 participants aged 21-83 who visited a community health center in 2011-2013. Food insecurity was assessed via the 6-item US Household Food Security Survey. Multivariable logistic modeling (adjusted for self-reported age group, gender, education, and marital status) examined the independent associations between language proficiency and citizenship on increased food insecurity.

RESULTS: One-third of participants were classified as food insecure. Most respondents were citizens (59.5%), foreign-born (92.4%; 70.3% from the Dominican Republic), and spoke monolingual Spanish (72.8%). Monolingual Spanish-speakers had marginally increased odds of food insecurity (odds ratio (OR) = 1.50, 95% confidence interval (CI): 1.00 to 2.26), compared to bilingual participants; however after adjustment this relationship was attenuated (OR = 1.25, 95% CI: 0.79 to 2.00). Non-citizenship was not associated with increased odds of food insecurity (OR=1.18, 95% CI: 0.82 to 1.68).

CONCLUSION: Food insecurity in this predominantly immigrant Caribbean Latino sample was higher than the national average for Latinos. Future research on food insecurity among different Latino ethnicities is needed in order to inform targeted interventions that promote food security.

TABLE OF CONTENTS

LIST OF TABLES:

CHAPTER 3

LIST OF FIGURES:

CHAPTER 2

PREFACE

Baseline data from the Latino Health and Wellbeing Study (NIMH R01MH085653), a prospective cohort study of 602 English and/or Spanish-speaking Latino adults in Lawrence, Massachusetts who were recruited from the Greater Lawrence Family Health Center, were used to perform the analyses outlined herein.

I wrote and designed the study and analyses outlined in this thesis. Drs. Milagros C. Rosal and Stephenie Lemon were responsible for the study design and data collection. Dr. William Jesdale provided assistance with respect to the theoretical framework and analyses performed.

Dr. Jesdale, Sharina D. Person, PhD, Jane Saczynski, PhD, and Kate L. Lapane, PhD provided editorial assistance and served on my Thesis Advisory Committee.

CHAPTER I

Introduction

Latinos and Food Insecurity

In 2013, an estimated 14.3% of US households were food insecure.[1] That is, they experienced financial constraints leading to "limited or uncertain ability to acquire acceptable foods in socially acceptable ways" (without resorting to emergency food supplies, scavenging, stealing, or other coping strategies).[2] Households at greater risk of food insecurity are typically low-income, have children under 18 years headed by a single parent (mother or father), and non-Hispanic Black and Latino. The US Latino population represents the largest US ethnic minority group (17%; 54 million), is projected to comprise one-third of the population by 2060,[3] and has the second-highest national poverty rates (23.5% vs. 27.2% for African Americans).[4] Nationally representative data estimate food insecurity in Latinos at nearly twice the national average (23.7% vs. 14.3%).[1] Food insecurity is associated with detrimental child development[5] and with chronic diseases wherein Latinos experience disparities (e.g., obesity).[6] National aggregated trends on food insecurity among Latinos may be masking the experiences of specific Latino subgroups. Little is known about food insecurity in Dominicans, the fifth-largest US Latino subgroup and the second most prevalent Latino subgroup in the northeast.[3] Explicit attention to Latino subgroups is warranted to better understanding social determinants of health.[7]

Language has been studied in the context of food insecurity in Latinos, but findings are not always constant. Some research has found that both greater English-

language use[8] and lack of English proficiency (Spanish monolingual profile) have been associated with greater food insecurity.[9,10] Other studies have also found the opposite: compared to English-only use, speaking primarily Spanish in the home is associated with greater food sufficiency (used synonymously with food security in those studies).[11,12] These studies primarily focus on Mexican-heritage populations (including adults,[11] youth,[8,12] and families[9]) and to a lesser extent on Puerto Ricans.[10] Some studies are based on convenience samples,[8,10] whereas others on state[9,11] or national data.[12] Measurement of the independent and dependent variables also differ across studies, including language assessed by language spoken[10] or used at home,[8,12,14] or by proxy (language of interview)[9] and food insecurity measures reflecting varying degrees of psychometric support.[13] These factors limit our understanding of the role of language on food insecurity among Latinos.

Moreover, despite differences in citizenship status among Latinos (23% in Mexican American immigrants compared to 47% of Dominican immigrants and 100% in Puerto Ricans),[14] research on citizenship status and Latino food insecurity is scarce. In a nationally representative study of Latino adults, non-citizenship was associated with greater food insecurity (63.3% of citizens were food secure, compared to 36.7% of noncitizens), but citizenship status was not included in multivariable analysis.[15]

In this Master's Thesis, ecodevelopmental theory (EDT) is used to consider the extent to which language and citizenship are associated with food insecurity. EDT is a product of critiques of acculturation (a multidimensional and complex concept that is commonly measured by language) that considers the multiple, interrelating contexts in which people live, and how these systemic relationships influence people's disease risk

and protective factors.[16] EDT incorporates three fundamental features to structure risk and protective factors in a comprehensive model of understanding health outcomes: 1) social ecology; 2) developmental perspective; and 3) social interactions (a feature of EDT, not necessarily statistical modeling).[17] This study specifically considers the social ecological feature of EDT.

Social Ecology

EDT extends nested systems of Bronfenbrenner's social ecology of human development, which originally focused on adolescents.[18] EDT includes four multilevel factors that affect individual development: microsystems, mesosystems, exosystems and macrosystems. Microsystems are the closest contexts that influence an individual directly, typically including family, school, friends, workplaces, and churches.[17] Microsystems are the first focus for understanding how outcomes (such as food insecurity) develop. Here, the relationship between the individual and other microsystems is reciprocal and increasingly complex as s/he develops over the life course.

Mesosystems are viewed as direct connections between microsystems, reflecting relationships between microsystems (e.g., the individual and family) and describing the quality and strength of these relationships. In this thesis, food insecurity reflects a household-level factor situated in the mesosystem (the individual participant is reporting about food insecurity in his/her household). Indeed, food insecurity is a household-level economic and social condition of limited access to food.[1]

Next, exosystems are the levels that are not directly in contact with the individual but have an indirect influence through individuals or processes (e.g., communities,

neighborhoods). Exosystems include institutional discrimination, community norms, community-based organizations, and food sources in the community (e.g. local grocery stores, food pantries). In this study, household food insecurity (a mesosystem) is situated in the exosystem of Lawrence, MA.

Lawrence is a predominantly Caribbean Latino community, home to the highest proportion of Latino residents in Massachusetts (of 76,377-plus residents in 2010, 73.8% were Latino, including 39.6% Dominican and 22.2% Puerto Rican).[19] Over a third (37.5%) of Lawrence businesses are Latino-owned, compared to 3.3% in Massachusetts overall, and a large representation of residents are foreign-born (37.6% vs. 15.0% in MA) and speak a non-English language at home (75.6% vs. 21.9% in MA).[19] Alongside this vibrant sociocultural profile, there is much socioeconomically disadvantage in Lawrence: its median household income is half that of Massachusetts as a whole ($32,851 vs. $66,866) and its poverty level is nearly 2.5 times the state average (29.2% vs. 11.4%).[19] This is integral to understanding food insecurity in this specific context.

Health risk and protective factors do not have a monolithic effect across entire Latino communities.[7] Context (e.g., Latino enclaves, low-income community) may come to influence health outcomes; language and citizenship status are context-dependent factors that may play a role in food insecurity. The context wherein individuals function influences opportunities for language expression (e.g., Spanish-English bilingualism, Spanish monolingualism), and may impact access to and/or receipt of resources that prevent or alleviate food insecurity. For example, in the context of Lawrence, where there is a sizable representation of Latinos, non-English (presumably Spanish) speakers, and

Latino-owned businesses, being a monolingual Spanish-speaker may be less of a barrier to accessing food and needed resources, as compared to in a community with greater representation of English-speakers and non-Latinos, in which English-Spanish bilingualism might be more advantageous.

Unfortunately, the present dataset lacks data on other exosystems, though suggested results (e.g., how language and citizenship affect food insecurity) could be expected to be similar in other Caribbean Latino enclaves with comparable socio-demographics, and possibly to larger communities with high Latino representation.

At the largest level in social ecological theory are the macrosystems, which represent the social influences and structures that influence an individual, the microsystem and the mesosystem.[17] Effects of macrosystems can vary by contextual factors such as gender, ethnicity, socio-economic status (SES), language, and citizenship status. Policies, laws, and social programs relevant to immigrant, socioeconomically and/or linguistically disadvantaged Latinos can affect their development, including their risk for or protection from food insecurity. Although the present study does not have data on the macrosystem, it should be noted that sociocultural factors (e.g., discrimination, social norms) could influence the utility and/or salience of language and citizenship among Latinos. Despite demographic shifts of a rapidly growing US Latino population, a 2009 survey conducted by the Pew Hispanic Center found that Americans identified Latinos as the racial/ethnic group they felt were most often subjected to discrimination in today's society.[20] Consideration of the role of sociocultural stressors, potentially exacerbated by language and citizenship, on US Latinos is in the context of high anti-

Latino sentiments. Given these social conditions and their influence on communities and interpersonal relations, the study of how language and citizenship may come to affect food insecurity in Latinos is important.

Given the aforementioned factors, the goal of this Master's Thesis is to estimate household food insecurity and examined the extent to which language-speaking proficiency and citizenship status are independently associated with increased food insecurity among a predominantly immigrant Caribbean Latino sample in Massachusetts. Within the context of community with a high Latino concentration, it is hypothesized that 1) being Spanish-monolingual would be associated with decreased food insecurity, and; 2) being a non-US citizen would be associated with increased food insecurity.

CHAPTER II

Methods

Study Design and Sample

This study analyzed baseline data from the Latino Health and Wellbeing Study, a prospective cohort study examining the impact of culturally specific sources of stress and resources on mental health service use among a sample of 602 Latino adults in Lawrence, Massachusetts. This study is being conducted by an academic-community team involving University of Massachusetts Medical School (UMMS) researchers and community partners that include the Greater Lawrence Family Health Center (GLFHC), YWCA of Greater Lawrence, the Lawrence Council on Aging/Senior Center, Caritas Holy Family Hospital, Lawrence General Hospital, and the City of Lawrence Mayor's Health Taskforce. The UMMS Institutional Review Board approved this study.

In an effort to maximize community representativeness, study participants were recruited from the GLFHC, a Federally qualified community health center that provides care for >80% of the Lawrence Latino population. Participants were eligible if they were Latino/Hispanic ethnicity; Spanish or English-speaking; 21+ years of age; and had an ambulatory or urgent care visit at the health center between 2011-2013. Participants were ineligible if they had: an inability or unwillingness to provide informed consent; plans to move out of the area within the study period; or cognitive impairments that precluded participation in study assessments.

Randomly selected patients were recruited into three age groups (21-34, 35- 54, 55+ years) and gender (men, women) strata using a quota-sampling frame. Patients who

met inclusion criteria were generated from the health center's administrative data, using proportional sampling. Four times per year, a patient database screening queries generated lists of adult Latino patients and a second query removed patients who had already been selected for invitation. Invitation letters signed by the community health center chief medical officer were sent to selected patients via standard mail. Spanish and English versions of the letter described the study in simple language and included a fact sheet and a toll-free telephone number to call to actively opt out of being contacted about the study. Bilingual community coordinators initiated a standard telephone recruitment protocol for individuals who did not actively refuse participation. Up to ten telephone calls were made using a standardized telephone recruitment protocol.

Assessments took place in a centralized community location. Informed consent was administered verbally, with the community coordinators reading the written documents verbatim and soliciting questions and items for clarification. Following written informed consent, bilingual and bicultural staff verbally administered literacy sensitive surveys conducted in participants' preferred language (Spanish or English). This study uses data from the baseline assessment visit, which had an approximate duration of 120-150 minutes, and included surveys assessing demographic, behavioral, psychosocial and environmental factors, among others. Participants received $50 for this visit.

A total of 3,067 patients were sampled, of whom 284 (9.3%) were ineligible (e.g., not Latino, age, not a Lawrence resident, cognitive impairment, psychiatric illness) (**Figure 1).** Among the remaining 2,783 potentially eligible individuals, 1,236 (44.4%) could be contacted and 634 refused. Consequently, 602 subjects could be contacted, were

eligible, and participated in the study. These 602 subjects represent 21.6% of the 2,783 original participant list and almost half of those that could be reached. Since a primary aim of this thesis was to examine the association between language proficiency (specifically, Spanish-English bilingual and Spanish-language monolingual) and food insecurity, our analytic sample was restricted to those whose language proficiency could be classified as Spanish-English bilingual or Spanish-language monolingual (N=574).

Figure 2.1: Recruitment Flowchart for the Lawrence Health and Wellbeing Study
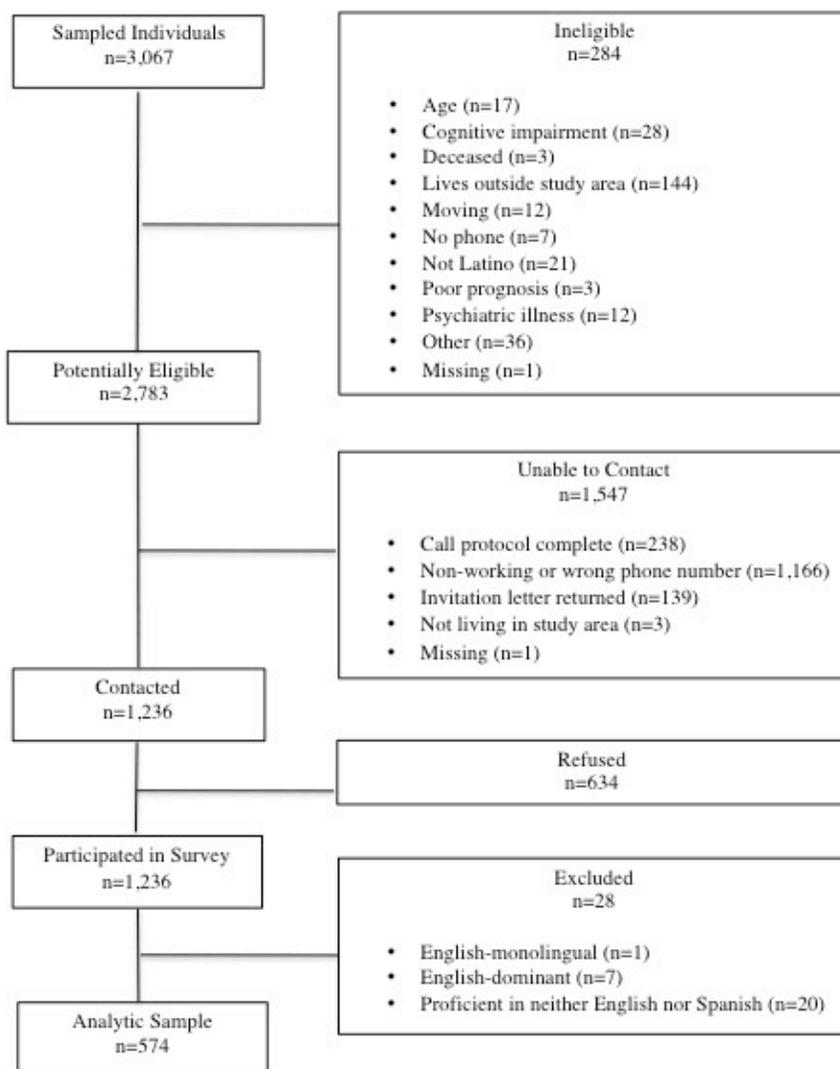
Study Measures

Household Food Insecurity (mesosystem)

The outcome variable food insecurity was assessed with the 6-item short form of the U.S. Household Food Security Survey.[21] This scale has shown reasonably high specificity and sensitivity and minimal bias with respect to the full 18-item scale (the "gold standard" instrument in the US) and allows comparisons with national prevalence data. Sample items referencing the past 12 months include: "How often did you and your family run out of food and had no money to buy more?" "Did you ever eat small portions or skip meals because you and your family did not have enough money for food?" and "Were you ever hungry but didn't eat because you couldn't afford to buy food?". Total scores ranged from 0-6, and households are classified based on affirmative answers as: 0-1, food secure (0=high food security, 1=marginal food security); 2-4, low food security (without hunger); or 5-6, very low food security (with moderate hunger) (Cronbach's alpha = 0.89).[21] For logistic regression modeling, we dichotomized household food insecurity as secure (=0) and insecure (=1, including low and very low security), based on the standard scoring.[21] While a continuous dependent variable would provide greater precision, the outcome measure was dichotomized to simplify the interpretability of the model results and facilitate comparisons with national estimates.

Language and Citizenship (microsystem)

The microsystem predictors were self-reported language-speaking proficiency in both English and Spanish (not very well to very well) and citizenship status. Participants who reported Spanish-speaking proficiency (well or very well) and limited English-

speaking proficiency (not well or not at all) were classified as Spanish-monolingual. Those who reported both Spanish- and English-speaking proficiency (well or very well) were classified as Spanish-English bilingual. This grouping resulted in 28 participants that were excluded from our analytic sample, described as English-monolingual (n=1), English-dominant (N=7), and proficient in neither language (N=20). Self-reported citizenship status was assessed by the question "What is your documentation status?" and categorized as US citizen or non-citizen (including legal US resident/on a visa/other). Due to small cell sizes, those with a visa (1.2%) and "other" (3.8%) documentation status were combined with "legal US resident" (35.5%).

Socio-demographics (microsystem)

Self-reported baseline socio-demographics assessed were: age (21-34, 35-54, 55+ years), gender (women), education (< high school, high school, > high school), marital status (married/cohabitating vs. not married, including never married, divorced, separated, or widowed), nativity (US-born vs. immigrant, classified as born outside US mainland); and perceived income as a proxy of economic hardship. Perceived income constituted the question: "In general, would you say you (and your family living in the same household) have more money than you need, just enough money, or not enough money to meet your needs?"). Due to a small cell size, responses "more than enough" (3%) was combined with "just enough" (48.2%).

Analytic Approach

Descriptive statistics were calculated for all variables for the overall sample and by each microsystem predictor (language proficiency, citizenship status). Bivariate

associations between the categorical microsystem predictors were examined through the chi-square test. Collinearity was evaluated by examining the variance inflation factors (VIF) between select socio-demographics (age, gender, education, marital status), language proficiency, citizenship, and food insecurity. The highest VIF was 1.41, indicating little concern about collinearity.[22] Logistic regression modeling was conducted to examine the independent associations between each microsystem predictor and food insecurity (Model 1 for language proficiency and Model 2 for citizenship status). After crude models were estimated, each model was adjusted for established food insecurity risk factors (age, gender, education, and marital status). Unadjusted and adjusted odds ratios (aORs) and 95% confidence intervals (CIs) were estimated. All analyses were conducted using Stata v.12 (StataCorp LP, College Station, TX).

CHAPTER III

Results

Characteristics of the Study Population

A total of 574 participants aged 21 to 83 comprised our analytic sample (Table 1). Overall, the mean age was 46.6 years (standard deviation: 15.4) and 51.9% were women. Over half had less than a high school education, were married/cohabitating, and held citizenship. Nearly half reported financial hardship. An overwhelming majority was foreign-born (92.4%; of which 70.3% were born in the Dominican Republic) and were monolingual Spanish speakers (72.8%). One-third of participants were classified as having experienced household food insecurity within the past 12 months.

Sample Characteristics by Language and Citizenship Status

There were significant baseline differences by language and citizenship in our sample **(Table 3.1)**. Compared to bilingual speakers, a larger proportion of monolingual Spanish-speakers were older, less educated, foreign-born, in financial hardship, non-citizens, and classified as food insecure. Relative to citizens, a larger proportion of non-citizen participants were less educated, foreign-born, and monolingual Spanish speakers.

Multivariable Associations between Microsystem Predictors and Food Insecurity

Regarding language-speaking proficiency, crude model estimates showed that, compared to bilingual speakers, monolingual Spanish-speakers had marginal increased odds of household food insecurity (Model 1; OR=1.50, 95% CI: 1.00 to 2.26) **(Table 3.2)**. After adjusting for age group, gender, education, and marital status, this relationship

was greatly attenuated towards the null. Citizenship status was not found to be associated

with increased odds of food insecurity (Model 2).

Table 3.1. Baseline Characteristics among Sample and by Microsystem Predictors

	Sample (n=574), %	Spanish-monolingual (n=418), %	Bilingual (n=156), %	Non-citizen (n=231), %	Citizen (n=340), %
Age Group		p<0.001		p=0.998	
21 – 34	30.3	18.9	60.9	30.3	30.3
35 – 54	35.2	36.1	32.7	35.1	35.3
55 – 83	34.5	45.0	6.4	34.6	34.4
Gender		p=0.709		p=0.418	
Women	51.9	52.4	50.6	49.8	53.2
Education		p<0.001		p=0.004	
< High school	52.5	60.8	30.1	60.6	47.0
High school	20.0	18.9	23.1	18.2	21.2
> High school	27.5	20.3	46.8	21.2	31.8
Marital Status		p=0.672		p=0.437	
Married/cohabiting	57.8	58.4	56.4	59.7	56.5
Not married	42.2	41.6	43.6	40.3	43.5
Nativity		p<0.001		p<0.001	
US-born	7.6	<1	26.0	0.0	12.1
Immigrant	92.4	99.3	74.0	100.0	87.9
Dominican Republic	70.3	79.5	45.4	87.2	59.6
Puerto Rico	14.2	10.9	23.4	0.0	23.6
Central/South America	7.9	8.9	5.2	12.8	4.7
Perceived Income		p<0.008		p=0.116	
More than/just enough	52.8	49.4	61.9	48.9	55.6
Not enough	47.2	50.6	38.1	51.1	44.4
Language Proficiency				p<0.001	
Bilingual	27.2	---	---	12.1	37.1
Spanish-monolingual	72.8	---	---	87.9	62.9
Citizenship Status		p<0.001			
Citizen	59.5	51.3	81.8	---	---
Non-citizen	40.5	48.7	18.2	---	---
Household Food Security		p<0.048		p<0.267	
Secure	66.7	64.3	73.1	64.1	68.5
Insecure	33.3	35.7	26.9	35.9	31.5
Low insecurity	18.0	19.9	12.8	20.4	16.2
High insecurity	15.3	15.8	14.1	15.6	15.3

Note. Missing data on participants for nativity (n=10), perceived income (n=4), and citizenship status (n=3). P-values based on the Pearson chi-square test for categorical variables.

Table 3.2. Association Between Microsystem Predictors and Food Insecurity, among Sample (N=574), Reporting Odds Ratios (95% Confidence Intervals)

	Food Insecurity	
	Unadjusted	**Adjusted§**
Model 1: Language-speaking Proficiency		
Spanish-monolingual (n=418)	1.50 (1.00 to 2.26)	1.25 (0.79 to 2.00)
Bilingual (n=156)	(referent)	(referent)
Model 2: Citizenship Status		
Non-citizen (n=231)	1.22 (0.86 to 1.74)	1.18 (0.82 to 1.68)
Citizen (n=340)	(referent)	(referent)

Note. **§** Adjusted for age group, gender, education, and marital status. Missing data on citizenship status (n=3).

CHAPTER IV

Final summary and conclusions

Discussion

The present study sought to estimate household food insecurity and examine the extent to which microsystem predictors (language-speaking proficiency and citizenship status) were associated with insecurity among a predominantly Caribbean Latino immigrant sample in the US. We hypothesized that: 1) being Spanish-monolingual would be associated with decreased food insecurity and; 2) being a non-US citizen would be associated with increased food insecurity.

The estimate of household food insecurity in our predominantly Caribbean Latino immigrant sample (33.3%) was higher than the national average for Latinos (23.7%) and the national US average (14.3%).[1] Previous studies examining Latino food insecurity within a local community context have found higher estimates than national averages,[23] suggesting that national or state data may not be capturing the extent or severity of food insecurity among Latinos. Consistent with our ecodevelopmental framework, the specific community context wherein our participants' lives are situated could help explain this high estimate. Lawrence, MA, has a median household income that is half that of Massachusetts as a whole and its poverty level is over twice the state[14] and national average.[4] Though collectively US Latinos disproportionately experience socio-economic hardship (23.5% poverty),[14] a greater proportion of Dominicans (26%) and Puerto Ricans (27%) live in poverty.[24,25] Immigrants comprised nearly our entire sample (92.4%), a population particularly vulnerable to food insecurity.[23] Estimates of food insecurity

among our Puerto Rican participants (39.5%) fall within previous estimates observed in this subgroup (12.1% to 76%).[10,26,27] No previous estimates exist by which we can compare food insecurity among our Dominican respondents (34.4%).

To our knowledge, our study is the first to examine food insecurity among a predominantly Dominican US sample, and adds to existing literature on food insecurity among Puerto Ricans.[10,26,27] In our study we observed no statistically significant associations between our microsystem predictors (language proficiency and citizenship status) and food insecurity.

Despite not finding an association between language and food insecurity, the direction of our adjusted effect estimate is consistent with previous findings based on a convenience sample of Puerto Rican mothers (n=200) in Hartford, Connecticut, wherein speaking only Spanish was found to be associated with increased risk of food insecurity, compared to speaking bilingual Spanish-English (OR=3.15, 95% CI: 1.06 to 9.34).[10]

Lack of evidence for the language-food insecurity association may also be related to other factors. Our hypotheses built from research focused primarily on Mexican-heritage populations, the largest and most researched US Latino subgroup.[14] Yet, significant heterogeneity exists among US Latinos regarding national origin, immigration factors, and life opportunities,[14] possibly leading to different risk and protective factors in health[7] such as food insecurity. Differences in samples, study design and methodology, and measurement of language and food insecurity in previous research limit our understanding of how language might affect food insecurity among Latinos.

To our knowledge, our study is the first to examine a multivariable relationship between citizenship status and food insecurity in Latinos. Although inquiring about citizenship can be challenging,[28,29] partnering with trusted community organizations may help researchers inquire about documentation status.[29] Indeed, the community-based participatory research (CBPR) nature of our study facilitated this query. Moreover, due to small cell sizes, our categorization of non-citizenship included those with legal residency, visas, and "other" (likely undocumented) status. This created similarity between citizens and non-citizens because those with legal residency and visas have the same rights as citizens to access resources that could decrease vulnerability to food insecurity. However, resources are not uniformly accessible to all documented immigrants. Documented immigrants are eligible for Supplemental Nutrition Assistance Program (SNAP, formerly known as the Food Stamp Program) benefits only if they have resided in the US for at least five years (with some exceptions).[30] In addition, regardless of legal documentation Latino immigrants face barriers to social services due to language, lack of knowledge about resources, stigma, or fear of jeopardizing their family.[28,29,31,32] Albeit these factors, it is likely that the similarity between citizenship categories would bias the association towards the null.

Nonetheless, research on food insecurity among US Latinos is of public health importance and we thus make recommendations to help promote food security in this growing population. In the absence of societal (macrosystem) changes that address the systemic nature of poverty and its inextricable underpinning in food insecurity, community-level (exosystem) efforts are warranted. To the extent that our sample is

representative of the Caribbean Latino residents of present-day Lawrence, MA, our findings may be useful in program planning and development. Community efforts that aim to promote food insecurity should address the specific needs of our participants, namely that of a socioeconomically disadvantaged and predominantly Caribbean Latino immigrant sample with limited English proficiency (72.8% were Spanish-monolingual).

Efforts that help mitigate socioeconomic disadvantages that may increase households' vulnerability to food insecurity and other forms of material hardship include, but are not limited to: linguistic access to resources and services (English and Spanish) across the lifespan, from Head Start to SNAP to elder care; expanded educational opportunities, including bilingual education and legal counsel on pathways to citizenship; employment opportunities, including youth programs and cultivation of racial/ethnic minority-owned businesses; initiatives on affordable rental housing and home-ownership; and anti-hunger social services such as SNAP, which helps low-income families, the elderly, and people with disabilities afford access to food.[33] Despite a high rate of poverty among Latinos, of the 46 million SNAP recipients in 2014[33] only 19% were Latino,[28] suggesting unmet needs for Latinos with socioeconomic disadvantage.

CBPR approaches combine academic and community expertise and resources to create synergistic partnerships with unique potential for meaningful, real-world impacts on community health.[34] The Lawrence-UMass Research Partnership comprises health researchers and professionals from city government, local health centers, social service agencies and other community-based organizations, representing diverse stakeholders with multifaceted strengths. The 10-year-plus CBPR infrastructure of the Partnership,

which shares the goals of using the present data to develop programs and projects to benefit the local community, can be leveraged in existing community efforts to address food insecurity in Lawrence, MA.

Strengths and Limitations

This study has several strengths. Though small sample sizes precluded Latino subgroup analyses, to our knowledge our study is the first to explore food insecurity among a largely Dominican origin community sample in the US. Unlike previous studies, we measured food insecurity using a validated scale with supported psychometric validation.[13] The ecodevelopmental framework, which acknowledges multilevel relationships that may be implicated in food insecurity, extends the current literature based on acculturation (a multidimensional concept for which language is the typically proxy).[16] The CBPR study approach allowed for surveys that were pre-tested, adapted for local language and literacy, and verbally administered in Spanish or English by trained interviewers from the target community, all of which are helpful in engaging under-represented communities in research[35] and may have helped inquire about citizenship status. Instead of languages spoken (quantity of use) or use preference, we measured self-reported speaking proficiency (quality of use), a valid and reliable language measure.[36]

Some limitations should be acknowledged. Self-reported data may have potentially influenced the relations under study. Though surveys were adapted to culture, language and literacy, translated food insecurity items may have been interpreted differently than the original English-language scale. Temporal relations cannot be addressed with our cross-sectional data. Given the difficulty reaching participants and a

refusal rate of 51% among individuals reached (though not confirmed eligible for the study), we cannot rule out selection bias in the reporting of household food insecurity and the relations under study. It is also possible that our findings represent an underestimate of food insecurity given the sensitive admission of inability to feed one's family.[37]

Conclusion

The estimate of household food insecurity in our predominantly immigrant Caribbean Latino sample is higher than the national average for US Latinos. We did not find support that language and citizenship status were associated with food insecurity. Limitations notwithstanding, our findings represent a step toward better understanding food insecurity among Latinos. Future research should examine food insecurity risk factors by Latino ethnicities in order to inform interventions that promote food security.

References

1. Coleman-Jensen, A., Gregory, C., & Singh, A. (2014). *Household Food Security in the United States in 2013.* US Dept. of Agriculture. Economic Research Service: Washington, DC. Accessed November 5, 2014 from http://www.ers.usda.gov/media/1565415/err173.pdf

2. Anderson, S. (1990). Core indicators of nutritional state for difficult-to-sample populations. *Journal of Nutrition,* 120(11):1559-600.

3. Ennis, S.R., Rios-Vargas, M., & Albert, N.G. (2011). *The Hispanic population: 2010 Census Briefs*. Brief No. C2010:BR-04. Accessed May 15, 2014 from http://www.census.gov/prod/cen2010/briefs/c2010br-04.pdf

4. Krogstag, J.M. (2014). *Hispanics only group to see its poverty rate decline and income rise.* Pew Research Center's Hispanic Trends Project Website. Accessed December 1, 2014 from http://www.pewresearch.org/fact-tank/2014/09/19/hispanics-only-group-to-see-its-povertyrate-decline-and-incomes-rise/

5. Chilton, M., Chyatte, M., & Breaux, J. (2007). The negative effects of poverty & food insecurity on child development. *The Indian Journal of Medical Research*, 126(4):262-72

6. Franklin, B., Jonas, A., Love, D., Puckett, S., Macklin, J., & White-Means, S. (2012). Exploring mediators of food insecurity and obesity: a review of recent literature. *Journal of Community Health*, 37(1):253-64.

7. Zsembik, B.A., & Fennell, D. (2005). Ethnic variation in health and the determinants of health among Latinos. *Social Science & Medicine*, 61(1):53-63.

8. Dave, J.M., Evans, A.E., Saunders, R.P., Watkins, K.W., & Pfeiffer, K.A. (2009). Associations among food insecurity, acculturation, demographic factors, and fruit and vegetable intake at home in Hispanic children. *Journal of the American Dietetic Association*, 109(4):697-701.

9. Kaiser, L., Baumrind, N., & Dumbauld, S. (2007). Who is food-insecure in California? findings from the California Women's Health Survey, 2004. *Public Health Nutrition*, 10(6):574-81.

10. Dhokarh, R., Himmelgreen, D.A., Peng, Y.K., Segura-Perez, S., Hromi-Fiedler, A., & Perez-Escamilla, R. (2011). Food insecurity is associated with acculturation and social networks in Puerto Rican households. *Journal of Nutrition Education and Behavior*, 43(4):288-294.

11. Langellier, B.A., Chaparro, M.P., Sharp, M., Birnbach, K., Brown, R., & Harrison, G.G. (2012). Trends and determinants of food insecurity among adults in low-income households in California. *Journal of Hunger & Environmental Nutritio*n, (7):401-413.

12. Mazur, R.E., Marquis, G.S., & Jensen, H.H. (2003). Diet and food insufficiency among Hispanic youths: acculturation and socioeconomic factors in the Third National Health and Nutrition Examination Survey. *The American Journal of Clinical Nutrition*, 78(6):1120-1127.

13. Marques, E.S., Reichenheim, M.E., de Moraes, C.L., Antunes, M.M., & Salles-Costa, R. (2014). Household food insecurity: a systematic review of the measuring instruments used in epidemiological studies. *Public Health Nutrition*, 25:1-16.

14. Motel, S., & Patten, E. (2012). *The 10 Largest Hispanic Origin Groups: Characteristics, Rankings, Top Counties.* Pew Research Hispanic Trends Project. Accessed April 8, 2015 from http://www.pewhispanic.org/2012/06/27/the-10-largest-hispanic-origin-groups-characteristics-rankings-top-counties/

15. Iglesias-Rios, L., Bromberg, J.E., Moser, R.P., & Augustson, E.M. (2015). Food insecurity, cigarette smoking, and acculturation among Latinos: data from NHANES 1999-2008. *Journal of Immigrant and Minority Health,* 17(2):349-57.

16. Lopez-Class, M., Castro, F.G., & Ramirez, A.G. (2011). Conceptions of acculturation: a review and statement of critical issues. *Social Science & Medicine*, 72(9):1555-62.

17. Szapocznik, J., & Coatsworth, J. D. (1999). An ecodevelopmental framework for organizing the influences on drug abuse: a developmental model of risk and protection. In M. Glantz & C. Hartel (Eds.), *Drug abuse: Origins & interventions* (pp. 331–366). Washington, DC: American Psychological Association.

18. Brofenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design* Cambridge, MA: Harvard University Press.

19. US Census Bureau. State & country QuickFacts. Accessed October 22, 2014 from http://quickfacts.census.gov/qfd/states/25/2534550.html

20. Pew Research Social and Demographic Trends (2010). *Blacks upbeat about Black progress, prospects: A year after Obama's Election*. Pew Research Center. Accessed December 1, 2014 from http://www.pewsocialtrends.org/2010/01/12/blacks-upbeat-about-black-progressprospects/

21. Blumberg, S.J., Bialostosky, K., Hamilton, W.L., & Briefel, R.R. (1999). The effectiveness of a short form of the Household Food Security Scale. *American Journal of Public Healt*h, 89(8):1231-1234.

22. Midi, H., Sarkar, S.K., & Rana, S. (2010). Collinearity diagnostics of binary regression model. *Journal of Interdisciplinary Mathematics*, 13(2):253-267.

23. Sharkey, J.R., Dean, W.R., & Johnson, C.M. (2011). Association of household and community characteristics with Adult and child food insecurity among Mexican-Origin households in colonias along the Texas-Mexico border. *International Journal for Equity in Health*, 10:19–32.

24. Motel, S., & Patten, E. *Hispanics of Dominican Origin in the United States, 2010.* Pew Research Hispanic Trends Project Website. Accessed August 15, 2014 from http://www.pewhispanic.org/2012/06/27/hispanics-of-dominican-origin-in-the-united-states-2010/

25. Motel, S., & Patten, E. *Hispanics of Puerto Rican Origin in the United States, 2010.* Pew Research Hispanic Trends Project Website. Accessed August 15, 2014 from http://www.pewhispanic.org/2012/06/27/hispanics-of-puerto-rican-origin-in-the-united-states-2010/

26. Gao X, Scott T, Falcon LM, Wilde PE, Tucker KL. Food insecurity and cognitive function in Puerto Rican adults. Am J Clin Nutr. 2009;89(4):1197-203.

27. Berkowitz, S.A., Gao, X., Tucker, K.L. (2014). Food-insecure dietary patterns are associated with poor longitudinal glycemic control in diabetes: results from the Boston Puerto Rican Health study. *Diabetes Care*, 37(9):2587-92.

28. Quandt, S.A., Shoaf, J.I., Tapia, J., Hernandez-Pelletier, M., Clark, H.M., & Arcury, T.A. (2006). Experiences of Latino immigrant families in North Carolina help explain elevated levels of food insecurity and hunger. *Journal of Nutrition*,136(10):2638-2644.

29. Chavez, N., Telleen, S., & Kim, Y.O. (2007). Food insufficiency in urban Latino families. *Journal of Immigrant and Minority Health*, 9(3):197-204.

30. SNAP to health! *SNAP: frequently asked questions.* Accessed April 10, 2015 from http://www.snaptohealth.org/snap/snap-frequently-asked-questions/#who

31. Munger, A.L., Lloyd, T.D., Speirs, K.C., & Grutzmacher, S.K. (2014). More than just not enough: experiences of food insecurity for Latino immigrants. *Journal of Immigrant and Minority Health,* Nov 7.

32. Vahabi, M., & Damba, C. (2013). Perceived barriers in accessing food among recent Latin American immigrants in Toronto. *International Journal for Equity in Health*, 12:1-9276-12-1.

33. Center on Budget and Policy Politics. (2015). *Policy Basics: Introduction to the Supplemental Nutrition Assistance Program (SNAP).* Accessed April 9, 2015 from http://www.cbpp.org/cms/index.cfm?fa=view&id=2226

34. Wallerstein, N., & Duran, B. (2010). Community-based participatory research contributions to intervention research: the intersection of science and practice to improve health equity. *American Journal of Public Health*, 1;100(1):S40-6.

35. George, S., Duran, N., & Norris, K. (2014). A systematic review of barriers and facilitators to minority research participation among African Americans, Latinos, Asian Americans, and Pacific Islanders. *American Journal of Public Health*, 104(2):e16-31.

36. Luk, G., & Bialystok, E. (2013). Bilingualism is not a categorical variable: interaction between language proficiency and usage. *Journal of Cognitive Psychology*, 25(5):605-621.

37. Keenan, D.P., Olson, C., Hersey, J.C., & Palmer, S.M. (2001). Measures of food insecurity/security. *Journal of Nutrition Education*, 33(1):S49-58.