

University of Southern California

# CITATIONS



The USC McNair Undergraduate Scholars Research Journal

Volume VI: Fall 2010



**THE RONALD E. MCNAIR  
POST-BACCALAUREATE ACHIEVEMENT PROGRAM**

# CITATIONS



The USC McNair Scholars Research Journal

## THE RONALD E. McNAIR POST-BACCALAUREATE ACHIEVEMENT PROGRAM

VOLUME VI 2010

Manuscripts are accepted from McNair Scholars participating in the program at the University of Southern California, Los Angeles, California 90089, (213) 740-8702.

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Citations is the official journal of the McNair Scholars Program (Ronald E. McNair Post-baccalaureate Achievement Program) at the University of Southern California. Funding is through a grant from the U.S. Department of Education (Grant. No. P217A990046-03).

Produced with editorial support from the Division of Student Affairs, Office of University Publications, and the USC Graduate School, 2009.

### Journal Disclaimer

*While the McNair Program editors have made every effort to assure a high degree of accuracy, rigor and quality in the content of this journal, the interpretations and conclusions found within each essay are those of the author's alone and not the McNair Program. Any errors or omissions are strictly the responsibility of each author. Also, please note that the works represented in the journal are from undergraduates learning to conduct and write about research.*

## A MESSAGE FROM THE USC McNAIR SCHOLARS PROGRAM

The Ronald E. McNair Post-Baccalaureate Achievement Program is a federally funded initiative that provides research and graduate preparation opportunities to a select group of first-generation college students, populations from low-income backgrounds, and ethnic minorities underrepresented in higher education. A primary objective of the McNair Program is to provide academically talented students from these backgrounds effective preparation for research experiences and graduate study, particularly for doctoral-level studies. The ultimate goal of the program is to diversify the graduate-level student body and the professoriate through placement of McNair alumni in faculty positions. Currently, McNair programs exist at over 200 colleges and universities nationwide.

Annually, the USC McNair Program receives a record number of applications from a highly competitive pool of faculty-nominated USC undergraduates representing an astoundingly diverse cross-section of majors, graduate school plans, and research interests. Applications are reviewed by a committee comprised of faculty, deans, provosts, staff and students. The program selects between 20 and 26 students annually. Throughout the Spring Semester, the new McNair Scholars begin preparing for graduate school, receive research training and instruction on developing research proposals, and acquire professional development. The Spring program prepares students for the intense Summer Research Institute (SRI), where students implement their research projects under the guidance of faculty mentors, refine their writing and professional skill sets, and continue preparing for graduate school. Scholars present their scholarship orally at a university-sponsored symposium attended by faculty, other students, and staff. Students also receive competitive scholarships and grants. A select group presents their research at national-level conferences. The USC Office of Undergraduate Programs administers the program with funding from a grant awarded by the U.S. Department of Education, Office of Postsecondary Education

USC has been a proud member of the McNair community since 1996, having served more than 280 students to date. More than 160 have gone on to post-baccalaureate study. Nearly 75 have earned master's or other professional degrees, and to date 25 have earned the Ph.D. or other professional doctorate. Around 65 McNair alumni are currently enrolled in post baccalaureate study. Many of the degrees earned and programs McNair scholars pursue include the nation's most selective institutions.

This fifth edition of the McNair Undergraduate Research Journal, "Citations," showcases the accomplishments of scholars from the 2008-2009 USC McNair Scholars cohort and reflects work from a variety of academic disciplines. These Scholars have taken on very challenging topics and employed a variety of research methodologies. In the process of conducting research and publishing findings, these Scholars have formed valuable relationships with faculty and advanced graduate student mentors.

Join the USC McNair Staff in congratulating the Scholars on their outstanding undergraduate achievements, research pursuits, and graduate school preparation. We extend our best wishes to this cohort of Scholars as they seek the full membership they have worked hard for and deserve in the academic community and professional sectors.

### **FIGHT ON!**

The USC McNair Staff

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*Professor, School of Law; School of Policy, Planning, and Development;*

*School for Communication and Journalism; Department of Political Science*

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*Assistant Dean, Graduate School, and Director, Office of Undergraduate Programs*

*Instructor, Department of American Studies & Ethnicity*

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Luis Carlos Rodriguez, Ph.D. Student

Letisha R. Wyatt, Ph.D. Student

Diana R. Moreno, M.Ed. Student

## PUBLICATION DESIGN:

USC Spectrum

*Alexis Markavage, Lead Designer*

*Kristie Kam, Designer*

*Helen Wang, Lead Designer*

*Natasha Wu, Designer*

*Luis Ramirez, Designer*

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# UNIVERSITY OF SOUTHERN CALIFORNIA MCNAIR SCHOLARS

**Brandyn Castro**, *Neuroscience and Business Administration*

**Rebecca Das**, *Anthropology & Gender Studies*

**Isabel Duenas**, *American Studies & Ethnicity*

**Patricia Gomes**, *American Studies & Ethnicity*

**Silvia Green**, *Anthropology*

**Keshia Groves**, *Psychology*

**Laura Hernandez**, *Psychology*

**Nabila Jahan**, *Physics*

**Keyaira Kelly**, *Communication and English*

**Darren Knight**, *Biological Sciences*

**Karina Ledezma**, *Health Promotion & Disease Prevention*

**Erin Lee**, *Biology and Spanish*

**Gustavo Lopez**, *American Studies & Ethnicity and Political Science*

**Andrea Martinez**, *Political Science and Chicano Studies and Psychology*

**Breanna Morrison**, *Policy, Planning & Development*

**Aileen Ng**, *Classics and Piano*

**Adam Perez**, *Journalism*

**Jorge Rodriguez**, *Physics*

**Luis Valdez**, *Health Promotion & Disease Prevention*

**Ashley Williams**, *Broadcast Journalism and Spanish and International Relations*

**Suzanne Williams**, *Health Promotion & Disease Prevention*

**Tenlong Zhao**, *Business Administration*

# FACULTY MENTORS

Lourdes Baezconde-Garbanati, Ph.D., *Institute for Prevention Research*

Miranda Barone, Ph.D., *Psychology*

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Terry Cooper, Ph.D., *School of Policy, Planning & Development*

Brian Francis, M.D., *Ophthalmology*

Thomas Habinek, Ph.D., *Classics*

Lanita Jacobs-Huey, Ph.D., *Anthropology/American Studies & Ethnicity*

Michael Jakowec, Ph.D., *Neurology*

Robin D.G. Kelley, Ph.D., *American Studies & Ethnicity*

Leonard Mitchell, J.D., MBA, *School of Policy, Planning & Development*

Shelia Murphy, Ph.D., *Annenberg School of Communication*

Nancy Lutkehaus, Ph.D., *Anthropology*

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Ricardo Ramirez, Ph.D., *Political Science/American Studies & Ethnicity*

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John Carlos Rowe, Ph.D., *English*

Robert Lint Sagarena, Ph.D., *Religion*

George Sanchez, Ph.D., *American Studies & Ethnicity/History*

Philip Seit, Ph.D., *Psychology*

Erna R. Smith, Ph.D., *School of Journalism*

William Steier, Ph.D., *Electrical Engineering/Electrophysics*

Tok Thompson, Ph.D., *Anthropology*



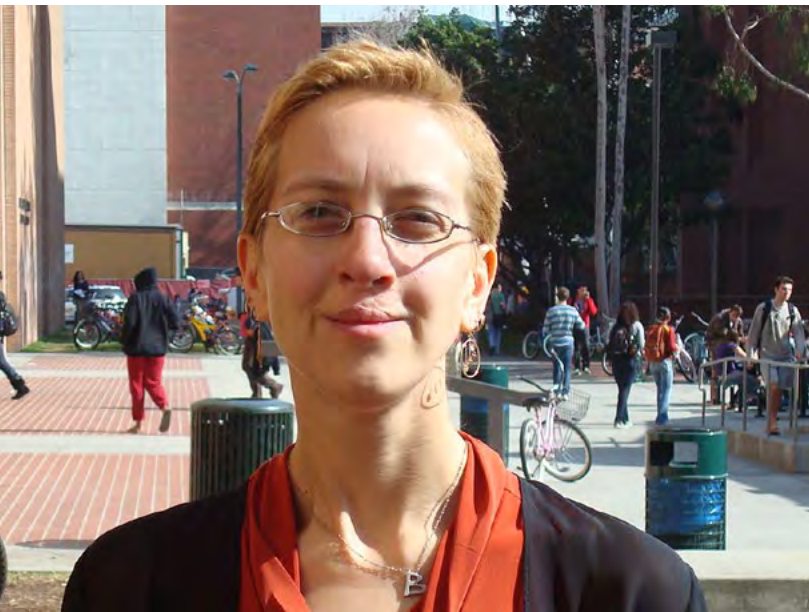
## Brandyn Castro

*Neuroscience/Business Administration*  
*Mentor: Michael Jakowec, Ph.D.*  
*Department: Neurology*

*Molecular Differences in Fischer 344 Rats:  
A New Animal Model of Autism*

The purpose of this study is to examine the neurological differences in protein levels and concentrations in Autism. The following are two aspects that will be introduced to the field: (1) the utilization of the Fischer 344 rat as an animal model of Autism and (2) the evaluation of the protein tyrosine hydroxylase (TH). TH is the enzyme that catalyzes the conformation of L-tyrosine into L-DOPA, the precursor to dopamine. Dopamine is a vital neurotransmitter for normal function within the brain and serves as a precursor for norepinephrine (noradrenaline) and epinephrine (adrenaline). Dopamine is produced in the striatum which leads us to perform immunocytochemistry and western blots to determine that there are lower levels of TH in the striatal area of Fischer 344 as compared to Sprague Dawley controls. This could lead to a variety of outcomes such as: lower levels of dopamine or higher levels of TH phosphorylation in the striatum in Autism. Future studies comparing additional proteins will give more insight into the proper analysis of these findings. Such proteins that merit further study include: dopamine transporter (DAT), glutamate receptor-1 (GluR1), glutamate receptor-2 (GluR2), metabotropic glutamate receptor-1 (mGluR1), and metabotropic glutamate receptor-5 (mGluR5). DAT is a protein spanning the membrane that binds dopamine and transports it from the intersynaptic space into the post-synaptic neuron. The glutamatergic system is necessary for normal brain function and has been compromised in other neurological disorders such as Parkinson's disease. This study (and future studies that stem from it) will lead to better insight as to the mechanisms behind Autism disorder and possibly lead to a cure.





## Rebecca Das

*Anthropology & Gender Studies*

*Mentors: Thomas Habinek, Ph.D. and  
Tok Thompson, Ph.D.*

*Departments: Classics and Anthropology*

*Challenging Gender: The Galli  
Priesthood – A Transgender Presence  
in the Ancient Mediterranean World?*

This project examines evidence for claims circulating in contemporary transgender circles that the Galli priesthood of antiquity exemplifies a transgender presence in ancient Greco-Roman cultures. First, the appropriateness of using the term “transgender” in connection with ancient peoples is considered. Second, a textual analysis of ancient Greek and Latin sources examines the characteristics and various functions of the Galli and prevalent contemporaneous attitudes towards them. Interpretations draw on feminist theory, queer theory, and symbolic anthropology. Finally, a case is made for further research on the Galli as cultural ancestors of modern transgender people. Conceptualizing the Galli as transgender is justified, although it is problematic due to the term’s contested definition. Textual analysis reveals strong parallels between the behavior and treatment of the Galli and contemporary transgender people. The Galli significantly challenged Greco-Roman gender norms through castration and such common gender markers as dress, behavior, hair style, and voice, resulting in negative attitudes towards them. An understanding of the Galli as transgender contributes significantly to deconstructing naturalized binary conceptualizations of gender and a history of transgender people, including the development of hegemonic attitudes towards them. More work is needed to clarify the complex role played by the Galli in the ancient world, specifically examining hegemonic attitudes towards castration, androgyny in religion, and variations in the priesthood from Phrygian Matar worship through the Greek Meter cult and into the Roman Magna Mater cult.



## Isabel Duenas

*American Studies & Ethnicity*

*Mentor: Robin D.G. Kelley, Ph.D.*

*Department: American Studies & Ethnicity*

*Homeboy Industries Providing a New  
Perspective on the Way to Combat Crime:  
Jobs Not Jails*

This study examines the way in which society has decided to treat people who have been involved in gangs, and who have been incarcerated. It criticizes the way in which these individuals are treated when they come out of prison, and takes a look at an organization that has chosen to help these individuals by providing resources without which they would not be able to reincorporate into society. I will study the organization “Homeboy Industries” by taking a deep look at the institution and what it provides to the individuals who participate in it. I will utilize interviews, which have already been conducted, to determine whether or not they have benefitted from the program. I hypothesize that the magnitude of the effect that this program will have on rates of recidivism for the men who participate in it will be immense. The men who participate in this program will prove that if America decided to help these individuals rather than try to solve the problem of gangs through incarceration they would be doing a greater good to society. These individuals would be able to re-incorporate back into society rather than turn back to gangs as their only way to survive.



## Patricia Gomes

*American Studies & Ethnicity*  
*Mentor: John Carlos Rowe, Ph.D.*  
*Department: English*

*No Culture Left Behind: Native American Youth in Urban Los Angeles*

Although Los Angeles County is home to the largest urban Native American population in the United States, there is little educational achievement support available for young students of this ethnic group. This lack of support is a major contributing factor to the high dropout rates among Native American high school students. This study examines ethnic identity as a predictor of self-esteem among Native American youth. Eight Native American high school students (six females and two males) participated in a multimedia interactive course that promoted higher education opportunities. This research explores attachments to both the tribal nation the participant is a descendant of, and the urban community he/she resides in. Participants completed a questionnaire to measure self-esteem and ethnic identity. Both ethnic identity and self-esteem were determined by using a modified version of the MEIM Scale (Phinney, 1992). Results indicated that for Native American youth, ethnic identity was a significant predictor of self-esteem.



## Silvia Green

*Anthropology*

*Mentor: Nancy Lutkehaus, Ph.D.*

*Department: Anthropology*

*Unnatural Maternal Instincts: The Effects of Breastfeeding on the Maternal Bond and Sudden Infant Death Syndrome*

Because maternal instincts do not come naturally to all women after giving birth, women have not always ensured the safety of their offspring. With this in mind, it is important to examine Sudden Infant Death Syndrome objectively and acknowledge the possibility that some cases are diagnosed incorrectly. The connection between SIDS and breastfeeding is important, as breastfeeding has been proposed as a protective factor against sudden infant death. This study explores how breastfeeding reinforces the maternal-infant bond and reduces postpartum mental illness, and how these factors may lead to what can appear to be a sudden infant death. The study presents two cases of women with differing breastfeeding and bonding experiences. This research also makes use of interviews with experts regarding the possibility of misdiagnosis and of mother-induced SIDS, as well as literature that explores studies on breastfeeding and SIDS, breastfeeding and maternal attachment, misdiagnosed cases of SIDS, and the maternal instinct. This study showed that the reduction in the prevalence of SIDS among breastfed babies may be caused by the breastfeeding mother's stronger bond with the infant and lower incidence of postpartum mental illness. Therefore, breastfeeding mothers are less likely to harm or neglect their infants. By acknowledging the maternal benefits of breastfeeding rather than the benefits to the infant, these findings propose another possible explanation for the reduction of SIDS in breastfed infants. Identifying risk factors in the mother will reduce the number of misdiagnosed SIDS cases and allow for a more accurate assessment of the causes of SIDS.



## Keshia Groves

*Psychology*

*Mentor: C. Miranda Barone, Ph.D.*

*Department: Psychology*

*Attitudes Towards Dating on the College Campus*

Dating during adolescence is correlated with the development of interpersonal skills including sharing, intimacy, communication, and negotiation as well as the establishment of future healthy relationships. In the academic setting, minority students seeking mates within their race may be unable to date due to a scarcity of potential partners. This study investigated ethnic differences in the dating scene at the University of Southern California. One hundred-twenty undergraduates from USC completed a survey evaluating attitudes towards dating on campus. The survey featured the Dating Anxiety Scale - Adolescents (DAS-A) and the Rosenberg Self-Esteem Scale. Results demonstrate that infrequent dating is related to high dating anxiety in Asians ( $r = -.530, p = .05$ ). Amongst Blacks, however, perceiving few dating mates on campus is related to higher dating anxiety, specifically fear of negative evaluation ( $r = .456, p = .05$ ) and dating anxiety in dating situations ( $r = .467, p = .05$ ). In addition, results reveal a positive correlation between high dating anxiety and low self-esteem for all racial groups except Asians; as dating anxiety increases, one's self-esteem decreases. Whites ( $r = -.820, p = .01$ ) and Latinos ( $r = -.814, p = .01$ ) exhibited the strongest correlation between increased fear of negative evaluation and low self-esteem. The results reveal ethnic differences in the experience of dating anxiety and attitudes towards dating on the college campus. Future research should examine ethnic differences in dating anxiety because issues concerning dating may impede one's adjustment and satisfaction on the college campus. This research can offer campus providers insight into a social issue that may hinder the adjustment of ethnic minorities to the college campus.



## Laura Hernandez

*Psychology*

*Mentor: C. Miranda Barone, Ph.D.*

*Departments: Psychology*

*Female Gang Members Social, Cultural, and Economic Motives for Joining Gangs in South Central Los Angeles*

When hearing the words “gang” and “gang member”, violence and crime are often associated with the two terms. For the most part these associations are justified; however, focusing on this relationship will cause one to miss out on more significant relationships. It is easy to view gang members as separate from ‘us’ and to accuse them of lacking maturity, morals, and most of all rationale. However, after reviewing the research, and learning about these individuals’ environments and personal experiences, it makes perfect sense that they would decide to join a gang. There are a variety of social, political, and economic reasons why youth join gangs. The majority flock to gangs in order to escape physical abuse, emotional abuse, poverty, and family instability. They strive to gain a strong support system, a means of supporting themselves, along with some adventure. The existing research on gangs is very valuable; however most of it focuses on males in large urban cities. Because of this, my research focuses solely on female gang members (and ex-gang members) in the smaller tourist community of Santa Barbara, CA. I will investigate females’ motives for joining gangs and see how they compare to the motives found in existing research.



## Nabila Jahan

*Physics*

*Mentors: William Steier, Ph.D. and Satsuki Takahashi, Ph.D. Student*

*Department: Electrical Engineering/  
Electrophysics*

*Titanium In-diffused Lithium-Niobate  
Fabry-Perot Waveguide Modulators*

Because of its sensitivity to electric fields and ability to withstand electromagnetic pulse attacks, Titanium indiffused Lithium Niobate waveguide has been a reasonable choice to use as a Fabry-Perot resonant modulator (as electric field sensors) in non-metal radio frequency receivers. In this study, the device demonstration of a previously fabricated Titanium indiffused Lithium Niobate waveguide as an electro-optic Fabry-Perot resonant modulator is discussed, along with the use and the fabrication process of the device. Due to power loss, the intensity of the laser light output through the device becomes significantly lower than the input, which deteriorates the performance of the device. As a measurement of the performance of the device as a Fabry-Perot resonator, the power loss is observed, and the laser light output intensity vs. wavelength spectrum is analyzed in comparison to the theoretical spectrum of an ideal Fabry-Perot resonator of similar features.



## Keyaira Kelly

*Communication/ English*

*Mentor: Lanita Jacobs-Huey, Ph.D.*

*Department: Anthropology/American Studies & Ethnicity*

*Disconnected Connections: Do Communication Technologies Vary in their Intimacy among College Students?*

As the use of e-mail and cell phones becomes more frequent, one must consider if these devices create intimacy, or an illusion of intimacy. American youth use technology as a daily means of communication, therefore, it is important to understand how these technologies aid or impede the development of intimate relationships. This study investigated how communication technologies vary in their intimacy among college students. We predicted that students will disclose more information via their preferred communication technology, and that students will feel more comfortable disclosing information in face-to-face interactions as opposed to over a communication device. Inspired by previous self disclosure scales The Intimacy through Mediated Technology scale (IMT) was created to measure the willingness of self disclosure through particular communication mediums in the early to middle stages of relationships. Subjects rated their willingness to disclose information over each communication device. We expected to find a correlation between ranking of given technology (and frequency) and disclosure over said technology. Also, we expected to see a difference between communication technologies based on intimacy ratings. The results demonstrated that high self disclosure over communication technologies correlated with high self disclosure in face-to-face interactions. There were also racial differences in willingness to disclose over particular communication mediums.





## Darren Knight

*Biological Sciences*

*Mentor: Brian Francis, M.D.*

*Department: Keck School of Medicine*

*The Relationship between Patient Satisfaction and Potential Compliance with Glaucoma Treatment amongst African Americans*

Glaucoma is an ocular disease that leads to the degeneration of retinal ganglion cells. In the chronic version of glaucoma, a lack of pain results in patients that are often unaware that their eyesight has begun to deteriorate. They remain unaware of their condition until they suddenly lose their sight due to leaving the disease untreated. Even when glaucoma is diagnosed, a considerable number of patients suffer from blindness due to noncompliance. African Americans suffer from glaucoma at a higher rate than Whites and noncompliance is a significant cause for this gap. This study analyzed the relationship between patient satisfaction and potential compliance with glaucoma treatment by administering surveys to African American patients over the age of forty. The survey questions focused on finding a relationship between patient satisfaction and compliance with glaucoma treatment. The study found that a large portion of participants cited the importance of the length of treatment and experience with the provider, in complying with a primary healthcare provider. Participants consistently mentioned the importance of a provider's qualities and skill but many noted that the price of a consultation could override other factors. Interestingly, the importance of price remained consistent amongst patients from different income ranges. These preliminary results imply that the gap in glaucoma induced blindness between African Americans and other races could be eliminated through intervention targeting the cost of care.



## Karina Ledezma

*Health Promotion and Disease Prevention  
Mentor: Lourdes Baezconde-Garbanati,  
Ph.D., M.P.H.*

*Department: Institute for Prevention  
Research, Keck School of Medicine*

*The Beliefs and Determinants of Physical  
Activity of Latina Women*

Studies show that leisure time physical activity of Latinas is lower than their white counterparts, consequently, predisposing them to complications in both obesity and diabetes. Concerned with low levels of aerobic exercise of Latinas during their leisure time, this study sought to identify and analyze the beliefs determinants influencing Latinas to engage in recreational physical activity, and thereby decreasing their risks of obesity and diabetes. The study focused on Latinas currently pregnant, pregnant within the past year, or those considering becoming pregnant in the near future. Women responded to a survey on physical activity, social support and acculturation. Findings indicated that most respondents had favorable views towards exercising, however, the level of house activities were significantly higher compared to recreational physical activity. Respondents indicated that their motivation to exercise is losing weight and staying healthy, however, obesity and diabetes were not recognized as chief contributors to a sedentary lifestyle. Although there was no significance difference between acculturation and physical activity, results showed that assimilation and integration into both American culture, and the country of birth of their parents, may be a potential indicator of increased exercise. Emotional social support, including encouragement and companionship, was also reported to have a potential relationship that may influence higher levels of physical activity of Latinas. With these findings, interventions should be implemented tailored to increasing level of physical activity of Latinas, as well as knowledge on its relationship to obesity and diabetes during their youthful years and in pregnancy. Interventions should furthermore focus on physical activity programs with encouragement, companionship, and advice on translating attitudes into behaviors in order to increase aerobic exercise during leisure time.



## Erin Lee

*Biology/Spanish*

*Mentor: Michel Baudry, Ph.D. and Claudia Aguirre, Ph.D. Student*

*Department: Neurobiology and Neuroscience*

*Progesterone Inhibits Estrogen-Mediated Neuroprotection against Excitotoxicity by Down-Regulating Estrogen Receptor- $\beta$*

Alzheimer's Disease (AD) is more prevalent in women than in men, suggesting that the depletion of female steroid hormones, such as progesterone (P4) and estrogen, in post-menopausal women aggravates the risk of developing AD. Based on several *in vitro* and *in vivo* experiments on neurodegeneration,  $17\beta$ -estradiol (E2) and progesterone (P4) have been found to be neuroprotective against a variety of insults. However, when E2 and P4 were combined, P4 generally reversed E2-mediated neuroprotection. Recent studies indicated that administering E2 for 20 h to cultured hippocampal slices and then adding P4 for 4 h eliminated the neuroprotective effects of E2 against NMDA toxicity. In this study, we examined the role of the two major subtypes of estrogen receptors, ER $\alpha$  and ER $\beta$ , in E2-mediated neuroprotection against NMDA neurotoxicity in organotypic hippocampal slices. Treatment with E2 did not modify ER $\alpha$  mRNA and treatment with P4 reversed E2-induced increases in ER $\beta$  mRNA and protein levels. However, P4 treatment reversed E2-mediated increase in ER $\alpha$  protein levels. Experiments with an ER $\alpha$  agonist, PPT, or an ER $\beta$ -specific agonist, DPN, indicated that E2-mediated neuroprotection against NMDA toxicity was mediated by the activation of ER $\beta$  but not of ER $\alpha$  receptors. Our results show that E2-mediated neuroprotection against NMDA toxicity is due to the activation of ER $\beta$  receptors. Particularly, P4 treatment following E2 treatment results in the down-regulation of ER $\beta$  mRNA and protein. The understanding of the underlying mechanisms of estrogen-progesterone interactions is important in order to yield a safe and effective treatment for postmenopausal women at risk for developing neurodegenerative diseases.



## Gustavo Lopez

*American Studies &  
Ethnicity/Political Science  
Mentor: George Sanchez, Ph.D.  
Department: American Studies &  
Ethnicity/History*

*Humanity vs. Illegality: Post-9/11 Print  
Media Discourse on Mexican Immigration*

The history of American public attitudes towards Mexican immigrants is complicated as it shifts between periods of tolerance and scapegoating, leaving migrants in an ambivalent position. Economic downturns and national tragedies tend to trigger anti-immigrant sentiment. One such tragedy that had severe consequences for the perception of Mexican immigrants, were the terrorist attacks of September 11, 2001. Though various scholars have examined how discourse around Mexican immigration reflects attitudes present in society, not much research has been done on how 9/11 specifically impacted those discourses. This study examines the shift in the discourse around Mexican immigration in print media since 9/11, specifically in the *Los Angeles Times* (LAT). A second objective of the study is to assess the normalized ideologies present in American society regarding Mexican immigration that are reflected within print media discourse. The first phase of the study consisted of collecting all front-page articles from the LAT that dealt with Mexican immigration and were published between 9/11/2000 and 9/11/2002. Once compiled, the articles were submitted to a content analysis of terms used to describe Mexican immigrants, which was guided by Critical Discourse Analysis. The study found that there was a significant decrease in the number of articles written that referenced Mexican immigration in general, but more importantly, an even sharper decline in articles that had an affirmative slant in their representations of migrants. Furthermore, post-9/11 articles were shown to focus on the ‘illegality’ of migrants while de-emphasizing their humanity thus framing them as undeserving of rights.



## Andrea Martinez

*Political Science/Chicano Studies/Psychology*  
*Mentor: Ricardo Ramirez, Ph.D.*  
*Department: Political Science/American*  
*Studies & Ethnicity*

*The Effect of Framing on Emotion and*  
*Policy Opinion: An Investigation of the*  
*Illegal Immigration Issue*

Politicians recognize the value of emotional appeals when attempting to influence opinion and garner public support. However, research concerning the impact of rhetorical framing on emotions often considers emotion to be an individual level-phenomenon. Using Intergroup Emotions Theory (IET), this study investigates the effect of framing upon emotional responses and political perspectives regarding the issue of illegal immigration. In an online survey, participants read a simulated excerpt from a presidential campaign speech that argued for an increase in border security to curb illegal immigration and its negative impact on Americans. The excerpt employed either a thematic frame, which focused on statistics related to immigration, or an episodic frame, which focused on the plight of an individual. Further, the ethnicity of a “victimized” group or person varied within the frame. Contrary to findings from prior framing studies, results of this study showed that episodic frames were not significantly more emotionally engaging than thematic frames. Also, both frames elicited similar levels of change in policy opinion, but in a direction opposite from that of the excerpt’s argument. As predicted from the racialized nature of illegal immigration, emotional reaction and policy opinion differed according to participant race and featured race. This study helps reveal the complexities of responses among different racial groups to immigration rhetoric. Results suggest that groups’ reactions to rhetorical strategies are particular to the policy issue at hand, and that race is an important factor to take into account when seeking to understand the opinions and decisions of members of the electorate.



## Breanna Morrison

*Policy, Planning and Development*

*Mentors: Leonard Mitchell, J.D., M.B.A.,  
and Terry Cooper, Ph.D.*

*Department:*

*School of Policy Planning and Development*

*How Community Involvement Affects  
Public Housing*

*Redevelopment Projects in Los Angeles*

*Case Study: Jordan Downs Redevelopment  
Project*

The nation-wide trend to replace public housing projects with mixed-income, mixed-use, developments has left some low-income residents displaced. This study investigates how community involvement affects public housing redevelopment projects in Los Angeles city in order to increase resident engagement and minimize displacement. Involvement was gauged for 15 major public housing developments using community indicators and statistical data like changes in crime rates and civic participation. This study used census and archival data to correlate community involvement, resident satisfaction, and redevelopment efficiency. In addition, a case study of the Jordan Downs redevelopment project in Watts was conducted using field observations and data analysis to collect information on resident satisfaction and the level of community involvement. The results of this research shed light on obstacles that arise when housing authorities attempt to initiate community involvement, barriers to resident involvement, methods to overcome those barriers, and the consequences of excluding residents in the redevelopment process from the start. Redevelopment projects that engaged the residential and surrounding community early on in the process had greater success in achieving community indicators.



## Aileen Ng

*Classics/Piano*

*Mentor: Thomas Habinek, Ph.D.*

*Department: Classics*

*Myth of Laocoön:*

*Changing Perceptions of Pathos*

This study analyzes the changed perceptions of the myth of Laocoön and his sons through the ancient classical period from 8th century BC to 4th century AD, particularly focusing on the evolving pathetic emotional responses to the legendary story. From the perspective of New Historicism, I analyzed the significance of pathos and the negotiation of justice in each retelling of the myth within its historical and cultural context. Many have reinterpreted the myth of Laocoön as an analogy to suit their own purposes, from the ancient Romans to Karl Marx who identified men who do not try to free themselves from a capitalist society as Laocoöns. But the reason for this subject to be utilized as a popular allusion has not been clearly identified. So, to comprehend the myth's prominence throughout centuries of history, one must first understand its original usage in the appropriate context. Translations and analyses of Homer's *Iliad*, fragments from Arctinus' *Sack of Iliion*, Virgil's *Aeneid*, Petronius' *Satyricon*, and Quintus Smyrnaeus' *Posthomerica* illuminate the tale's earliest motives as a piece of influential literature. Through studying the five texts in chronological succession, the pathos elicited becomes more pronounced in that the authors' struggle to justify this story of injustice becomes more obvious and difficult. The perseverance of the myth's significance is owed to the complexity of human reaction to pathos and injustice. The staying power of such a legend resides in its ability to challenge readers and authors to rationalize injustice against their moral judgment.



## Adam Perez

*Journalism*

*Mentor: Laura Pulido, Ph.D.*

*Department: American Studies & Ethnicity*

*From White to Brown: Latino Racial Identity in post WWII Los Angeles*

While studies have discussed the construction of race within the Latino community, there is lack of focus on the post WWII era. This era is crucial to Latino racial politics since it follows a time of racial ambiguity. The Zoot Suit Riots, which exposed the racial turmoil of wartime Los Angeles, along with court cases, illustrate a discrepancy in the ethnic categorization of Mexican as racially White but still inferior. Prior studies have presented external defining processes but do not address how Latinos self identified. This research addresses the role of political organizations and their use of racial identification in the promotion of a political consciousness. Archival research on the Civil Rights Congress, Los Angeles Chapters, a progressive grass roots organization, was conducted from 1945 to 1956. Further investigation conveyed that the CRC's classification of Mexican racial identity diverged from what the law categorized as "White". The progression of the Civil Rights Congress in Los Angeles transformed ideals and goals set forth by the organization. Findings demonstrated that although Mexicans were categorized as White by law, they did not benefit from the same privileges as Anglo Americans. Many Latinos rebelled against their ascribed White racial categorizations as a result of being cast out from mainstream American "Whiteness." Thus, Latinos in post World War II Los Angeles set precedence to the beginning emergence of racial politics in the 60s and 70s and into today. Racial identification within the Los Angeles Mexican community has shifted and most importantly was ignited by a political consciousness.





## Jorge Rodriguez

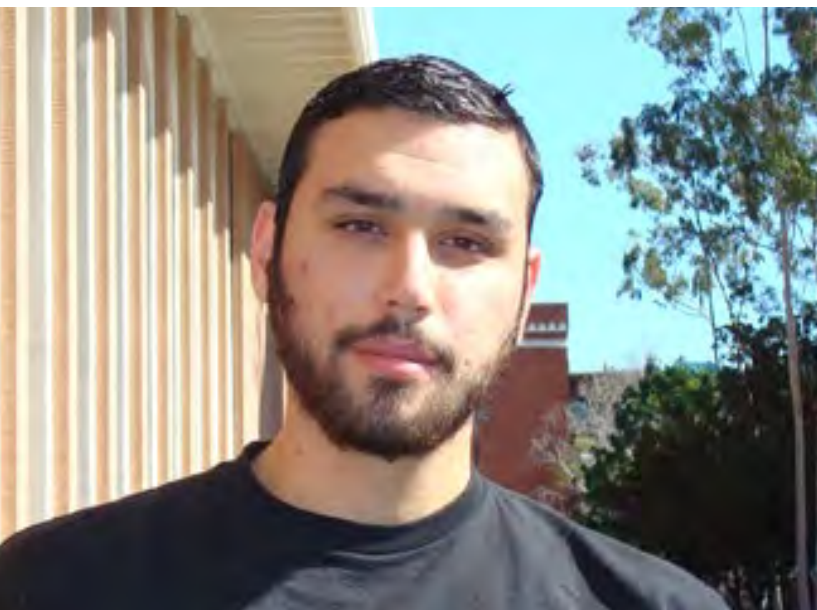
*Physics*

*Mentors: Edward Rhodes, Ph.D.*

*Department: Physics/Astronomy*

*Variation of Width, Asymmetry, and Frequency of Solar Pressure Modes during the Sun's Magnetic Activity Cycle*

The mechanism of the sun's magnetic activity cycle is one of the major questions that have persisted in solar astronomy for the past three decades. It is believed that by studying structural properties of the sun such as the activity cycle, we will be able to make important advances in understanding the solar interior and solar evolution that can then be applied to other more distant stars. In this project, the author will use a global helioseismic approach to examine width, asymmetry, amplitude and frequency parameter shifts of high degree and high frequency pressure modes within the sun and compare them to corresponding changes in the level of solar activity for the year 2001. The data used consists of three-day time series power spectra generated by a group at the University of Southern California and initially collected by the Global Oscillation Network Group. This network consists of six identical telescopes positioned around the world in order to maximize the continuity of solar observations and decrease down time. These power spectra were then renormalized, averaged with respect to the azimuthal order  $m$ , and fit to both symmetric and asymmetric theoretical profiles. Differences in frequency, width, amplitude and the asymmetry parameters are compared to computed activity differences using a linear regression. Understanding how different mode parameters change with the solar cycle is paramount to furthering our knowledge of the solar cycle, and of stellar evolution and structure in general. Other similar examinations and inversions of pressure modes have lead to recent discoveries regarding internal solar structure and processes that are now known as the hallmarks of Helioseismology.



## Luis Valdez

*Health Promotion and  
Disease Prevention*

*Mentor: Robert Lint Sagarena, Ph.D.*

*Department: Religion*

*Botánicas in South Los Angeles: Attitudes  
and Beliefs Associated with their Roles as  
Complementary and Alternative Medicine  
(CAM) Sites in the Latino Community*

The purpose of this study is to examine the therapeutic roles *botánicas* perform and how they service their clientele. *Botánicas*, esoteric stores that market herbal remedies and religious paraphernalia, are found in most urban cities across the United States that have a sizeable Latino population. This research was inspired by prior studies involving these stores, which have noted that these locations could potentially serve as Complementary and/or Alternative Medicine (CAM) sites for their culturally specific customers. Moreover, prior research has also examined the manner in which the United States delivers a universal approach to healthcare, and many have concluded that this system is ineffective when addressing culturally diverse populations. Thus, this study seeks to explore the *botánica* as a potential CAM site by analyzing the attitudes and beliefs of *botánica* customers towards this subject- doing so, will confirm their roles as alternatives to biomedicine and/or possible complement to modern healthcare. Participants were chosen based on the criterion that they were paying customers of a South Los Angeles *botánica*. The participants were interviewed on-site and were asked to answer ten open-ended questions about their experiences and attitudes towards the stores. The results indicate that the stores do provide their customers a complement to healthcare and should be considered a CAM site. Furthermore, *botánicas* present public health officials with an additional resource in dispersing public health campaigns to a specific population, and should be utilized accordingly.



## Ashley Williams

*Broadcast Journalism, Spanish,  
International Relations*

*Mentor: Erna R. Smith, Ph.D. and  
Philip Seit, Ph.D.*

*Department: School of Journalism  
and Psychology*

*Connecting Television Network News to the  
College Aspirations of African American  
High School Students*

Television news impacts individuals' perception of themselves. Compared to local news, network news has a greater impact on its audiences due to its national presentation of issues and current events. Previous studies demonstrate that network news' portrayals of African Americans increase the endorsement of African American stereotypes and racial attitudes within society. Since African American adolescents watch more television than any other demographic, increased exposure to television network news programming may affect their college aspirations and self-concepts. This experiment investigates if viewing television network news programming affects the college aspirations of African American high school students. An online survey was administered to sixty African American students recruited from Crenshaw High School in Los Angeles, California. Students viewed two television network news packages and responded to follow-up questions. One package focused on a societal issue selected as most interesting to the subject, and the second featured President Barack Obama providing solutions to solve the societal issue. Results showed that subjects believed network news programming encouraged negative stereotypes of African Americans. Results also revealed that network news programming, which included a successful African American providing solutions to societal issues, increased college aspirations and self-concepts. This research encourages future discussions on stopping the endorsement of stereotypical portrayals of African Americans in television network news and using network news to encourage African Americans to attend college.



## Suzanne Williams

*Health Promotion and Disease Prevention*

*Mentor: Shelia Murphy, Ph.D.*

*Department: Annenberg School for Communications*

*Television and Its Effects on Contraceptive Use in Young Adults*

Before attending college, students spend more time with mass media (television, music, magazines, and movies) than in school or with their parents. Most of the media that students are exposed to includes some sort of sexual content and less than 1% of that content is considered as portraying sexually healthy behavior. Previous studies have linked increased media usage to the earlier initiation of sexual intercourse and the prediction of teen pregnancy. In this study, I apply the framework of the social cognitive theory and the cultivation effect in order to understand why television shows have influenced the behavior of its viewers. The purpose of this study is to determine if an attachment to shows with high sexual content affect contraceptive usage in young adults, specifically college students (18-25). Data was collected through an online survey (Qualtrics.com) at the University of Southern California using a sample of about 60 male and female students. Participants answered questions about the sexual messages portrayed in their favorite shows and their past sexual relationships. The media's failure to show realistic consequences of unsafe sex is a huge issue because television is ranked second only to school sex education programs on where people learn about sex. When people imitate the sexual behaviors shown on television, they are setting themselves up for consequences such as unintended pregnancies and sexually transmitted infections. More studies need to be done to evaluate the media's influence on its viewers so that public health officials can design interventions to combat the media's negative effects.



## Tenlong Zhao

*Business Administration*

*Mentor: A. Cyrus Arman, Ph.D.*

*Candidate in Physics*

*Department: Physics*

*Exploring the Positive Effects of Tax and Subsidy on California Homeowners' Earthquake Insurance Purchase*

*"When it comes to earthquakes, the question for many Californians is not if they will hit, but when and how hard." - Bill Lockyer, California State Treasurer*

Looming concerns over the seismic risks present in California beg for one question, how prepared are Californians hedging against the imminent disaster? Purchasing adequate earthquake insurance remains one of the best ways for homeowners to be prepared for the next "Big One". However, because people do not think probabilistically on their purchase decision, (Huber et al., 1997) California homeowners are vastly under purchased on earthquake insurance; according to CEA (California Earthquake Authority), only about 12 percents of California homeowners have earthquake insurance, down from 30 percents in 1996. Uninsured earthquake damages will not only place extreme financial stress on individuals, but also remain a major challenge for the state's budget planning. Love them or hate them, taxes and subsidies have always been tools for the government to effectively influence consumer behaviors. It is then arguable that California state government may achieve the goal of increasing its homeowners' earthquake insurance purchases by imposing mandatory earthquake taxes along with incentives for earthquake insurance purchases (e.g. a tax credit subsidy). By conducting a survey geared towards California homeowners on the issues raised above, this study brings new insight into homeowners' attitudes toward taxes and subsidy, which are directly related to their decisions to purchase earthquake insurance. This study has an important implication in the sense that it actively seeks solutions to ameliorate the state's earthquake preparedness.

# THE EFFECT OF FRAMING ON EMOTION AND POLICY OPINION: AN INVESTIGATION OF THE ILLEGAL IMMIGRATION ISSUE



## ANDREA MARTINEZ

*Political Science/Chicano Studies/Psychology*

*Mentor: Ricardo Ramirez, Ph.D.*

*Department: Political Science/American Studies & Ethnicity*

*McNair Scholars Program*

*University of Southern California*

Politicians recognize the value of emotional appeals when attempting to influence opinion and garner public support. However, research concerning the impact of rhetorical framing on emotions often considers emotion to be an individual level-phenomenon. Using Intergroup Emotions Theory (IET), this study investigates the effect of framing upon emotional responses and political perspectives regarding the issue of illegal immigration. In an online survey, participants read a simulated excerpt from a presidential campaign speech that argued for an increase in border security to curb illegal immigration and its negative impact on Americans. The excerpt employed either a thematic frame, which focused on statistics related to immigration, or an episodic frame, which focused on the plight of an individual. Further, the ethnicity of a “victimized” group or person varied within the frame. Contrary to findings from prior framing studies, results of this study showed that episodic frames were not significantly more emotionally engaging than thematic frames. Also, both frames elicited similar levels of change in policy opinion, but in a direction opposite from that of the excerpt’s argument. As predicted from the racialized nature of illegal immigration, emotional reaction and policy opinion differed according to participant race and featured race. This study helps reveal the complexities of responses among different racial groups to immigration rhetoric. Results suggest that groups’ reactions to rhetorical strategies are particular to the policy issue at hand, and that race is an important factor to take into account when seeking to understand the opinions and decisions of members of the electorate.

# INTRODUCTION

A sizeable body of research supports the notion that emotion often plays a central role in impacting individuals' political decision-making processes. It is not surprising, then, that attempts by news media, campaigns, and others seeking to influence opinion and garner public support have used emotional appeals to frame political issues (Gross, 2008). Although much of the framing research focuses on cognitive reactions (e.g. Iyengar, 1991; Kinder & Sanders, 1990; Nelson & Kinder, 1996), the existing studies that examine emotional responses to framing provide insight for understanding the role of emotion in political communication. However, since emotion has traditionally been considered an individual level phenomenon (Smith, Seger & Mackie 2007), even these existing studies on emotional and framing provide little information about the possible effects of issue-framing on group-level emotions. This study extends Gross' (2008) work by examining whether or not the use of episodic and thematic framing in a persuasive message affects group-level emotional responses and policy opinions of voters. Intergroup Emotions Theory (IET) is used to assess how the priming of ethnic group identity within episodic and thematic frames impacts emotional reactions of voters.

## REVIEW OF LITERATURE

### FRAMING BACKGROUND:

Throughout the framing literature, there exist varying definitions of "frames." Druckman (2001) categorizes these definitions into frames in communication and frames in thought. Frames in communication refer to a speaker's uses of words, images, phrases and presentation styles when communicating with another (Cappella & Jaimeson, 1997; Gitlin, 1980; Iyengar, 1991), whereas frames in thought refer to what an individual sees as relevant to understanding a situation (Goffman, 1974; Sweester & Fauconnier, 1996). Although frames are consistently recognized as existing in both public discourse and in the minds of individuals, (Brewer, 2001; Druckman, 2001; Iyengar, 1991), authors generally agree that frames in communication play a vital role in influencing frames of thought. Therefore, it

is apparent why those looking to understand the catalysts for people's political opinions and decisions would analyze frames of communication—the foundation of this "framing effect."

For political elites, framing is a way of conveying complex social policy problems and telling audience members which aspects of those problems to focus their attention on. According to Gurevitch and Blumler (1990), frames target audience members directly through press conferences, debates, advertisements, and speeches. Speeches are considered a primary source of elite political thought (Gamson and Modigliani 1987), and speeches during political campaigns, when a candidate's success is highly contingent on swaying members of the electorate, utilize strategy targeted toward persuading audiences of a particular demographic (e.g. a political campaign speech at a conference for the Council of La Raza Unida, or a speech presented to the NAACP). This study will analyze issue-framing in campaign speeches since this has not been a central focus in the literature (rather, issue-framing in news media has been the focus).

An important assumption underlying the political communication framing literature is that people are sensitive to contextual cues when they express opinions or make decisions. How an issue or event is "framed," by emphasizing certain aspects of that issue over others, is a contextual cue that could be used within political candidates' campaign speeches to influence audience members' judgments and decisions about that particular issue (Gross, 2008; Iyengar, 1991). The shaping of individuals' opinions on issue-related policies has been reflected by multiple studies that emphasize the significance of news media's imposition of frames on particular issues (e.g., Brewer, 2001; Gilliam & Iyengar, 2000; Gross, 2008; Gross & D'Ambrosio, 2004; Iyengar, 1991; Iyengar & Kinder, 1987; Iyengar & Simon, 1993; Jacoby, 2000; Ju, 2006; Kinder & Sanders, 1990; Nelson, Clawson, & Oxley, 1997). Although political speeches have not been sufficiently investigated as a source of framing, the existing research on framing within news media provides relevant information applicable to understanding framing in various forms of political communication, including speech.

### FRAMING AND EMOTION:

Some existing framing studies focus on frames specific

to an issue or context, while others spotlight more general, rhetorical device-like frames, such as episodic and thematic framing. Kinder & Sanders (1990) assessed emotional responses to varying frames specifically related to affirmative action. Affirmative action framed as an unfair advantage proved to be associated more strongly with negative emotions than did affirmative action framed as reverse discrimination. Gross (2008) analyzed the effect of episodic and thematic framing on emotional response and policy opinion. Episodic framing of issues was more emotionally engaging, while thematic framing was more persuasive. Both studies, along with others (e.g., Brewer, 2001), suggest that framing operates through both affective and cognitive channels. Thus, emotional responses, not just cognitive ones, are shown to depend on how an issue is framed.

An important characteristic of the framing argument that can be taken from these studies on news media and applied to analyzing frames in other forms of communication is its derivation from Appraisal Theory (e.g., Gross, 2008; Gross & D'Ambrosio, 2004). Appraisal Theory, while there are multiple versions (e.g., Ellsworth, 1991; Lazarus, 1991; Roseman, 1991), suggests that events, by themselves, do not determine emotional responses, but rather it is the evaluations and interpretations of those events. This theory claims that cognitive comparison of an actual state to a desired or desirable state is an essential precursor of emotions. Therefore, if frames alter the information and considerations audiences have available when interpreting events, it follows that emotional responses should differ depending on the frame used to present an issue.

Gross (2008) applies Appraisal Theory to understand emotional responses to episodic and thematic frames. While episodic frames offer a specific example or case study, thematic frames place issues into a broader context. Consistent with Appraisal Theory, the type and strength of emotions elicited depends on whether the message recipient interprets the situation as consistent or inconsistent with their expectations and desires. Because episodic frames manipulate the way audience members interpret events often by providing them with information regarding the plight of an individual, this “human interest” information they have available is expected to be emotionally engaging and increase sympathy for a featured subject. Therefore,

the “human interest” aspect of an episodic frame is expected to be more emotionally engaging than are statistics and generalities of a thematic frame (Gross 2008). Iyengar (1991), however, argued that episodic frames might instead lead people to hold featured individuals responsible for their own dilemmas and divert attention from societal responsibility, consequently reducing support for programs designed to resolve social problems. Thus, there is strong evidence suggesting that episodic frames could actually be less persuasive in a context that might lead individuals to attribute responsibility for a problem to the featured individual.

While Gross’ study uses emotional appraisal to help explain the way frames affect emotion, a fundamental characteristic of Appraisal Theory missing from this research is the way individual and situational factors interact to generate different emotional responses. Roseman (1991) and Lazarus & Lazarus (1994) state that two individuals with different appraisals of the same event may react with different emotions. At the same time, two individuals with the same appraisals of different events should respond with the same emotion. This emotional phenomenon reflects people’s varied personal goals and beliefs, which then influence the personal meaning individuals create from similar circumstances (Lazarus & Lazarus, 1994). Such meaning exists innately in the “cognitive structures and commitments developed over a lifetime that determine the personal and hence emotional significance of any person-environment encounter” (Lazarus, 1984, p.). Thus, it is an individual’s identity, reflecting these “cognitive structures and commitments developed over a lifetime,” or an individual’s “culture,” so called by Lazarus & Lazarus (1994), that influences the goals and beliefs which cause relational meanings one constructs in appraising situations. These assertions involving the rudiments of Lazarus’ appraisal theory engender implications for analysis of individuals’ differing emotional responses, including that which has been presented in the framing literature. When making a framing effect argument, it seems important to investigate the audience members’ identity and how it will condition the individual over time to be more or less impacted by particular frames. Identity or culture factors of Appraisal Theory are often missing from the framing literature when analyzing differing emotional responses among audience



members.

Although a few existing framing experiments and studies address racial identity in some circumstances, such as how manipulating the racial identity of a featured individual influences people's responses (e.g., Gilliam & Iyengar, 2000; Gross, 2008; Iyengar & Kinder, 1987), there is little focus on how the racial identity of participants might also affect their responses. For example, Gross (2008) was interested in whether the race of the individual portrayed in the episodic frame would alter the emotional impact of that frame on the subject. She included in her experiment a race manipulation to determine the level of sympathy and pity expressed by participants and to determine if the emotional effects of the episodic frame would differ when a news column featured a Black woman versus a White woman.

Gross found that empathy was not specific to the race of the individual portrayed. However, had the race of the subjects been taken into consideration, Gross may have discovered something further. For example, there could have been increased sympathy expressed by Black subjects when reading the news column about the Black woman, and more negative feelings expressed when reading the news column about the White woman. Such findings could be very advantageous for those trying to influence the opinion of a subset of the population, as often is the case when presidential candidates give campaign speeches. These framing speculations, derived in part from Lazarus' explanation of how identity and culture influence emotional appraisal patterns, necessitate further investigation of group-related identities, such as race, as a factor influencing emotional responses. Therefore, I now review the relationship between framing, social group identity, and emotion.

## **FRAMING, GROUP IDENTITY, AND EMOTION:**

Nelson and Kinder (1996) relate framing to group identity by arguing that the importance of group sentiment in public opinion depends on how issues are framed in elite rhetoric. They conducted four experiments that presented subjects with variously framed issues, such as government spending to assist the poor. Each policy issue lent itself to "group-centric thinking,"

which is characterized as leading "individuals to reach opinion by drawing on their thoughts and feelings toward the group in question" (Nelson & Kinder, 1996, p.) Their analysis suggested that power of group attitudes to influence opinion on social policy depends on how the policy is framed. They found that impact of group attitudes on policy opinion was significantly larger when the policy had been framed in a way that emphasized the social group at the center of the controversy. While their study provides insight to the relationship between group identities and framing, it lacks an explanation of the role emotions play when these group-centric frames are employed.

Specifically, Intergroup Emotions Theory (IET) (Mackie, Devos, & Smith, 2000; Smith & Mackie, 2006) speaks to the previously described assertion that identity is a crucial component of emotional appraisal theory. Intergroup emotions theory (IET) also follows from appraisal theory by using the conception of the self to connect events and goals seen as relevant to a group with emotions felt by an individual who identifies with the group (Ginger-Sorolla, Mackie, & Smith, 2007). In other words, when an individual identifies with a group, that in-group becomes part of the self, thus acquiring social and emotional significance (Smith, Seger, & Mackie, 2007; Tajfel, 1981). The IET literature suggests that group allegiances and loyalties are an important factor in conditioning political stimuli produced by campaigns.

Research by Hutchings et. al. (2006) revealed an understanding of identity-based emotions in response to threatening or reassuring political stimuli. Descriptions of George W. Bush and Al Gore, as either opposed to or supportive of black interests, elicited different emotions for black and white participants. Huddy & Mason (2008) use a similar theoretical approach, but highlight the importance of partisan allegiances, rather than ethnic allegiances, to eliciting emotions within a campaign.

The focus of IET on who is most likely to react with strong feelings to political stimuli, rather than only on how or which emotions are elicited by political stimuli, offers insight to the idea that groups respond differently to emotionally appealing stimuli. Current framing literature, which uses appraisal theory for theoretical foundation, can be expanded upon by incorporation

of IET. The introduction of IET to current framing research will further explore the complexity of frames, which are not likely to arouse uniform positive or negative responses in all people (Huddy & Mason, 2008). It is important to understand how their impact, like many political stimuli, depends on voter's identity-based allegiances and loyalties (Miller and Krosnick, 2004). Thus, this study examines if emotional responses and policy opinion differ in between episodic and thematic frames, and if priming of ethnic group identity within these frames impacts emotional reactions and policy opinions of voters.

## **ISSUE OF ANALYSIS: ILLEGAL IMMIGRATION:**

The value of Latino support to presidential candidates and their parties was powerfully displayed in the 2008 election. Latino support for the Republican presidential candidate fell from 39% in 2004 to 31% in 2008. Election results and national surveys revealed that many Latinos were driven away from the GOP most specifically due to the harsh anti-immigrant tactics and rhetoric of conservative political elites (America's Voice, 2008). By 2005, most estimates of undocumented immigrants in the United States were cited as 11-12 million, but the overall range was from 8-20 million (Garcia & Sanchez, 2008). With illegal immigration now often ranked among the top five biggest problems facing the US according to national polls in 2008, it is no wonder that the issue has become a highly debated topic among politicians. According to America's Voice, a campaign to advance immigration reform, Republican opposition to immigration reform legislation and support of harsh, anti-immigrant policies has pushed Latinos further toward the Democratic party since 2004 (America's Voice, 2008).

The 2008 election was certainly not the first case of Latino mobilization as a response to conservative threats against illegal immigrants. For example, in 1994, California Governor Pete Wilson led a campaign for the state's Proposition 187, which was a severe measure designed to withhold not only health and social services from undocumented immigrants, but also withhold educational services to the children of those immigrants. Harsh anti-immigrant ads played on the fears and xenophobia that some people hold and they seemed to be designed to scare voters into

supporting the proposition (Garcia & Sanchez, 2008). Although the proposition did pass, this campaign led to a mobilization of Latino voters. The Republican advertising campaign, run at a time when the state was coming into majority-minority status, greatly hurt the position of the Republican Party in California among not only Latino voters, but unexpectedly among white voters (Garcia & Sanchez, 2008; Bowler, Nicholson, & Segura, 2006).

When considering why illegal immigration measures have historically incited mass response from not only illegal immigrants, but also Latino citizens, we begin to address the underpinnings of Intergroup Emotions Theory. Garcia and Sanchez (2008) claimed that Latinos throughout the nation, regardless of how they felt personally about immigration, were offended at Proposition 187 attacks because they were attacks on members of their own ethnic group. Even third- and fourth-generation Latinos had expressed sympathy for people from their ancestral homelands. Although this proposition, and other anti-immigrant measures, were not explicit attacks on Latinos, they were perceived to be "anti-Latino" and the Republican Party was subsequently perceived as anti-Hispanic (Garcia & Sanchez, 2008). There is much evidence suggesting that illegal immigration and its policies are strongly racialized as an inherently Latino-related issue (Chomsky, 2007; Beasley 2006; Barreto et. al., 2008; Brader & Valentino, 2007). For example, a study by Brader and Valentino (2007) found that people's opinions on illegal immigration are strongly influenced by their level of prejudice toward Latinos.

When drawing from Intergroup Emotions Theory, it follows that if Latinos perceive illegal immigrants as part of their in-group, attacks on illegal immigrants will be taken as attacks against the entire ethnic group. While some authors attribute Latino participation and support for a largely immigrant cause to group solidarity (Barreto et. al., 2008), Intergroup Emotions Theory goes even deeper to address the social-psychological underpinnings of that group solidarity.

The issue of illegal immigration is unique in that it provokes the perception of threat in different ways and by various groups. In addition to Latinos seeing anti-immigration rhetoric as a threat against the in-group, many non-Latinos see the actual

flow of illegal immigration to the United States as a threat as well. Immigration is sometimes charged as a threat to American culture, but more often perceived as an economic threat (Beasley, 2006; Garcia & Sanchez, 2008; Rivera, 2008; Brader & Valentino, 2007). In fact, much of the anti-immigrant rhetoric that Latinos have reacted to, especially in the 2008 election, revolves around the accusation of illegal immigrants as a risk to the economic welfare of American citizens. Illegal immigrants are blamed for causing and exacerbating a wide variety of problems in the United States, especially unemployment and low wages (Chomsky, 2007). This “immigrants take American jobs” argument has been the most commonly used to justify the need for a restrictive immigration policy. The logic is that mass immigration inundates the job market with low-skilled workers, creating a loose labor market and resulting in lower earnings and less opportunity for advancement for low-skilled American citizens (Chomsky 2007; Rivera 2008; Krikorian 2008). Therefore, illegal immigrants are seen as a double threat considering their status as both non-majority (i.e. Latino) and non-American (i.e. “illegal”). The focus of this study on illegal immigration, which provides a rich context of ingroup-outgroup threat, will help us understand how certain frames might prime group identity, increase awareness of threat, and result in affective reactions and political opinions suggestive of subsequent political behavior.

Political elites, especially while running for office, have used various rhetorical techniques, including episodic and thematic framing, when debating, discussing, or giving speeches on the issue of illegal immigration. Because much research supports the notion that emotions impact political decisions, these script techniques are often employed in hope that “an emotional nerve be touched” among targeted populations (Beasley 2006). As discussed earlier, Gross (2008) found that episodic frames elicited more sympathetic emotions than thematic frames, but thematic frames elicited stronger change in opinion toward the persuasive direction of the frame (i.e. favoring a reduction of mandatory minimum sentencing). In a 2008 Democratic Primary debate in California, candidates Barack Obama and Hillary Clinton utilized episodic and thematic framing strategies when responding to a question regarding illegal immigration. An African American woman claimed that illegal immigrants were

increasing unemployment in the African American community by taking jobs (again, here is that threat to the in-group), and wanted to know how the candidates would address that issue once in office. Hillary Clinton used an episodic frame stating:

“I believe that in many parts of our country, because of employers who exploit undocumented workers and drive down wages, there are job losses. And I think we should be honest about that. There are people who have been pushed out of jobs and factories and meat processing plants, and all kinds of settings. And I meet them. You know, I was in Atlanta last night, and an African-American man said to me, ‘I used to have a lot of construction jobs, and now it just seems like the only people who get them anymore are people who are here without documentation.’ So, I know that what we have to do is to bring our country together to have a comprehensive immigration reform solution” (Transcript: Democrats debate in CA, 2008).

Barack Obama took a different position claiming that illegal immigrants should not be used as a scapegoat for increasing unemployment and a failing economy. He used a thematic frame, identifying statistics that all ethnic groups were suffering from unemployment and it was not a result of illegal immigration (Transcript: Democrats debate in CA, 2008). Obama and Clinton possessed different positions on the issue and used different framing techniques to impact their audience.

While I am interested in affective responses to episodic and thematic framing, I am also interested in how priming of ethnic identity within these frames impacts intergroup emotions. For example, Hillary Clinton’s response to the illegal immigration question indirectly

perpetuated an in-group threat by telling the African American questioner that it was an “African American man” who was being displaced from the workforce as a result of illegal immigration. This study attempts to understand, using Intergroup Emotions Theory, how a message’s rhetorical focus on victims of the same in-group identity elicit emotions, and if those emotions may be enhanced or reduced depending on an episodic or thematic frame.

Similarly, when Obama and McCain spoke to Latino audiences using episodic frames, they spoke about individuals with ethnically identifiable Latino names, such as “Felicitas,”

“Francisco,” (Campaign Speeches, Obama to NALEO, 2008) or “Maria Hernandez-Gonzales” (Campaign Speeches, McCain to the National Council of La Raza, 2008). Intergroup emotions theory suggests that such a strategy produces identity salience, leading one to identify with the victim and feel emotions of sympathy and associated anger or fear toward the threatening out-group (Yzerbyt et al., 2003). Because emotions such as fear, anger, and sympathy, have been shown to affect political behavior in various ways (Brader & Valentino, 2007; Brader, 2005; Huddy, Feldman, & Cassese, 2007; Lippia & Menning, 2007), the ethnic priming of these emotions can be used to a politician’s advantage. Based on intergroup emotions, I predict varying the featured ethnic identity within episodic and thematic frames will have an effect on ethnic groups’ emotional responses and policy opinions when candidates express conservative rhetoric about illegal immigrants being an existential threat and America’s need for heightened border security. This anti-immigration stance will allow for an in-depth analysis of intergroup emotions and framing since it is, as said above, laden with intergroup threat on multiple levels.

## RESEARCH HYPOTHESIS

H1: Episodic framing of illegal immigration policy will elicit stronger emotions than thematic frames on the same topic

Drawing from Gross’ (2008) research concerning episodic and thematic framing, I hypothesize that emotions will be stronger after exposure to an episodic frame regarding a “victim” of illegal immigration. Particularly, the “human interest” aspect of episodic frames will elicit more sympathy than thematic frames, as was the case in Gross’ study.

H2: Thematic frames will be more persuasive than episodic frames.

When comparing pretest opinions on immigration to post-manipulation opinions on immigration, I predict both episodic and thematic frames to have a statistically significant effect on policy change in the direction of the argument (i.e. the argument will render participants less favorable toward

immigration). However, based on research by Gross (2008) and Iyengar (1991), I expect the change in policy to be greater among those who receive a thematic frame.

H3: Race congruent frames, where the race of a featured victim is congruent with that of the message recipient, will elicit more sympathy than race incongruent frames, where the race of a featured victim does not match that of the message recipient.

Scherer (2001) suggested the appraisal theory foundation of intergroup emotions can be used to explain sympathetic emotions resulting from social identity primes. He claims that shared emotion between two individuals is based on our ability to infer the needs and goals of others and to share values and norms. Based on this framework, the likelihood of a sympathetic response to the plight of another person is greatly enhanced if that person belongs to the same social group. This is the case because sharing a greater amount of relevant appraisal criteria, as well as the existence of a greater ability to infer the underlying appraisal processes of the other (Garcia-Preito & Sherer, 2006; Sherer, 2001; Yzerbyt, 2003) are what lead to the emotional convergence predicted by intergroup emotions theory.

H4: Responses may vary depending on the race of the featured victim and the race of the participant.

Based on the racialized nature of the illegal immigration issue, I expect racial identity to play a role in people’s responses to a message on this topic. For example, when presented with an anti-immigration frame, I would expect Latinos to react somewhat differently from the general sample because of their distinctive and historical relationship with the issues of immigration and illegal immigration. I expect that Latinos will react in ways opposite to those predicted by the general hypotheses because they see the anti-immigrant message as a threat, leading them to buffer against that negative feeling by reacting with an even more positive stance on immigration. Other ethnic groups may respond differently depending on how they view illegal immigrants (e.g. double threat, a partial threat, or as entirely part of the in-group and not a threat at all).

# METHODOLOGY

## PARTICIPANTS

Participants were recruited from the 2007 list of Los Angeles County registered voters, obtained from the Los Angeles County Registrar of voters. The subject pool consisted of voters with recorded email addresses. A random selection tool in SPSS was used to obtain a random sample of 100,000 people; they received an invitation to the study via email. Of these, 2,051 started the survey and 276 dropped out, resulting in a final N = 1,775 (50% female; 50% male; 11.6% Asian, 11.7% Latino, 4.7% Black, 62.3% White). Among Latinos, 65% said they traced their ethnic heritage to Mexico. About 15% of the total sample were foreign born, the median age was 37 years old, Further, the political affiliation breakdown was 46% Democrat, 17% Republican, and 23% Independent.

The entire study was conducted online and responses were recorded online. Subjects had approximately three weeks from the end of March to mid-April, 2009, to respond to the recruitment email and participate in the study. The first 100 subjects who took the survey were compensated with a \$10 gift-card to their choice of three online stores. All other subjects who participated were entered into a drawing for a \$250 Visa gift card. Upon completion of the survey, participants were debriefed as to the actual goal of the study and thanked for their participation.

## DESIGN

The experiment employed a 2 (frame: episodic, thematic) x 4 (target race: White, Black, Asian, Latino) factorial design and subjects were randomly assigned to read one of eight articles, four episodic and four thematic, in which the race featured in the article either matched or did not match that of the participant. The article was a simulated excerpt from a political campaign speech that argued for heightened border security to curb the flow of undocumented immigrants into the United States. This excerpt highlighted the threat of undocumented immigrants on American citizens with regard to labor competition and suppression of wages. It focused on the “victim,” who was negatively affected by increased illegal immigration (See Appendix A for sample articles). The immigration excerpt was

created using information and quotations that appear in actual presidential campaign speeches when candidates speak on the issue of increased border security.

## PROCEDURE

The study was conducted using the website [www.qualtrics.com](http://www.qualtrics.com). Data was collected over three weeks during the spring 2009 academic semester. Qualtrics was used for construction and implementation of the survey, as well as data collection.

Subjects were sent an email inviting them to participate in an online voter opinion survey that assessed their opinions regarding various political issues, a deception used to mask the actual purpose of the study. The email also informed potential participants of the study, explained that it was approved by the university’s International Review Board (IRB), emphasized that all data was confidential, and that they could leave the study at any time. If participants clicked the survey link, they were directed to the survey.

Subjects were first prompted to include their email address if they wished to be eligible for compensation. They then completed a pretest questionnaire that gauged their opinion on 15 policy questions, 3 of which were related to illegal immigration and the rest served as distracter questions. Participants responded on a 5-point likert scale (where 1=strongly disagree, 2=disagree, 3=unsure/no opinion, 4=agree, 5=strongly agree), which asked them to indicate their level of agreement with subsequent policy statements. The three statements regarding illegal immigration were as follows: (1) The US government should spend more money on increasing border security. (2) Illegal immigrants are an overall gain to the US economy. (3) Illegal immigrants should not receive any of the rights or benefits that lawful permanent residents enjoy. Participants were then asked to use a feeling thermometer to rate their feelings toward various out-groups including illegal immigrants, Whites, Latinos, Asians, and Blacks. Veterans, homosexuals, and politicians were inserted as filler groups to distract from race. Participants were also presented with a 1 item racial tolerance scale, which asked them to identify their level of agreement with the following statement: “Irish, Italian, Jewish and many other minorities overcame prejudice

and worked their way up. Hispanics should do the same without any special favors.” Higher responses indicate greater tolerance and lower resentment.

Next, all participants were asked to read three different articles, one regarding welfare, one regarding the environment, and another regarding illegal immigration. The welfare and environment articles were distracters for this experiment so as to prevent from excessive attention being paid to the immigration article. The immigration article was presented as an excerpt from a past presidential campaign speech. Following each passage were questions relating to certain policies. For example, after reading the immigration article, participants were asked five emotion questions. Specifically they were asked if the presidential candidate giving the speech made them feel hopeful or made them feel angry. Also, they were asked how much sympathy they felt toward Americans losing their jobs, and how angry and fearful they felt toward illegal immigration. These last three emotions, which suggest empathy and aversion, were selected because it was anticipated that they were the emotions most likely to be evoked by the details of the excerpt. In past studies, these emotions were most commonly elicited when the victim was a member of the in-group (e.g. Brader & Valentino; Huddy & Mason 2008; Yzerbyt et. al. 2003). Participants were also asked three policy questions, the exact three that were in the pretest. Likert scales were used for both policy and emotion questions.

Using a randomization tool in Qualtrics, each participant was randomly assigned to read one of eight speech excerpts on illegal immigration. There were four episodic frames, which featured a male individual who had been fired from his low-skilled construction occupation as a result of his employer hiring illegal immigrants. All episodic frames were identical except for varying the race of this victimized individual. Racial identity in the episodic frames was varied implicitly, via racial surname of the individual featured. For example, to prime ethnic identification for White subjects, there was a frame highlighting the displaced worker, “Daniel Roberts.” To prime ethnic identification for Latino subjects, there was a frame highlighting the displaced worker, “Daniel Gonzalez.” Also, there were four thematic frames, which did not highlight a specific individual or

situation, but instead used generalities and statistics to identify a specific ethnic group that was suffering from unemployment and suppression of wages as a result of illegal immigration. The thematic frames referred explicitly to the ethnic groups, such as “White Americans” and “Hispanics” as being victims of the increased job competition and wage suppression caused by illegal immigration. All thematic frames were identical except for varying the race of this victimized ethnic group.

Following the experimental manipulation, participants were asked to answer questions about their racial in-group. They indicated their racial/ethnic background and answered a host of questions about how strongly they identified with their in-group. Participants were again asked to rate their feelings toward out-groups (the same set of out-groups in the pretest, just in a different order) and answer the racial tolerance question. Finally, participants answered a host of demographic variables to gauge for gender, education, generation, income, and party affiliation, strength of party identification, and vote history.

## FINDINGS

I found minimal support for the hypothesis that episodic framing alters emotional response relative to a thematic frame on the same topic (Appendix B). I ran a One-Way ANOVA to compare the effect of frame on emotional response. Table 1 presents the means of emotional reaction by frame condition, along with their respective F- and P-values. It is important to note that higher numbers signal more “positive” feelings, so higher number for sympathy would indicate more sympathy, whereas higher numbers for fear and anger would actually indicate less fear and anger (to maintain consistency with higher numbers reflecting a more positive position toward illegal immigration). By default, lower numbers for fear and anger would indicate more “negative” responses toward illegal immigration, reflecting more fear and anger. Results show that, in general, episodic and thematic frames differed only in terms of fear toward illegal immigrants. Thematic frames elicited greater fear ( $M=4.08$ ) toward illegal immigrants than did

episodic frames ( $M=4.20$ ),  $F(1,1752)=4.21$ ,  $p < .05$ . There were no significant differences between the frames for the emotions of sympathy toward Americans losing their jobs or anger toward illegal immigration.

Further, I used a paired samples  $t$ -test to assess change in policy opinion from the policy questions in the pre-test to the policy questions immediately following the experimental treatment (Appendix C). Both thematic frames  $t(854) = -2.69$ ,  $p = .007$  and episodic frames  $t(888) = -1.97$ ,  $p = .05$  elicited change in policy opinion from the pre-test to the post-test for the statement, "The US government should increase funding for border security." While both frames elicited change, a One-Way ANOVA revealed no significant difference between episodic and thematic frames in eliciting change. It is also important to note the direction of change in opinion that both frames elicited. Participants became more favorable toward immigration (i.e. less in favor of increasing funding for border security) after reading the anti-immigrant message. There was no significant change in opinion for the statements, "Illegal immigrants are an overall gain to the US economy" and "Illegal immigrants should not receive the same rights as citizens." A One-Way ANOVA compared the effect of race congruence on emotional response (Appendix B). Results in Table 2 show that, in general, those who received a race congruent ( $M=4.23$ ) frame expressed significantly more sympathy toward Americans losing their jobs than those who read a race-incongruent message ( $M=4.07$ )  $F(1, 1757)=6.38$ ,  $p = .01$ . In other words, people were more likely to express sympathy for Americans losing their jobs when the victimized individual described as losing his job to illegal immigrants in the frame was of the same race as the participant. When examining the results by race of the subject, White participants expressed significantly more sympathy in the race congruent frame ( $M=4.26$ ) than they did in the race incongruent frame ( $M=4.08$ )  $F(1, 1091)=5.66$ ,  $p < .05$ . So, when "Daniel Roberts" was described as losing his job to illegal immigrants, White subjects were significantly more likely to experience sympathy for Americans losing their jobs than if they read about "Daniel Gonzales," "Daniel Chung," or "Jermaine Williams."

When disaggregating results by race of the participant and race of the featured individual, we see that emotional

responses are specific to racial identity. For example, Latinos ( $M=4.46$ ) expressed significantly less fear toward illegal immigration than did all other racial/ethnic groups. Latinos ( $M=4.00$ ) also expressed significantly less anger toward illegal immigration than Blacks ( $M=3.21$ ) and Asians ( $M=3.67$ ),  $p < .05$ . Overall, participants expressed significantly more feelings of anger toward illegal immigration when reading about a Latino ( $M=3.45$ ) losing his job than a White person ( $M=3.72$ ) losing his job,  $p = .006$ . Further, when Whites read about Blacks ( $M=4.07$ ) or Latinos ( $M=4.06$ ), they reported significantly less sympathy than when they read about Whites ( $M=4.26$ ) or Asians ( $M=4.12$ ),  $p < .05$ . Latinos ( $M=4.00$ ) expressed significantly more anger when reading about a Black person ( $M=3.54$ ) than a White ( $M=4.35$ ) or Latino ( $M=4.04$ ) person losing their job,  $p < .05$ .

## DISCUSSION

Contrary to my hypothesis based on Gross' (2008) study, I did not find strong evidence suggesting episodic frames were more emotionally engaging than thematic frames. In fact, when it came to fear, thematic frames actually elicited more fear than did episodic. One of the main differences between Gross' (2008) study and this one, which might help explain these findings, was that Gross did not include targets of the emotions. Whereas her emotion measures were more general, asking how the person felt in reaction to the article, mine were specific, asking how the person felt toward a specific target. The target for the fear measure was illegal immigration. This is important in understanding the relationship between the question and the passage. The episodic passage was identified as episodic because it focused on an individual who was put out of work due to illegal immigration. So perhaps people did feel fear in response to the episodic article, but it was more directly related to the episodic focus—job loss—and not necessarily illegal immigration.

Another difference between this study and Gross' study was that the political issues differed. Gross' treatment passage focused on reducing mandatory minimum sentencing, whereas my treatment passage related to illegal immigration and argued

for an increase in border security. There is no doubt that the issue of mandatory minimum sentencing is less propagated in national media and less publicly debated than illegal immigration. Illegal immigration is often blamed for raising unemployment and suppressing wages for American citizens, and in general, is discussed as a matter affecting the nation as a whole. Therefore, the use of statistics and generalities in thematic frames to portray a negative impact on the nation, coincides with the way society typically understands and discusses the issue of illegal immigration and may be why a thematic frame elicited stronger emotions. Furthermore, it can be said that greater fear is unique to illegal immigration, at least when comparing the issue with mandatory minimum sentencing. For example, the issue of illegal immigration, which is defined by an out-group (illegal immigrants) and an in-group (citizens), establishes intergroup threat, and consequently the potential for fear, more so than does mandatory minimum sentencing.

Another possible explanation for why the framing hypothesis was not supported is that the established framing effect (Gross, 2008) may be exclusive to articles and news media stories. As stated earlier, the framing of issues within speeches has not been studied to the same extent as framing within news articles. News articles have the ability to go into great depth on an issue (as in Gross' article on mandatory minimum sentencing), while discussion of an issue in campaign speeches, which often attempt to address a whole host of pressing issues, needs to be limited and concise. So it could be that episodic frames of news media articles are able to elicit more emotion than thematic frames because more time is spent talking about the individual and therefore enhancing the reader's ability to establish a greater connection between himself or herself and the featured individual. With that being said, our results have implications for effectiveness of framing in communication mediums where the amount of detail is limited, such as in speeches or debates where responses are timed. In these cases, thematic frames may be more powerful than episodic frames, at least for the elicitation of fear. The idea that framing within speeches may elicit emotions in a different manner than framing within news media calls for further examination in future research studies.

The hypothesis that a race congruent frame would result

in greater levels of sympathy was supported by the results of this study. The fact that congruence between race of the featured individual losing his job and race of the participant led to greater sympathy helps support and can be explained by Intergroup Emotions Theory. It has been demonstrated that when a victim of a harmful behavior is perceived to belong to the same group as the self, one is more likely to feel sympathetic emotions and the corresponding action tendencies on behalf of the victim even in situations that do not directly confront the self (Garcia-Prieto & Sherer, 2006; Yzerbyt, 2003). The results from this study have great implications for political candidates wishing to impact their audience using rhetorical strategy. Candidates are able to use race congruent frames when attempting to create sympathy, and since increased sympathy has been shown to be associated with greater susceptibility to persuasion (Gross 2008), using a race congruent frame might actually result in audiences agreeing more with the candidate's message.

A paired samples T-test revealed that both thematic and episodic frames elicited change in opinion with regard to whether the US government should increase spending on border security. This outcome seemed to only moderately support my hypothesis that thematic frames would be more persuasive since only one of the three policy questions elicited change in opinion. However, when taking a closer look at the manipulation, the passage was arguing only for increased border security to curb the flow of illegal immigrants. It did not argue for more or less immigrant rights or whether immigrants were a gain to the US. Therefore, it makes sense that if thematic frames are more persuasive, the effect would be on the policy that is argued in the persuasive message. Further, the fact that policy opinion changed in a direction opposite that of the excerpt's argument is of particular interest. Participants became more favorable toward immigration after reading an anti-immigrant message, independent of whether the message was framed thematically or episodically. Mendelberg (2001) provides one possible explanation for this outcome. He argues that most voters reject blatantly racial appeals because they violate deeply held egalitarian beliefs. Therefore, it is possible that the racialized nature of illegal immigration, coupled with the racial appeals in both frames, led participants to buffer themselves against the message's attempt at persuasion. Another



possibility is that participants simply recognized the excerpt as an experimental treatment and, in an effort to guard themselves from manipulation, expressed opinions that diverged from the excerpt's argument.

Moreover, the hypothesis that responses may vary depending on race was supported by the results of this study. The fact that Latinos expressed significantly less fear and anger toward illegal immigration than did all other racial/ethnic groups provides support for the idea that illegal immigration is a racialized issue and suggests that many Latinos consider illegal immigrants part of the in-group. Further, participants expressed significantly more feelings of anger toward illegal immigration when reading about a Latino ( $M=3.45$ ) losing his job than a White person ( $M=3.72$ ) losing his job,  $p=.006$ . This effect could be due to the fact that illegal immigration is not usually described as negatively affecting the Latino community. Rather, illegal immigrants are usually seen as part of the Latino community and, therefore, not a threat to Latinos. So perhaps this frame, in a sense, de-racializes the issue to an extent, allowing the victims to be Latino, and subsequently allowing Latinos and Asians (groups with the most positive feelings toward illegal immigrants) to express more anger toward the issue without appearing prejudice toward Latinos. The finding that Latinos expressed significantly more anger when reading about a Black person than a White or Latino person losing their job reflects a common reaction by the Latino community to the widespread scapegoating of illegal immigrants for African American unemployment. Although the target of Latinos' anger is not entirely clear, since anger toward "illegal immigration" could be referring to anger toward illegal immigrants or anger toward anti-immigrant rhetoric surrounding the issue, the racialized nature of the issue suggests in this case that anger is directed toward rhetoric. This deduction, if accurate, indicates that it would not be in a political candidate's best interest to identify African Americans as victims of illegal immigration if attempting to conjure support from the Latino community.

## CONCLUSION

This study attempted to identify the effects of using episodic and thematic frames, as well as racial priming, in presidential campaign speeches. Results of the study help to identify the situations in which emotions of fear, anger, and sympathy, can be elicited among the audiences of speeches. While the results of many studies and experiments often generalize their findings to society as a whole, this study does not assume that all members of the electorate are interchangeable. Rather this research adds to the framing literature by looking at intergroup emotions theory and how ethnic identity priming within episodic and thematic frames affects people with various ethnic group identities. In regard to the issue of illegal immigration, I attempted to take into account the context that impacts emotional responses and affects susceptibility to persuasion. From my findings, I am able to conclude that framing effects need to be interpreted based on the issue at hand, the intensity of group salience to the particular issue, the strength and direction of intergroup threat, and the medium of communication (e.g. speeches, new articles, debates).

For those interested in understanding intergroup emotions and framing effects as they relate to the issue of immigration can take away from this study how various frames impact emotions of sympathy, anger, and fear. Much research has been done to show the behavioral consequences of these emotional responses. For example, it been shown that fear increases selective attention to threatening stimuli and produces negative interpretations of ambiguous information. Flexibility in cognitive processes is subsequently decreased for attributes associated with the potential threat (Beck & Clark). Higher levels of intergroup fear and perceived threat therefore tend to strengthen original ingroup-outgroup boundaries (Wilder, 1993). Thus, when candidates, particularly Republicans, are discussing illegal immigration and attempt to elicit fear in their audiences toward illegal immigration in speeches, it may be to their advantage to use thematic framing as opposed to episodic framing.

Future studies that will contribute to this literature are those comparing different levels of ethnic identification among

various groups and how strength of ethnic identification affects their emotions and policy change. Also, a regression analysis taking into account various demographic factors, such as gender, age, and political affiliation, will allow for more telling findings. To have a more significant impact among presidential campaigns, more exploration needs to be done on how distinct groups of the electorate may respond to similar emotional appeals in different ways (Leege & Wald, 2007; Schnur, 2007). Also, because many Republican strategists claim Republican candidates need to sway a significant portion of the Latino vote to be victorious in future presidential elections, further analysis on rhetorical implications for Latinos and immigration will be useful for campaign strategists.

In conclusion, politicians recognize the value of emotional appeals when attempting to influence opinion and garner public support. However, research concerning the impact of rhetorical framing on emotions often considers emotion to be an individual level-phenomenon. Using Intergroup Emotions Theory (IET), this study investigates the effect of framing upon emotional responses and political perspectives regarding the issue of illegal immigration. In an online survey, participants read a simulated excerpt from a presidential campaign speech that argued for an increase in border security to curb illegal immigration and its negative impact on Americans. The excerpt employed either a thematic frame, which focused on statistics related to immigration, or an episodic frame, which focused on the plight of an individual. Further, the ethnicity of a “victimized” group or person varied within the frame. Contrary to findings from prior framing studies, results of this study showed that episodic frames were not significantly more emotionally engaging than thematic frames. Also, both frames elicited similar levels of change in policy opinion, but in a direction opposite from that of the excerpt’s argument. As predicted from the racialized nature of illegal immigration, emotional reaction and policy opinion differed according to participant race and featured race. This study helps reveal the complexities of responses among different racial groups to immigration rhetoric. Results suggest that groups’ reactions to rhetorical strategies are particular to the policy issue at hand, and that race is an important factor to take into account when seeking to understand the opinions and

decisions of members of the electorate.

## APPENDIX A

Example of Episodic Frame (Latino condition):

“[...] This election is about real problems facing Americans today. For example, unemployment is rising quickly, but yet hundreds of thousands of illegal immigrants cross our borders each year only to take jobs away from hardworking Americans like Daniel Gonzalez. Daniel is a man from Los Angeles who was recently laid off from his construction job and later found out his employer had been hiring undocumented workers for lower wages. Daniel can’t find a decent paying job and is now struggling to support his family.

From people like Daniel, we have seen that admitting large numbers of illegal immigrants reduces job prospects and depresses wages for American workers. He, like all Americans, should not have to watch our broken borders go unfixed, and our laws be disrespected. This issue is about sovereignty, security, and fairness.

As president, I will work to protect the border by strengthening its security. When we have achieved our border security goal, disheartening stories like that of Daniel Gonzalez will not be so prevalent. Ending illegal immigration won’t be an easy task, but I have the will to bring order and fairness to a situation that is currently out of control.”

Note: To vary the ethnic identity prime within the frame, the ethnically identifiable name of “Daniel Gonzalez” for the Latino condition was replaced with “Daniel Chung” for the Asian condition, “Daniel Roberts” for the White condition, and “Jermaine Williams” for the Black condition.

Example of Thematic Frame (Black condition):

“[...] This election is about real problems facing Americans today. For example, unemployment is rising quickly, but yet twelve million illegal immigrants are working and living in the US, while hundreds of thousands of people cross our borders illegally each year only to take more jobs away from hardworking

Americans.

A shift of jobs from the legal workforce to illegal immigrants has contributed to a spike in unemployment, especially among African American citizens. When illegal immigration increased during the past year, the unemployment rate among African American citizens shot up to 8.4 percent, compared to 4.7 percent unemployment for non-African-American workers.

Data and basic economics indicate that an increasing number of illegal immigrants reduces job prospects and depresses wages for American citizens. To prevent certain populations from being disproportionately displaced due to illegal immigration, we should refuse to watch our broken borders go unfixed, and our laws be disrespected. This issue is about sovereignty, security, and fairness.

As president, I will work to protect the border by strengthening its security. When we have achieved our border security goal, discouraging unemployment statistics will not be so prevalent. Ending illegal immigration won't be an easy task, but I have the will to bring order and fairness to a situation that is currently out of control."

Note: To vary the ethnic identity prime, the explicit identification of "African-American" for the Black condition was replaced with "Asians Americans" for the Asian condition, "White Americans" for the White condition, and "Hispanics" for the Latino condition.

## APPENDIX B

Table 1: Emotional Response and Policy Opinion by Frame

Emotion	Episodic	Thematic	F-value	P-value
Sympathy	4.10	4.12	0.07	0.79
Fear	4.20	4.08	4.21	0.04**
Anger	3.63	3.54	1.59	0.21
Policy				
Border Security	2.77	2.73	0.29	0.59
Immigrant Rights	2.96	2.95	0.02	0.90
Immigrant gain	2.85	2.81	0.43	0.51

Note: Table entry is mean emotional response and mean policy opinion score by frame. In the survey, Fear, Anger,

and Border Security were reverse coded so that higher numbers consistently mean more "positive" reactions to immigration. This means higher scores for aversion emotions and anti-immigrant policy should be inversely interpreted as less fear, less anger, and less strict immigration policy. Asterisks indicate that responses to episodic and thematic frames differed significantly (One-Way ANOVA on means): \*\*\*p<.01 \*\*p<.05 \*p<.10.

Table 2: Emotional Response and Policy Opinion by Race Congruence/Incongruence

Emotion	Race Congruence	Race Incongruence	F-value	P-value
Sympathy	4.23	4.07	6.38	0.01***
Fear	4.13	4.14	0.07	0.80
Anger	3.70	3.55	3.46	0.06*

Note: Table entry is mean emotional response and mean policy opinion score by race congruency. In the survey, Fear, and Anger were reverse coded so that higher numbers consistently mean more "positive." This means higher scores for aversion emotions should be inversely interpreted as less fear and less anger. Asterisks indicate that responses to episodic and thematic frames differed significantly (One-Way ANOVA on means): \*\*\*p<.01 \*\*p<.05 \*p<.10.

## APPENDIX C

Policy	Pre-test	Post-test	t-value	p-value
Border Security				
Immigrant Rights				
Immigrants as Gain				

Note: Table entry includes mean policy opinion score in the pre-test and post-test. In the survey, measures for increasing border security and whether illegal immigrants should receive the same rights as citizens were reverse coded so that higher numbers consistently mean more "positive." This means higher scores for these "anti-immigrant" policies should be inversely interpreted as less strict immigration policy. Asterisks indicate that responses to episodic and thematic frames differs significantly (Paired Samples T-Test on means): \*\*\*p<.01 \*\*p<.05 \*p<.10.

Table 2: Change in Policy Opinion for Thematic Frames

Policy	Pre-test	Post-test	t-value	p-value
Border Security				
Immigrant Rights				
Immigrants as Gain				

Note: Table entry includes mean policy opinion score in the pre-test and post-test. In the survey, measures for increasing border security and whether illegal immigrants should receive the same rights as citizens were reverse coded so that higher numbers consistently mean more “positive.” This means higher scores for these “anti-immigrant” policies should be inversely interpreted as less strict immigration policy. Asterisks indicate that responses to episodic and thematic frames differs significantly (Paired Samples T-Test on means): \*\*\* $p < .01$  \*\* $p < .05$  \* $p < .10$ .

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# MOLECULAR DIFFERENCES IN THE FISCHER 344 RAT, A POTENTIAL NEW ANIMAL MODEL OF AUTISM?



## BRANDYN CASTRO

*Neuroscience/Business Administration*

*Mentor: Michael Jakowec, Ph.D.*

*Department: Neurology*

*McNair Scholars Program*

*University of Southern California*

The purpose of this study is to examine the neurological differences in protein levels and concentrations in Autism. The following are two aspects that will be introduced to the field: (1) the utilization of the Fischer 344 rat as an animal model of Autism and (2) the evaluation of the protein tyrosine hydroxylase (TH). TH is the enzyme that catalyzes the conformation of L-tyrosine into L-DOPA, the precursor to dopamine. Dopamine is a vital neurotransmitter for normal function within the brain and serves as a precursor for norepinephrine (noradrenaline) and epinephrine (adrenaline). Dopamine is produced in the striatum which leads us to perform immunocytochemistry and western blots to determine that there are lower levels of TH in the striatal area of Fischer 344 as compared to Sprague Dawley controls. This could lead to a variety of outcomes such as: lower levels of dopamine or higher levels of TH phosphorylation in the striatum in Autism. Future studies comparing additional proteins will give more insight into the proper analysis of these findings. Such proteins that merit further study include: dopamine transporter (DAT), glutamate receptor-1 (GluR1), glutamate receptor-2 (GluR2), metabotropic glutamate receptor-1 (mGluR1), and metabotropic glutamate receptor-5 (mGluR5). DAT is a protein spanning the membrane that binds dopamine and transports it from the intersynaptic space into the post-synaptic neuron. The glutamatergic system is necessary for normal brain function and has been compromised in other neurological disorders such as Parkinson's disease. This study (and future studies that stem from it) will lead to better insight as to the mechanisms behind Autism disorder and possibly lead to a cure.



# INTRODUCTION

Autism is a condition that was first described in 1943 by Leo Kanner (Amaral et al., 2003). At this time autism was considered a cardinal feature of schizophrenia and was not yet its own syndrome. The condition, termed “infantile schizophrenia, was due to an infants response to a dysfunctional mother-child relationship described as a “refrigerator mother” (Fombonne, 2003). Later in 1998, Rapin et al. defined autism as a developmental disorder that can be characterized by behavioral symptoms across three general areas: social reciprocity, communication, and restricted and repetitive interests and behaviors (DSM-IV, 1994). Some common symptoms of autism described in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) include: inability to relate to children or adults, poor speech or lack of speech, hyperactivity or passiveness, inappropriate laughter or crying, lack of eye contact, oversensitivity or hyposensitivity to touch, and difficulty dealing with changes in routine.

Autism was originally thought to be a brain-based, primarily genetic disorder. As the definition became broader, to include additional etiologies such as postnatal evolution and environmental causes, the overarching term to classify the disorder was Autism Spectrum Disorders (ASD). ASD is an extremely heterogeneous disorder, including variations among patients in symptoms, onset, and severity, and can be associated with unusual talents or impairments (Herbert, 2005). In regards to the timing of onset, some patients express symptoms as an infant while others may not get diagnosed until adulthood. Clinical features of the syndrome are also separated by functionality; some autistic people are highly functional college graduates while others will never exceed an elementary school level of education. There is additionally a dichotomy in prevalence among sexes, with men being 4-10 times as likely to be affected by idiopathic autism than women (Stone et al., 2004). The complexity of the ASD makes it incredibly difficult to study the precise cause of the abnormal behavior observed.

Autism primarily has a genetic basis and diagnosis is made according to DSM-IV criteria. There has been an exponential increase in diagnosis of children with the disorder over the past 17 years. According to the Individuals

with Disabilities Education Act (IDEA) data, the number of individuals age 6-21 diagnosed with autism has increased from 22,664 people in 1994 to 141,022 people in 2003 (IDEA, 2004). This drastic increase in prevalence is primarily caused by a broader definition of who is categorized as having an ASD rather than a result of an increased number of patients who have acquired the disorder. The Center of Disease Control and Prevention (CDC) reports 1 in every 110 children is diagnosed with autism in the United States and 1.5 million children are presently diagnosed as autistic (CDC, 2011). The annual cost of autism in the United States is estimated at \$35 billion dollars per year and the average cost to care for one autistic patient for his or her lifetime is \$3.2 million (Ganz, 2007).

This huge fiscal impact on society demonstrates the importance of conducting research to discover more about this relatively ambiguous disorder, with hopes of developing a preventative measure or treatment for ASD. There are limited methods of study for the disorder; magnetic resonance imaging (MRI) scans can be performed in autistic individuals to assess size and some chemical differences in isolated areas of the brain but morphological studies of brains from autistic individuals can only be conducted in postmortem brains. This provides little insight into the development of the disorder and cause for such wide arrays of symptoms. Without knowing how autism develops and progresses, it is difficult to identify exactly how it is caused and how to target the disorder for prevention and treatment. This study aims to develop a means to investigate ASD by providing an animal model for further evaluation into the etiology and development of the disorder.

Animal models provide a means to study autism further. They offer a way to discover the mechanism behind a condition and then use that knowledge to create treatments and therapies. There are three main ways to develop an animal model for a specific disease or disorder: (1) Scientists can genetically engineer the animal to express the genetic composition typical of that disease. An example of this is the triple knock-out mouse used to study Alzheimer's Disease. (2) Chemicals can be injected that target certain areas of the body in the animal to replicate the symptoms of the disease. This can be seen in the Parkinson's Disease model where the neurotoxin MPTP is injected into the

animal. (3) The animal can occur spontaneously in nature. This can be seen in the Fischer 344 animal model of autism used in this study.

The Fischer 344 rat exhibits behavioral traits that are similar to the characteristics seen in autism. These include lack of interaction with other individuals, lessened maternal instincts, lack of exploratory behavior, and high levels of anxiety (Siviy et al., 2003; Rex et al., 1999). For these reasons, the Fischer 344 rat may serve as a new animal model for ASD. These rats will be studied here in comparison to Sprague Dawley control rats. Differences in the levels and concentrations of enzymes will be examined in various areas of the brain including: prefrontal cortex, striatum, amygdala, substantia nigra, and cerebellum. Studies will be conducted using immunocytochemistry (ICC) and western blots.

Little, if anything, is known about the molecules and mechanism is involved in the pathogenesis of autism. Previous studies have been focused on defining the behavioral characteristics that define ASD. As we saw from the data from IDEA on the increased prevalence of ASD, redefinition in DSM-IV broadened the people who fall under the category of an ASD diagnosis. The majority of research on the neurological implications of autism has come from MRIs and postmortem brains. These studies have provided evidence that there is dysfunction in the dopaminergic and glutamatergic systems (Salgado-Pineda et al., 2005). The dopaminergic system is comprised of three main pathways (Figure 1). The nigrostriatal pathway is comprised of projections from the substantia nigra to the striatum. Complications of this pathway are associated with Parkinson's Disease. The mesolimbic pathway sends projections from the ventral tegmental area (VTA) to the amygdala. Lastly, projections that stem from the VTA and lead to the prefrontal cortex make up the mesocortical pathway. Damage to this pathway could lead to Schizophrenic behavior (Laviolette, 2007).

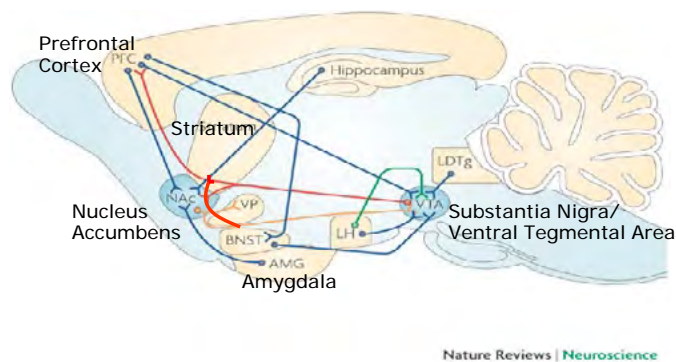


Figure 1. The red pathway denotes the dopaminergic system. The blue pathway denotes the glutamatergic system. The green pathway denotes the GABAergic system.

Tyrosine hydroxylase (TH) is an enzyme that catalyzes the conversion of L-tyrosine into L-DOPA, which is the precursor for dopamine (DA). The levels of the enzyme tyrosine hydroxylase (TH) will be examined in Fischer 344 rats as compared to Sprague Dawley controls. The striatum, prefrontal cortex, and amygdala will be examined here. Analysis of this enzyme could give us insight into relative levels of DA in isolated areas of the brain. This knowledge will assist us in further discovery of the mechanism for the dopaminergic dysfunction seen in autism. Differences in TH concentrations at the level of the striatum are expected because it is one of the main regions where DA is produced.

## LITERATURE REVIEW

Autism is a complex disorder rooted with a genetic basis. The etiology of the condition is still unknown but a variety of studies have shown neuroanatomical, morphological, and neurochemical differences in autism that warrant further investigation. Studies have shown that specific areas of the brain are larger and smaller in size in autistic subjects. The dopaminergic system, including the areas of the VTA, striatum, prefrontal cortex, and amygdala, is hyperactive in autism. The associated areas are all shown to be enlarged in autistic individuals (Carper et al., 2005; Howard et al., 2000; Sears et al., 1999). The size of the cerebellum is smaller with less Purkinje cells in autistic individuals (Ritvo et al., 1986; Williams et al., 1980; Kemper et

al., 1998; Hashimoto et al., 1995; Courchesne, 1997). These size alterations accompany specific behavioral symptoms of autism. Additional studies have shown dysfunction in the dopaminergic and glutamatergic systems in autism (Salgado-Pineda et al., 2005). Current animal models, although limited, try to replicate these findings in order to create another platform with which to study the unknown disorder. This research study aims to provide an additional animal for neurological exploration and understanding of autism. The following gives a brief overview of these previous findings that provide the basis for this study.

### BASAL GANGLIA DIFFERENCES IN AUSTISM

Sears et al. conducted a comprehensive study of the basal ganglia in autism in 1999. They compared 35 relatively high-functioning autistics with 36 healthy controls ranging from 12 to 29 years of age. A 20-minute high resolution MRI was conducted for each subject and the size of their caudate, putamen, and globus pallidus (structures associated with the basal ganglia) was compared. The striatum is composed of the caudate and putamen, which are separated by a white matter tract called the internal capsule. Results show a significant increase in the size of the caudate in the autistic subjects ( $p \leq 0.01$ ). A behavioral analysis was performed to correlate these differences found with specific clinical symptoms. Autistic subjects showed difficulties with minor changes in routine ( $p$ -value = .003), compulsions/rituals ( $p$ -value = .001), and complex mannerisms ( $p$ -value = .002) (Table 1).

Relationship of Caudate Volume to Items from the ADI  
Ritualistic-Repetitive Behavior Domain

ADI Item (Ever present)	Spearman r	p
Difficulties with minor changes in routine	-.48	.003
Compulsions/rituals	-.52	.001
Complex mannerisms	.49	.002
Circumscribed interests	-.10	n.s.
Unusual preoccupations	-.02	n.s.
Repetitive use of objects	.30	n.s.
Unusual sensory interests	-.02	n.s.
Abnormal idiosyncratic negative response	.16	n.s.
Unusual attachments	-.20	n.s.
Resistance to change in the environment	-.06	n.s.
Hand and finger mannerisms	-.08	n.s.
Verbal rituals	-.03	n.s.

Table 1 (Sears et al., 1999)

### PREFRONTAL CORTEX DIFFERENCES IN ATISM

Carper et al. conducted studies in 2002 and 2005 examining the frontal lobe in autistic postmortem brains. Previous studies demonstrated variations in the size of the frontal lobe

between autistic and normal individuals and this study further clarifies these abnormalities. MRI scans of autistic children 2.2-5 years of age were used to compare the orbitofrontal cortex (OFC), medial frontal cortex (MFC), dorsolateral prefrontal cortex (DFC), and precentral gyrus (PCG). Figure 2 shows the deviation from the normal size that autistic brains exhibited in this study. Statistical differences were shown with the increase in size of the MFC and DFC in autistic children as compared to controls. This leads to the assumption that there might be molecular differences in the prefrontal cortex because larger size of brain tissue is due to hypertrophy or hyperplasia, if edema and neoplasia are excluded (Goss, 1966). This serves as a basis for our evaluation of the TH levels in the prefrontal cortex in the Fischer 344 rats as compared to Sprague Dawley controls.

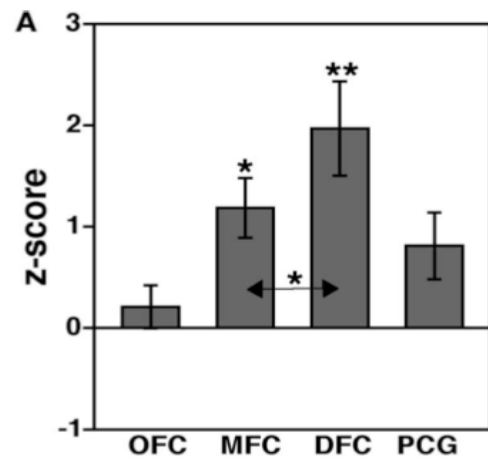


Figure 2 (Carper et al., 2005)

### AMYGDALA DIFFERENCES IN AUTISM

The amygdala plays an important role in mediating social perception and regulating emotion (Morris et al., 1998). For this reason, the amygdala has been a target of interest for studies in autism. Howard et al. (2000) examined the behavioral and neuroanatomical alterations of the amygdala in autistic individuals. The study compared 10 males with high-functioning autism (HFA) age 16-40 with 10 healthy normal controls of similar sex and age. HFA is defined as impairments of social interactions, communication and behavioral flexibility, but normal language and intellectual functions (Howard et al., 2000). Neuropsychological testing showed that HFA showed impairment in recognition of facial expressions of fear, percep-

tion of eye-gaze direction, and recognition memory for faces. MRI volumetric techniques, using a T1-weighted 3D spoiled-gradient echo sequence, were performed to measure and compare the intracranial volume of the amygdala, hippocampus, and parahippocampal gyri. In the HFA subjects, the amygdala volume was increased bilaterally compared to control subjects. No significant difference was seen in the volumes of the hippocampus or parahippocampal gyri. This increased volume of the amygdala serves as a basis for our experiment to examine differences in TH, and therefore dopamine, in the Fischer 344 rats as compared to Sprague Dawley controls.

### DIFFERENCES IN COMPOSITION OF FRONTAL, PARIETAL, AND TEMPORAL LOBES

The brain is composed of white matter, gray matter, cerebrospinal fluid, and neuroglia. White matter contains myelin which creates faster neuronal signaling while gray matter does not have myelin. In 2002, Carper et al. looked at differences in the composition of the frontal, parietal, temporal, and occipital lobes by comparing autistic individuals and normal controls (Figure 3). Subjects were under 4 years of age. The amount of white matter, gray matter, and cerebrospinal fluid was quantified and there were significantly higher levels of white matter in the frontal and parietal lobes in autism. In addition, the frontal and temporal lobes of the autistic subjects had higher levels of gray matter in the frontal and temporal lobes. No significant differences were found in cerebrospinal fluid. The excess amount of white and gray matter in the frontal lobe is a possible explanation for the larger prefrontal cortex which is seen in autism. This further validates the abnormality in this region and serves as reasoning for examination of TH levels in the prefrontal cortex of Fischer 344 rats.

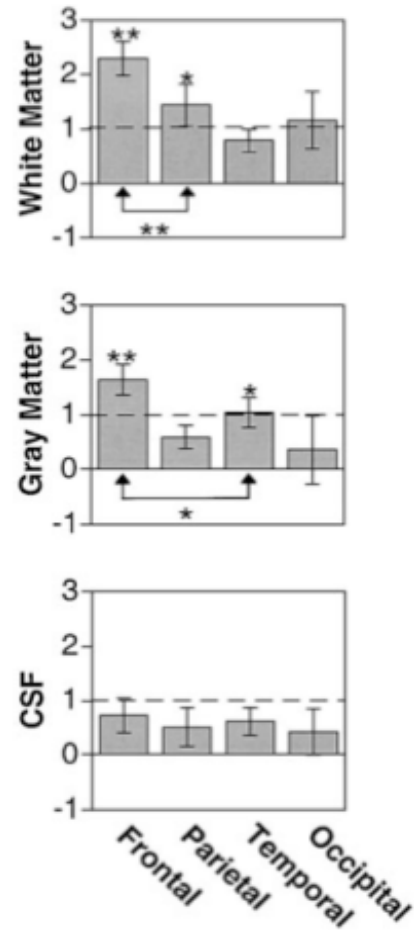


Figure 3 (Carper et al., 2002)

### CEREBELLAR DIFFERENCES IN AUTISM

Multiple studies have shown that there are differences in the cerebellum between normal individuals and autistic patients. Autopsies demonstrate that there is a 35%-50% reduction in number of Purkinje cells in autism cerebellum as compared to normal cerebellum (Ritvo et al., 1986; Williams et al., 1980; Kemper et al., 1998). MRI scans have also shown that the size of the cerebellum in autism is smaller than that of a regular individual (Hashimoto et al., 1995; Courchesne, 1997).

A study conducted by Purcell et al. in 2001, further examined these differences in the cerebellum, using postmortem cerebellum samples from 10 autistic individuals and 10 normal or control individuals. By performing reverse transcriptase-polymerase chain reaction (RT-PCR), higher levels of mRNA were found from a variety of glutamate related genes, which confirm the dysfunction of the glutamatergic system in autism. There were significantly higher levels of mRNA levels from excitatory amino acid transporter 2 (EAAT 2) and the AMPA-

type glutamate receptors 1, 2, and 3. In addition, microarray analysis was conducted to investigate differences in proteins in the postmortem cerebellum. There were higher levels of excitatory amino acid transporter 1 and 2, AMPA-type glutamate receptor 1, NMDA receptor 1, and glutamate receptor interacting protein (GRIP). Using autoradiography, lower levels of AMPA-type glutamate receptors were discovered in the cerebellum (granule and molecular cell layers) but no significant difference in these levels in the prefrontal cortex or caudate-putamen. There were no significant differences in NMDA in either region of the cerebellum, prefrontal cortex, or caudate-putamen. Pseudocolor images (PI) showed significantly decreased AMPA binding in the cerebellum of a representative autism brain section as compared to a normal individual. No significant differences in PI were seen with NMDA binding.

## HYPERACTIVATION OF THE DOPAMINERGIC SYSTEM IN AUTISM

Dopamine is a catecholamine neurotransmitter that has a variety of functions within the brain including behavior, voluntary movement, reward, attention, and cognition (Nieoullon, 2002). This neurotransmitter functions in many of the behaviors shown to be abnormal in autism. Autism is associated with hyperactivation of the dopaminergic system because risperidone, a dopamine antagonist, lessens the severity of many common autistic symptoms (McCracken et al., 2002; McDougle et al., 2005). Table 2 outlines the symptoms alleviated by risperidone from 101 autistic children age 5 to 17. The table compares those treated with placebo to those treated with risperidone. Nakasato et al. (2007) explored this concept further; exposure to drugs, such as valproic acid (VPA), contributes to the development of autism by increasing the levels of dopamine in the brain (Figure 4). Behavioral and anatomical characteristics of autism in humans can be replicated in animals, such as rodents, by exposing mothers to teratogen VPA at the time of neural tube closure (Arndt et al., 2005; Williams et al., 2001). Basal dopamine levels in the frontal cortex were determined in control (n=6) and VPA-exposed (n=5) rats. The VPA-exposed rats showed a significantly higher basal dopamine level than control rats ( $P < 0.05$ ). This abnormality may be associated with depressive and withdrawal

behavioral symptoms, such as the isolation from other people and lack of social interaction, seen in autism.

Measure from Ritvo-Freeman Real Life Rating Scale	Score in Placebo Controlled Trial (N=101)						Results of Placebo-Controlled Trial		
	Baseline		Week 4		Week 8		Frd. of Study Effect Size (Cohen's d)	Interaction of Treatment With Time F (df=1, 87) p	
	Mean	SD	Mean	SD	Mean	SD			
Subscale I: sensory motor behaviors							0.45	10.8	0.002
Risperidone	1.00	0.52	0.65	0.43	0.59	0.42			
Placebo	0.93	0.58	0.83	0.47	0.91	0.60			
Subscale II: social relationship to people							0.60	—	n.s.
Risperidone	0.60	0.43	0.20	0.43	0.15	0.42			
Placebo	0.72	0.43	0.47	0.51	0.46	0.52			
Subscale III: affectual reactions							1.10	15.4	<0.001
Risperidone	1.68	0.64	1.00	0.67	0.88	0.56			
Placebo	1.64	0.64	1.64	0.64	1.60	0.71			
Subscale IV: sensory responses							0.77	8.5	0.004
Risperidone	1.12	0.53	0.70	0.44	0.60	0.28			
Placebo	1.21	0.53	0.98	0.54	1.07	0.54			
Subscale V: language							0.81	—	n.s.
Risperidone	0.28	0.38	0.15	0.31	0.03	0.29			
Placebo	0.46	0.42	0.30	0.39	0.34	0.41			
Overall							1.08	15.3	<0.001
Risperidone	0.94	0.36	0.54	0.36	0.45	0.31			
Placebo	1.03	0.37	0.84	0.39	0.88	0.40			

Table 2 (McDougle et al., 2005) The Ritvo-Freeman Real Life Rating Scale was used to evaluate the benefits seen in autistic children treated with risperidone as compared with placebo treatment. Subscale I: sensory motor behaviors include hand flapping, rocking and pacing. Subscale II: social relationship to people includes appropriate responses to interaction attempts and initiation of appropriate physical interactions. Subscale III: affectual reactions include abrupt changes in affect, crying, and temper outbursts. Subscale IV: sensory responses include being agitated by noises, rubbing surfaces, and sniffing self or object. Subscale V: language includes communicative use of language and initiation of appropriate verbal communication. Significant ( $p < 0.01$ ) benefit from risperidone treatment was seen in sensory motor behaviors, affectual reactions, and sensory responses. This thus proves an overall positive effect to the drug for autism.

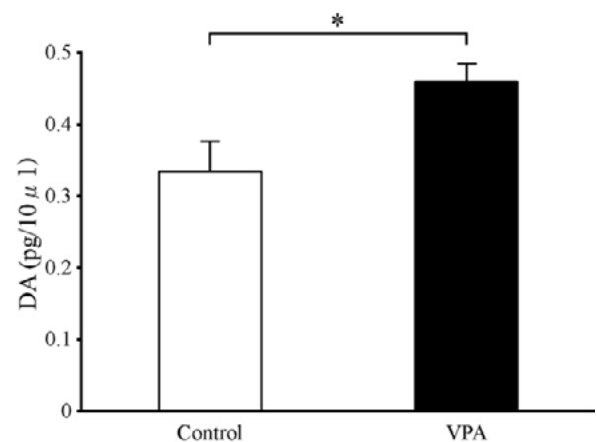


Figure 4 (Nakasato et al., 2007)

## **HYPOGLUTAMATERGIC SYSTEM SEEN IN AUTISM**

Glutamate is a neurotransmitter involved in synaptic plasticity and cognitive functions like learning and memory (McEntee et al., 1993). Certain brain regions are implicated in autism based on neuropathological and brain imaging studies. These include areas such as medial temporal structures like the amygdala and the hippocampus and cortical areas such as the frontal, prefrontal, and parietal cortices (Howard et al., 2000; Raymond et al., 1996; Carper et al., 2002; Carper et al., 2005). The regions explained here are also structures involved in the glutamatergic system causing scientists to conclude that there is dysfunction in the glutamatergic system in autism. In exploring this topic further, they have found that glutamate antagonists result in similar features that are seen in autism (Carlsson et al., 1998). Comparable symptoms include heightened or distorted visual, auditory, olfactory, and tactile perception, defective proprioception, difficulties estimating time, concrete thinking, defective habituation, depersonalization, rapid fluctuations of mood, anxiety, social withdrawal, hyperactivity, and repetitive movements. This leads to the conclusion that deficient glutamatergic transmission is involved in autism. The study also examined the similarity in effects that were seen in patients treated with serotonin (5-HT) 2A receptor agonists. Patients treated with 5-HT<sub>2A</sub> agonists exhibited most of the above symptoms. A mechanistic study determined that GABA interneurons in the piriform cortex excite 5-HT<sub>2A</sub> receptors while inhibiting glutamatergic pyramidal cells. Through this system, 5HT<sub>2A</sub> stimulation indirectly inhibits the glutamatergic system. This has opened new doors as far as autism treatment is concerned. A typical counter to the hypoglutamatergic system are glutamatergic agonists, however these often result in neurotoxicity. Glutamatergic systems can indirectly be stimulated through 5-HT<sub>2A</sub> blockers which have fewer side effects. If the Fischer 344 rat were to serve as an appropriate animal model for autism, it would show similar neurological findings. The amygdala, hippocampus, frontal cortex, prefrontal cortex, and parietal cortex would show lower levels of glutamate as compared to controls.

## **CURRENT ANIMAL MODELS OF AUTISM**

Animal models are crucial for research; however no animal can replicate humans or an entire disease. Oftentimes animals have a shorter lifespan so diseases that progress over years in humans can be tracked over the course of months or hours in these models. Animal models can be developed to target one or more traits encompassed within a disorder such as autism. There are a few animal models of autism currently being used. Each expresses specific symptoms of autism so they can be used to study the broader spectrum of the disorder, including the neurological, molecular, or morphological pathogenesis. The following are mouse models of autism and the symptoms that they exhibit (Halladay et al., 2009): (1) The A/J mouse strain is an inbred cross between the Cold Spring Harbor albino and the Bagg albino. These mice exhibit low levels of social behavior in reciprocal social interaction and sociability assays, deficits in social learning of food preference assay, low activity, and high anxiety-like behavior. (2) The BALBcBy/J is an inbred mouse substrain derived from the Andervont lineage of the Bagg Albino Bailey (BALB/cJ) mice. These mice show low levels of social behavior in reciprocal social interaction and sociability assays and high anxiety-like behavior. (3) The BTBR is a mutant inbred strain of mice. They exhibit low levels of social behavior in reciprocal social interaction and sociability assays, impaired play, high anxiety-like behavior, and low exploratory behavior (The Jackson Laboratories, 2011).

## **THE BALB/CJ ANIMAL MODEL OF AUTISM**

Brodin (2007) began looking at the BALB/cJ mouse as an animal model of autism due to social behavior abnormalities. C57BL/6J mice are a widely used inbred strain traditionally used as controls (The Jackson Laboratories, 2011). A behavioral test was conducted to compare how BALB/cJ and C57BL/6J control mice interacted with a “stimulus” mouse. The stimulus mouse was placed in a Plexiglas cylinder and then the Plexiglas was removed to observe free interaction. Measures of sociability included the time spent in social approach (i.e. measure of time that the test mouse spent far from the stimulus mouse that was confined to a Plexiglas cylinder), the time spent in social sniffing

(the time spent directly sniffing the stimulus mouse contained in the cylinder), and the time spent in direct social interaction (i.e., time spent in direct contact between test and stimulus mouse during free interaction) (Table 3). The BALB/cJ showed significantly lower levels of sociability than C57BL/6J controls in all measures. Baseline locomotor activity was equivalent in both strains showing evidence that the differences in sociability were due to behavioral differences caused by the situational apparatus.

Behavior	Strain comparison
Time spent in social approach	C57BL/6J > BALB/cJ
Time spent in social sniffing	C57BL/6J > BALB/cJ
Time spent in direct social contact	C57BL/6J > BALB/cJ
Baseline locomotor activity	C57BL/6J = BALB/cJ

Table 3 (Brodkin, 2007)

In addition, Brodtkin found that the BALB/cJ show less maternal behaviors when caring for their young as compared with C57BL/6J controls. Reduced maternal behaviors of BALB/cJ mothers are part of a general pattern of low social interaction in BALB/cJ mice, increasing the validity of this model for autism. ASD have shown a relatively high prevalence of aggressiveness and self-injurious behaviors (McCracken et al., 2002). This aggressiveness was shown in the BALB/cJ male mice when places in a cage together. These mice tended to fight frequently, sometimes resulting in serious injury.

The BALB/cJ mice have a relatively high brain weight and high brain to body weight ratio in contrast with C57BL/6J controls (Roderick et al., 1973). This corresponds with autistic subjects, whose brains are typically 10% larger than normal by 2-3 years of age (Hazlett et al., 2005).

There was also significant increase in the volume of the forebrain, neocortex, and hippocampus in the BALB/cJ strain. The increase in the size of the forebrain could be correlated with the larger frontal cortex seen in autism (Carper et al., 2005).

## BEHAVIORAL DIFFERENCES IN FISCHER 344 RATS

Fischer 344 rats are a naturally occurring strain that is inbred. These rodents are not yet recognized as an animal model of autism; however behavioral studies of these animals

can be correlated with autism. Studies have been conducted in a number of laboratories to examine behavioral differences between Fischer 344 rats and controls. Autistic individuals demonstrate a lack of interaction with other children or adults. Similarly, young Fischer 344 rats show a decreased rate of play with other rats of their same age as compared to controls (Siviy et al., 2003). Two rats of the same strain were placed in a cage together after being separated for 24 hours. The amount of play was recorded by observing the number of nape contacts and pins. A nape contact was identified when one partner brought its snout within 1 cm of the other's nape. A pin was characterized if one rat was on its back with at least three paws in the air. Data shows that the Fischer 344 rats show a significantly lower interaction in regards to both nape contacts and pins as compared to Lewis controls (Figure 5).

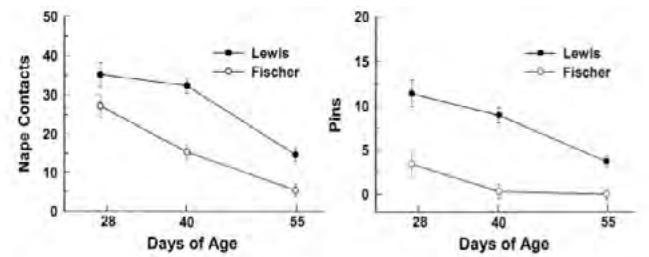


Figure 5 (Siviy et al., 2003)

Fischer 344 rats also exhibit less maternal behavior, including crouching, licking, nursing, and pup retrieval, than a normal rat (Siviy et al., 2003). The data for crouching, or the time a mother spends crouching over her pups in a nursing-like posture, shows a lower number of occurrences in Fischer 344 rats. In addition, the Fischer 344 mothers spend significantly more time out of the nest, away from her pups, than did the Lewis rat controls. This aspect of Fischer 344 rat behavior correlates with the tendency for autistic individuals to isolate themselves from other people and serves as evidence that these rats be good models to study morphological differences in the brain.

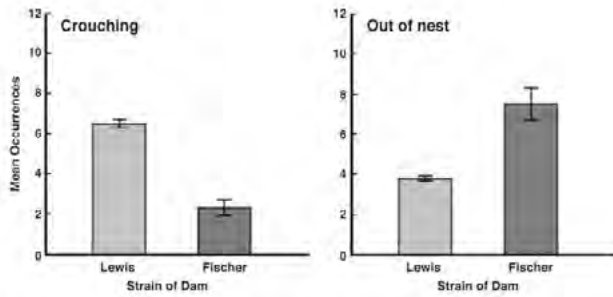


Figure 6 (Siviy et al., 2003)

Rex et al. (1999) conducted further behavioral analysis of the Fischer 344 rats. A variety of behavioral tests compared the Fischer 344 to Harlan-Wistar controls. In the modified open field test, rats were deprived of food for 20 hours and then placed in a large white open field containing food in the middle. Eight of the ten Harlan-Wistar rats ate food under these conditions but none of the Fischer rats began feeding. In addition the Fischer 344 rats spent less time in the inner area of the open field and more in the periphery. The Fischer 344 rats had a lower rate of locomotor activity. This shows that Fischer rats have a higher level of anxiety than the controls because time spent in the periphery of the open field has been correlated with higher anxiety.

Rex and colleagues also tested social interaction by placing two rats of the same strain in a cage together and recorded the interaction between the two. Fischer 344 rats typically took longer to initiate contact with the unfamiliar partner, showed a lower frequency of contact, and spent less time in contact as compared to the Harlan-Wistar rats. In addition, the X-Maze test that Fischer 344 rats had a lower exploratory level than Harlan-Wistar controls. Fischer 344 rats also spent more time in the immobilization state (lack of movement) while on the maze.

## RESEARCH QUESTION

Do Fischer 344 rats show a hyperactive dopaminergic system, with associated increased levels of TH, at the levels of the striatum, prefrontal cortex, and amygdala?

## HYPOTHESIS

Fischer 344 rats will show morphological differences at the molecular level, specifically within the dopaminergic system. The Fischer 344 strain of rats is not currently an established animal model of autism and studies have not yet been conducted to investigate morphological alterations in the brains of these rats. In order for the Fischer 344 rat to be a good animal model to study the etiology and mechanism of autism, the brain is expected to show an enlarged striatum, prefrontal cortex, and amygdala. In addition, the cerebellum is anticipated to be smaller than controls. The hyperactivity of the dopaminergic system would be seen with increased levels of TH in the striatum, prefrontal cortex, and amygdala in the Fischer 344 rats as compared to controls. The basis for the use of these rats stems in the abnormal behavioral characteristics that correlate with autism, such as delayed rates of interaction, reduced levels of care for offspring, lack of exploratory behaviors, and high levels of anxiety (Siviy et al., 2003; Rex et al., 1999).

## METHODS

Sprague Dawley rats (n=3) and Fischer 344 rats (n=3) were used in this study. The animals were group-housed in a temperature controlled room under a 12-hour light and 12-hour dark cycle with free access to water and standard rodent food. The rats were eight to ten weeks of age and weighed about 150 grams. All procedures were performed in accordance with the NIH Guide for the Care and Use of Laboratory Animals, and were approved by the Institutional Animal Care and Use Committee at the University of Southern California. The number of rats used assured a large enough n to detect changes within each experimental design.

## COLLECTION OF BRAIN TISSUE

When the rats reached the appropriate age, they were fixed by transcardial perfusion in order to prepare the brain tissue for histological evaluation. Six animals (Sprague Dawley n=3 and Fischer 344 n=3) received an intraperitoneal injection



of 500 uL of nebutol to anesthetize the animal. Once the animal had diminished reflexes, the animal was prepared for perfusion. The right atrium and left ventricle (near the apex) were cut and the animal was perfused with 200 ml of cold-saline followed by 500 ml of 4% and paraformaldehyde/phosphate-buffered saline (PFA/PBS) pH 7.2. Brain tissue was harvested and placed in 4% PFA/PBS solution for 24 hours. The brains were then placed in 20% sucrose solution until they sank to the bottom (48 hours). Tissue was frozen using methyl butane on dry ice and placed in the -80°C freezer for 18 hours.

## IMMUNOCYTOCHEMISTRY

Fixed tissue from three rats from each group was cut to 25 micron thickness using a cryostat. Slices were placed (free-floating) in a solution of phosphate buffer solution plus thimerisol, an anti-fungal agent, in six well dishes. One slice from each well was placed on subbed slides and nissl stained for correct orientation (i.e. which part of the brain was in each well).

Commercially available antibodies included rabbit polyclonal anti-TH (Chemicon, Temecula, CA). Tissue slices from the midstriatum, prefrontal cortex, and caudal end of the temporal lobe were selected and washed with Tris-buffered saline (TBS; 50mM Tris pH 7.4 and 0.9% NaCl) and blocked. Slices were then exposed to primary antibody at a concentration of 1:1000 for 18 hours at 4°C. Sections were washed in TBS and exposed to biotinylated goat anti-rabbit IgG secondary antibody (using the ABC Elite kit) at a concentration of 1:500. Antibody staining was visualized by development in DAB/H<sub>2</sub>O<sub>2</sub> to desired darkness. Multiple sections of each animal were stained to ensure that differences in staining intensity were due to differences in antigen expression.

The pattern of expression of TH protein in the striatum was determined using immunocytochemical staining to examine the anatomical distribution of TH and quantitatively analyze the TH protein levels at different regions of the brain. Immunocytochemical staining of coronal sections at the level of the midstriatum showed intense TH staining within the striatum as well as intense fibrous TH immunoreactivity within the striatum across both Fischer 344 and Sprague Dawley rats which were quantified (Figures 7 and 8). ICC staining of the

prefrontal cortex showed neuronal staining using TH (Figures 9 and 10). Staining of the caudal end of the temporal lobe showed TH stained fibers in the area of the amygdala for both strains of rats (Figure 11).

## Image Analysis

Images from the striatum, prefrontal cortex, and amygdala were taken under a microscope at 2x, 10x, 40x, and/or 60x magnifications for visualization. Additional images were collected and digitized. The Image J computer program was used to determine relative optic densities (OD) (expressed as arbitrary units of within the linear range of detection). OD units ranges from the 0-255 (darkest level = 0; lightest level = 255). In the mid-striatal sections, measurements were taken from the cortex, dorsal lateral striatum, dorsal medial striatum, nucleus accumbens, and whole striatum and the relative optic density was determined by subtracting the relative optical density of the corpus callosum as background. The prefrontal cortex was measured from the slices and the relative optical density from around the tissue was subtracted as background. In the slices from the caudal end of the temporal lobe, the relative optical densities of the cortex and amygdala were measured and the relative optical density of the corpus callosum was subtracted as background. The various areas of each section were analyzed and statistical differences, or lacks thereof, between the two strains of animals were recorded.

## RESULTS

### ANALYSIS OF TH EXPRESSION IN STRIATUM

Analysis of the levels of TH protein in the striatum was done using Image J software to measure relative optic densities. The cortex, dorsolateral striatum, dorsomedial striatum, nucleus accumbens, and whole striatum were compared between the Sprague Dawley and Fischer 344 rats (Figure 8). No significant difference was seen in the TH protein levels in the cortex (Figure 10). This is expected because DA is not produced here and is therefore

used as a control for analyzing the relative differences between the two strains of rats. Fischer 344 showed significantly ( $p < 0.05$ ) less TH in the dorsolateral striatum and dorsomedial striatum. The nucleus accumbens and whole striatum showed even more differentiation ( $p < 0.01$ ) between the Fischer 344 and Sprague Dawley rats with lower levels of TH being expressed in the Fischer 344.

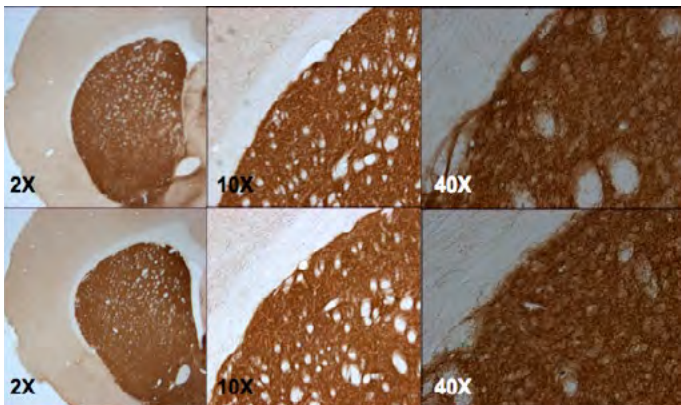


Figure 7. TH protein expression in the striatum of (A) Sprague Dawley and (B) Fischer 344. Immunocytochemical analysis using an antibody against TH protein demonstrated decreased expression of TH in Fischer 344. Coronal sections at the level of the midstriatum were stained for TH protein and images made at low magnification (2x; left panels), mid magnification (10x; middle panels), and high magnification (40x; right panels). In both the Sprague Dawley and Fischer 344 animals displayed intense TH in the striatal area, as seen by dark staining. Thick networks of TH-positive fibers were seen in both the Sprague Dawley and Fischer 344 animals in the right panels.

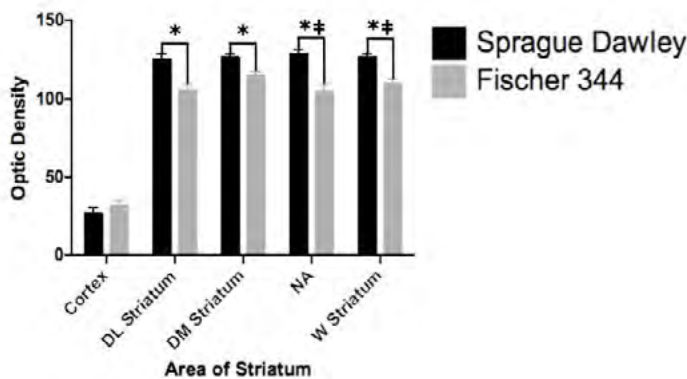


Figure 8. Immunocytochemical analysis of striatal TH protein. Analysis was carried out on coronal sections at the level of the midstriatum of Sprague Dawley (n=3) and Fischer 344 (n=3) rats. No difference in the relative amount of TH protein was seen in the cortex. A significant decrease of striatal TH protein was seen in the Fischer 344 in the DL CPu, CM CPu, NA, and W CPu. Ctx - cortex, DL CPu - dorsolateral striatum, CM CPu - dorsomedial striatum, NA - nucleus accumbens, and W CPu - whole striatum. The \* represents statistical significance compared with the Sprague Dawley group ( $p < 0.05$ ). The ‡ denotes statistical significance with  $p < 0.01$ . Error bars are standard error of the mean.

## ANALYSIS OF TH EXPRESSION IN PREFRONTAL CORTEX

The relative optic densities were measured in the prefrontal cortex and the levels of immunocytochemical TH staining were compared between the Fischer 344 and Sprague Dawley rats. No significant difference of TH expression was seen in the prefrontal cortex of these rats (Figure 10). This data suggests that the defects in the mesocortical dopaminergic pathway may not be the cause of enlargement of the prefrontal cortex seen in autistic humans. Additional pathways such as the glutamatergic system may be responsible and should be examined.

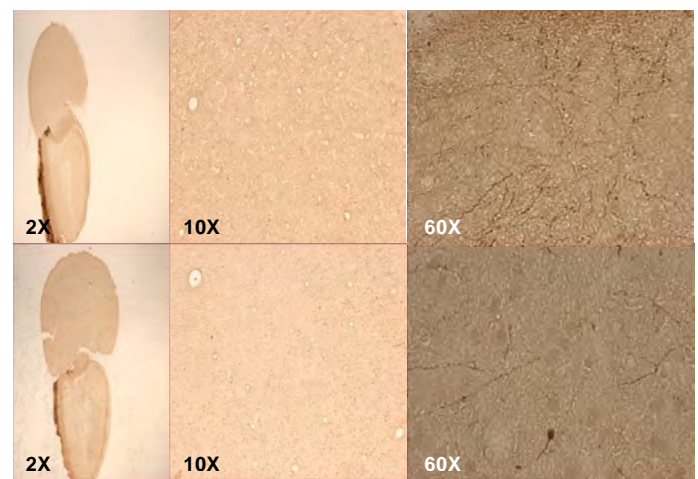


Figure 9. TH protein expression in the PFC of (A) Sprague Dawley and (B) Fischer 344. Immunocytochemical analysis using an antibody against TH protein demonstrated no difference in expression of TH in Fischer 344. Coronal sections at the level of the prefrontal cortex were stained for TH protein and images made at low magnification (2x; left panels), mid magnification (10x; middle panels), and high magnification (60x; right panels).

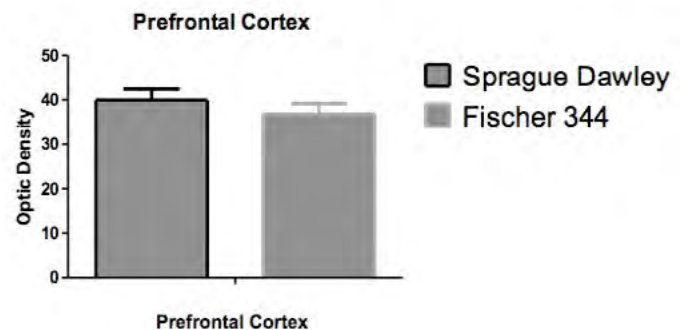


Figure 10. Immunocytochemical analysis of PFC TH protein. Analysis was carried out on coronal sections at the level of the prefrontal cortex of Sprague Dawley (n=3) and Fischer 344 (n=3) rats. No difference in the relative amount of TH protein was seen in the prefrontal cortex. Error bars are standard error of the mean.

## ANALYSIS OF TH EXPRESSION IN AMYGDALA

Sections from the caudal end of the temporal lobe were visualized at a series of magnifications and analyzed after being stained with TH using an immunocytochemistry technique (Figure 11). The TH levels of the cortex and amygdala were compared between the Fischer 344 and Sprague Dawley. No significant differences were found in the cortex or amygdala (Figure 12).

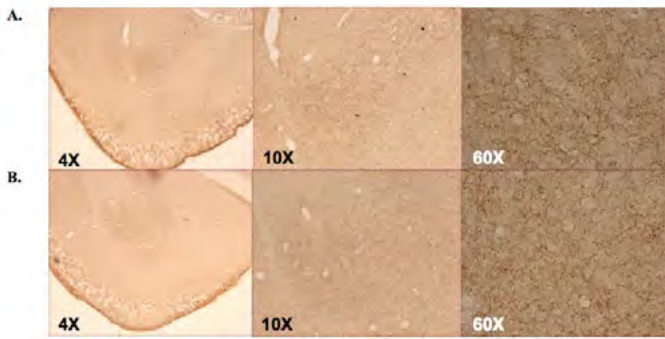


Figure 11. TH protein expression in the caudal end of the temporal lobe of (A) Sprague Dawley and (B) Fischer 344. Immunocytochemical analysis using an antibody against TH protein demonstrated no difference in expression of TH in Fischer 344. Coronal sections at the level of the caudal end of the temporal lobe were stained for TH protein and images made at low magnification (4x; left panels), mid magnification (10x; middle panels), and high magnification (60x; right panels). Both the Sprague Dawley and Fischer 344 animals displayed darker TH in the amygdala area, as seen by darker staining. Thick networks of TH-positive fibers were seen in both the Sprague Dawley and Fischer 344 animals in the right panels.

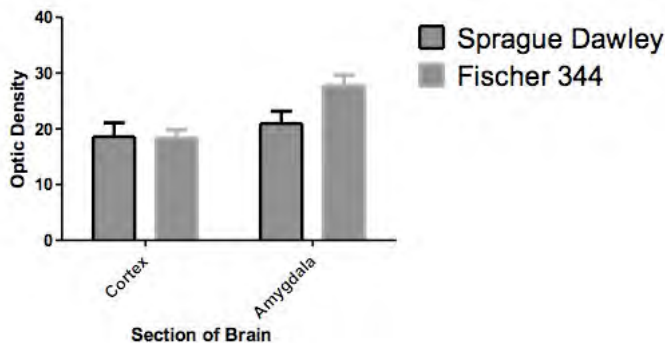


Figure 12. Immunocytochemical analysis of TH protein in the caudal end of the temporal lobe. Analysis was carried out on coronal sections at the level of the caudal temporal lobe of Sprague Dawley (n=3) and Fischer 344 (n=3) rats. No difference in the relative amount of TH Protein was seen in the cortex or amygdala. Error bars are standard error of the mean.

## DISCUSSION

The Fischer 344 rat has consistently shown behavioral

abnormalities similar to Autistic individuals. In this study, it was anticipated that morphological differences would accompany these aberrant behaviors. This was demonstrated using immunocytochemical staining of TH protein in the various areas of the brain that have shown to be altered in studies of postmortem brains and MRI scans from autistic subjects, including the striatum, prefrontal cortex, and amygdala.

Analysis of this data shows a significant decrease in the levels of TH in Fischer 344 in the striatum (dorsal lateral striatum, dorsal medial striatum, and nucleus accumbens) as compared with Sprague Dawley controls. Lower levels of TH can correspond with lower levels of dopamine because TH is an enzyme that catalyzes the reaction to form dopamine. This does not replicate the findings regarding dopaminergic dysfunction in autism. Hyperactivation of the dopaminergic system seen in autistic individuals would correlate with higher levels of TH and dopamine. The levels in the Fischer 344 rat are lower therefore opposing our initial hypothesis. This serves as evidence against the legitimacy of the Fischer 344 rat to be an animal model of autism since it expresses the opposite morphological finding than we would expect.

The dorsal lateral striatum is responsible for motor behavior. The decrease in the level of TH in this region of the Fischer 344 may correlate the passiveness and hyperactive behavior associated with autism. This hyperactivity could include the stereotypical repetitive movements or ticks, representing involuntary movements. Dopamine helps to regulate voluntary movements so lack of TH and dopamine would increase the amount of involuntary movements. Non-motor behavior, which is primarily what autism is characterized by, is seen in the dorsal medial region and nucleus accumbens. The nucleus accumbens is also responsible for reward behavior. Lower levels of TH in these areas in the Fischer 344 rat could represent the delay in developmental characteristics seen in Autism such as communication or interpersonal skills. The abnormal social behavior seen in the Fischer 344 rat and in autism is further supported by the lower levels of TH in these specific areas of the dopaminergic system located within the striatum.

Analysis of the levels of TH in the prefrontal cortex using immunocytochemistry shows no difference in dopamine

levels between the Fischer 344 and Sprague Dawley rats. The prefrontal cortex is involved in the mesocortical pathway of the dopaminergic system. Dysfunction in this pathway is associated with schizophrenia and schizophrenic symptoms are commonly associated with ASD (Kambarova et al., 2011; Li et al., 2011). The Fischer 344 rat may not be a good animal to portray autistic patients with associated schizophrenic behaviors because no difference was found in the dopamine levels here. There are projections to the prefrontal cortex from the glutamatergic system; therefore it was hypothesized that some of the abnormalities seen in the prefrontal cortices of autism patients may be due to abnormalities in glutamate (Figure 1). If the Fischer 344 rat is an accurate model of the dysfunction of the glutamatergic system seen in autism, differentiation between glutamate levels in the Fischer 344 strain would be expected. Future studies will analyze whether this is the case.

TH levels in the amygdala showed no difference in the levels of dopamine between the Fischer 344 and Sprague Dawley rats. No difference in the level of dopamine would be expected in this area because there are no dopaminergic projections that extend to the amygdala. The results validate this theory. The amygdala sends out neuronal projections involved in the glutamatergic system (Figure 1). Future studies will determine whether dysfunction of this system and the enlargement to the amygdala, seen in autistic individuals, is due to differences in glutamate levels in the amygdala in Fischer 344 rats.

## **FUTURE WORK**

Studies are currently being conducted in order to analyze the ability for the Fischer 344 to accurately represent certain behavioral and morphological characteristics of autism. Additional methods will hopefully validate the current findings including western blot analysis to compare TH levels in the various areas of the brain. Observation of the cerebellum is also necessary in order to investigate the size, cellular, and receptor differences seen in autism subjects when studying the postmortem brain. The substantia nigra will also be investigated since it is also involved in the nigrostriatal dopaminergic system.

The substantia nigra produces dopamine and sends projections to the striatum so similarities between the striatum and substantia nigra are hypothesized.

Other proteins are being investigated to compare the brain morphology of Fischer 344 rats with Sprague Dawley controls. Such proteins that merit further study include: dopamine transporter (DAT), glutamate receptor-1 (GluR1), glutamate receptor-2 (GluR2), metabotropic glutamate receptor-1 (mGluR1), and metabotropic glutamate receptor-5 (mGluR5). DAT is a protein spanning the membrane that binds dopamine and transports it from the intersynaptic space into the post-synaptic neuron. It is hypothesized that differing levels of DAT will correlate with the TH levels to show the differentiation in dopamine in the Fischer 344. This will correspond with the dysfunction in the dopaminergic system seen in Autism. The glutamatergic system is necessary for normal brain function and has been compromised in Autism as well as other neurological disorders such as Parkinson's disease. The glutamate receptors will be analyzed to discover if the Fischer 344 does in fact express glutamatergic dysfunction as well.

## **SIGNIFICANCE**

### **SIGNIFICANCE OF A NEW ANIMAL MODEL**

An additional animal model to test autism may provide insight into its neurological mechanism and the progression of the disorder can be observed over time. If the morphology and mechanism of autism is determined, then treatments can be created to reverse the abnormal neuronal interactions. These findings could then be used on animals such as monkeys which are closer relatives to humans. If the treatments succeed in normalizing the developmental disabilities seen in autism from these animals, they can then be used on humans as a possible treatment or cure. In addition, the new animal model could be used to test drugs and currently available treatments. The success of the drugs could be measured and any side effects could be observed before administration to humans. Succeeding in this aspect could help in treating autism and will hopefully lead to a cure.

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# FROM WHITE TO BROWN: LATINO RACIAL IDENTITY IN POST WWII LOS ANGELES



## ADAM PEREZ

*Journalism*

*Mentor: Laura Pulido, Ph.D.*

*Department: American Studies & Ethnicity*

*University of Southern California*

*McNair Scholars Program*

While studies have discussed the construction of race within the Latino community, there is lack of focus on the post WWII era. This era is crucial to Latino racial politics since it follows a time of racial ambiguity. The Zoot Suit Riots, which exposed the racial turmoil of wartime Los Angeles, along with court cases, illustrate a discrepancy in the ethnic categorization of Mexican as racially White but still inferior. Prior studies have presented external defining processes but do not address how Latinos self identified. This research addresses the role of political organizations and their use of racial identification in the promotion of a political consciousness. Archival research on the Civil Rights Congress, Los Angeles Chapters, a progressive grass roots organization, was conducted from 1945 to 1956. Further investigation conveyed that the CRC's classification of Mexican racial identity diverged from what the law categorized as "White". The progression of the Civil Rights Congress in Los Angeles transformed ideals and goals set forth by the organization. Findings demonstrated that although Mexicans were categorized as White by law, they did not benefit from the same privileges as Anglo Americans. Many Latinos rebelled against their ascribed White racial categorizations as a result of being cast out from mainstream American "Whiteness." Thus, Latinos in post World War II Los Angeles set precedence to the beginning emergence of racial politics in the 60s and 70s and into today. Racial identification within the Los Angeles Mexican community has shifted and most importantly was ignited by a political consciousness.



# INTRODUCTION

In 1994, Prop 187 passed with a landslide in California. Prop 187 was commonly referred to as the “Save our State” (SOS) initiative. The proposition was devised as a means to save billions of dollars in state tax revenues and to “send a message to Washington” about the economic and social problems posed by the estimated 1.6 million illegal immigrants in the state (Tolbert 809). Opponents of Prop. 187 argued that the policy would “create a two-tiered society” fostering a police-state mentality in which “legal residents would be questioned simply because of their accent and/or skin color”(Tolbert 810).

Although Proposition 187 was dismissed as unconstitutional, it exposed a general anti-immigrant, anti-minority sentiment to those who posed a threat to the dominant white population (Calavita 285, Tolbert 810). A Los Angeles Times exit poll found that the Prop. 187 initiative “polarized the electorate along racial lines, with broad support among white voters while losing amongst other ethnic groups”(LA Times). Whites voted 2 to 1 in support of Prop 187. Latinos, in contrast, opposed the measure 77% to 23%, while 53% of Black and Asian voters opposed the measure, suggesting the measure may have been broadly conceived as anti minority and/or anti-Latino (Tolbert 809). These findings may suggest that illegal immigration was viewed as a statewide problem and threat to the status quo (Tolbert 810). During this turmoil there was an uprising of support from the Latino community. In an interview with the Free Press, Victor Martinez a San Francisco attorney with La Raza Centro Legal stated, “What is happening is the community was not educated before...There was not a grass-roots effort going on until recently. All the work that the thousands of volunteers have been doing all over the state in the last few months is really paying off now” (Ferriss 1994). Protestors against the proposition claimed that the Latino community was being targeted. Many Latino organizations began unifying and fighting back against prop 187. As a result, solidarity within the Latino population strengthened. In a 1994 article with the LA Times boycott leaders from the organizations stated:

“We can’t support companies that support Pete Wilson, who is the No. 1 enemy of the Latino community,” said Fabian Nunez

of La Alianza, a community advocacy group in Pomona. “The purpose of our boycott is to send messages to businesses that Latino immigrants, through their spending power, won’t support politicians who support racist policies”(LA Times 1994).

This quote by group organizers illustrated that solidarity within the Latino community was achieved by a political consciousness and unifying under a common threat. Robinson argues that Proposition 187 was crucial to how “whiteness is constructed from the top and the bottom”(Robinson 5). Thus, interaction between the elites and grassroots forces, as eluded by Robinson, represents how whiteness is produced, reaffirmed and transformed. Prop. 187 illustrated that Latinos were forcibly protesting against being demonized and categorized as second-class citizens.

Although evidence suggests that the majority of Latinos do not identify with being White, they are regarded as such under the census classification. Latinos in the 2000 census were asked to choose the best fit among the existing racial categories, which did not include Latino or Hispanic as its separate category. During the 2000 Census, 47.9% of Hispanics indicated they were White, 2% reported they were Black, 42.2% chose the “Some Other Race” category,” 1.2% said they were American Indian, and less than 1% said they were Asian, Native Hawaiian, or Other Pacific Islander (Calavita 284). Thus, there is a discrepancy and ambiguity in how Latino racially self-identify and how they are perceived racially. What can be determined is that the 2000 census and the census preceding it offer a limiting and an inadequate portrayal of the United States Latino population. These statistics provide a limited purview of how Latinos identify themselves racially.

Latino racial identity and solidarity are historically linked to political movements. My research examines post WWII Los Angeles in which Latinos faced discrimination and segregation despite being categorized as White under law. During this era, Latino’s begin to unite against the encroachment of their civil rights by the mainstream White majority. Systematic violence, discrimination, segregation and illegal deportation became ubiquitous. Latino involvement in political organizations instilled sense of collective identity in communities. By examining these organizations and grass roots we can understand the processes of racial identification and the racialization of oneself through

politics. For the purpose of this project I will use the term Latino but will focus specifically on the Mexican population since they composed the overwhelming majority of the Latino population in Los Angeles. Also, the term Latino is more inclusive and does not discredit the participation of other ethnic groups. Investigating how political organizations in post WWII Los Angeles use race to promote a political consciousness will demonstrate how political and racial identities emerge. My research will help explain the trend of Latino identification and political activism within a historical prism.

## LITERATURE REVIEW

### POST WWII AMERICA: END OF ISOLATIONIST POLITICS

The end of World War II signified a pivotal movement for the United States as it entered the global stage and ended its isolationist politics. According to Estrella, World War II had a significant impact on Mexicans in the United States. It awakened “hopes that had been lost by the depression”(Estrella 5). The economic boom that followed WWII provided second generation Mexicans with opportunities in both industry and armed forces, which could improve their economic and social well being (Alvarez 5). As the United States became a global power, it had to revamp its position on isolationism since immigrants and American minority communities had “cultural, emotional, and family ties to other countries influence by events in the international arena”(17).

### CONSERVATIVE MOVEMENT AND THE RED SCARE

After World War II, a conservative movement ignited by the “red scare” began to seep into every facet of American culture. HoSang illustrates that after World War II “racial nationalism were prominent: organized lynchings, vigilante violence and mass killings, forms of indentured servitude, restrictions on immigration and property ownership, minstrel shows, segregated classrooms, hotels and restaurants... and mass-based white supremacist movements” (12) were ever-present. “Anti-subversive” acts such as the Smith and McCarran acts

forced Mexicans to lose economic benefits. The Taft-Hartley Act restrained labor union powers and activities that provided Mexicans with social services. Mexicans and other minority groups unjustly bore the cost of the war through excessive taxes, prices, and declining wages (Chavez 74).

As California passed legislation to eradicate racial discrimination in employment, public services, housing sales, and restrictions of interracial marriage, racial discrimination and hierarchies still lingered. Ho Sang reiterates that not only did race inequalities persist through this period, the “increasingly came to be understood as both acceptable and inevitable within the same political discourse which so earnestly celebrated tolerance and condemned racial prejudice” (16).

At the forefront of the conservative movement was the notion of “Whiteness.” Whiteness can be defined as “not really a color...but a set of power relations”(HoSang 16/Martinez). Thus, “Whiteness” functions as a social organizing principle based on privilege. During the post-war era, “Whiteness” was expanded to reclassify racial groups as White, including Mexican-Americans. Martinez argues that “Whiteness” ensured public and private privileges that allowed one to escape “being the object of other; domination” (4). While the halcyon days of the 1950’s are often praised for its economic development, minorities such as African Americans and Latinos faced discriminations and exclusion of the privileges of “Whiteness.” Inequalities in power relations were expedited by segregated communities and workplace hierarchies implemented to protect white residents security.

### LEADING TO POLITICAL RACISM AND STRICT IMMIGRATION POLICIES- RACE TO RACIST IDEOLOGY

The changing demographics facing California were driven by a wave of new immigrants. Employers began to look toward Mexico as a source of labor for their steadily increasing needs. (Sanchez 19). The majority of immigrants during pre and post WWII were from Latin America, the Caribbean, and Asia, and most of these classified as nonwhite or as “people of color.” Wilson posits that these groups were “in-between” racial lines that were “genetically inferior” and “different in ways that went beyond acquired cultural characteristics” (Wilson 1). Within the context of changing demographics, the issue of race seems

inevitable. According to Fredrickson race is a socially, culturally, and historically “constructed” category that usually has a close connection to “racism” as an ideology or attitude (Fredrickson 244). “Race”, however, is a much more problematic concept since it is constantly in flux. Racial category, for Latinos in 1930, as previously stated was determined as “other.” After protests from the Mexican government, Mexicans were reclassified as white between 1940 and 1970, when the ethnic category “Hispanic” was introduced.

## **MEXICANS AND THE AMERICAN RACIAL PARADIGM**

In the post-war west, the topic of race had moved from the peripheries to center stage. As Mexicans became Mexican Americans, as stated by White, they “racialized themselves in response to the Anglo hegemony they encountered.” As a result many “Mexicans recast themselves as ‘white’ Americans (White 132/Basler 126). The classification that Mexicans were white was first introduced after the Treaty of Guadalupe Hidalgo in 1868. The treaty clearly stated that Mexicans in the United States could become full citizens. However, to claim citizenship, they had to willingly “give up [their] Mexican character”( Saldaña-Portillo 821) For Mexicans to possess whiteness: they must either give up their lands and homes to return to Mexico or become excluded from the dominant national character. Choosing a white identity becomes a profound statement for Mexican Americans, as it was an indication of how they perceive themselves as a part of the United States.

Generations of the United States United States-born Mexican Americans were coerced to actively claim their citizenship rights. Historians have characterized the generation of the 1930's, 1940's and 1950's as the first to understand themselves as a group with standing in the United States (White125). Before this, Mexican Americans did not necessarily differentiate themselves from Mexicans. Differences in attitude within the Latino community illustrated that some members referred to themselves as white while others identified as some other race, suggest both groups employed their racial identity as a measure of belonging. Chicano historians and Latino studies scholars have generally divided into two camps in their

assessment of the Mexican American generation's “other white” legal strategy. Some scholars argue that Mexican Americans are “at best, suffering from an internalized racism or, at worst, as race traitors, so afflicted by their inspirational whiteness that they abandoned not only African Americans in the quest for racial justice but their own poorer, darker Mexican immigrant brethren.” (Saldaña-Portillo 824/ White 399). On the contrast, other scholars have argue that the Mexican American generation was strategically deploying their legal classification as white to advance a civil rights agenda .The latter group casts the Mexican American generation as a “savvy cultural negotiators for their raza”, competent in “fashioning and refashioning legal arguments in defense of both Mexican Americans and Mexicans” who faced segregation and systematic racial violence (140 ). Mexican Americans face a unique and ongoing identity process that involves ethnicity, nationalism, and race. Naturalized Mexican Americans identity does not exclusively reflect permanent phenotypical markers. Navigating the social and political battleground and its relationship to race is a significant challenge for naturalized citizens as they re-cast themselves as “Americans”.

1950's post war Los Angeles; changing demographics in LA

By the 1950, Los Angeles had become a home trajectory for many American and international migrants. Los Angeles had become a “ multifaceted racial terrain... where national and international influence both shaped and were shaped by local minorities' experiences with discrimination”(2). The steady migration of minority groups to Los Angeles in combination to the suburban “white flight” eroded the predominance of whites (Soneshien). The development of the citrus suburbs demanded “primarily seasonal, migratory, and cheap” labor (Garcia 36). Mexicans began to dominate the low wage market. This dominance was only fueled by a bilateral agreement between the United States and Mexico that brought 4.6 million contract workers to harvest U.S. crops from 1942 to 1964 (Garcia 160). The war served as catalyst for Los Angeles's demographic transformation, accounting for 31 percent growth from 1940-50 (12). Latino migration to Los Angeles was strengthened by the demand for cheap labor and economic growth. Latino immigration widened and continued to reinforce Latino Communities. In LA, the postwar years helped increase

the “ghettoization” of Latinos in some inner city neighborhoods (214).

## **DEMOGRAPHICS OF THE LATINO COMMUNITY; WHERE ARE THEY LIVING, WHERE ARE THEY EMPLOYED? WHAT IS THEIR PLACE IN THE CITY OF LA?**

Los Angeles in the postwar era was where Latinos, specifically Mexicans were both desired for cheap labor while being discriminated against. “Barrioization”, a term coined by Camarillo (1979, 53) and expanded by Villa (2000, 4), is understood “as a complex of dominating social processes originating outside of the barrios” that contributed to the formation of residentially and socially segregated Latino neighborhoods (Farhart 213). Despite the ruling of the 1954 Supreme Court’s decision in *Brown vs. Board of Education*, children of Mexican origin were subjugated to segregation in public school. In actuality, the division of Latino schools had increased since that time (Orfield and Eaton 1996; Frankenberg and Lee 2002/ Farhart 214) and is primarily a reflection of neighborhood segregation. The post war years forged the “ghettoization” of Latinos in inner city neighborhoods such as Boyle Heights and East LA and inner- ring suburbs like Huntington Park. As Latino infiltrated Los Angeles, American whites and European immigrants abandoned the city for other suburbs (Farhart 214) creating a physical and racial divide.

In the post-World War II years leading into the 1950’s, Latinos were forced to defend their identity against an emerging “White” identity, which consolidated various minorities of European descent into suburban middle-class citizens. Thus, “Whites” were isolated from denigration of city life. Themes of purity and civic values became the pillars for establishing white suburbia culture (Farhat 214). Exclusion from the “White” suburban culture deterred many Mexicans and other Latinos from assimilating into the mainstream American culture, forging instead their own enclaves within Los Angeles (Huntington 30).

## **LATINO COMMUNITY IN THE LOS ANGELES RACIAL LANDSCAPE**

During the 1950’s, Mexican organizations had begun coalescing into protest groups in Los Angeles after suffering

from racism during the post World War II era. The question of race, patriotism, and citizenship momentarily shifted to include Mexican Americans. Traditional racialists looked to biology as the primary explanation for the imagined rise in juvenile delinquency among Mexican Americans such as the the crises of the Sleepy Lagoon Murder Trial and Zoot Suit Riots. The New Mexican American generation presented a more aggressive political orientation to the Mexican American community (Warren 210).

The Zoot Suit Riots (1943) in Los Angeles illustrated the racial tensions between American service man against Mexican American youth dressed in extravagant clothes referred to as a Zoot Suit. The Zoot Suit made the “Pachuco” more conspicuous, serving as a badge of rebelliousness against the outside world. (Warren 7) The Pachuco, was neither Mexican nor American, they did not fit into society. The Pachucos and the zoot suit fad was alluring to minorities that “did not meet the criteria for the first-class membership in American Society” and emphasized a “myriad of racial, gender, and regional influences (Alvarez 17/ Warren 16). Thus, the Pachucos coalesced in retaliation against the “White” America they were supposedly apart of.

Events in Los Angeles are crucial to gaining an understanding of Latino politics. The Mexican American community experienced significant changes during the late 1930’s and early 1940’s. Mexican Americans continued to suffer various forms of racial discrimination; meanwhile, the demographic shifts of the Mexican ancestry population brought many changes in how community related to the dominant society. The population changed from an immigrant population, to one comprised of the American born children of immigrants. Scholars today have refuted the previous alluded “shortcomings” of this generation by portraying a “dynamic, evolving Latino cultures mediating the forces of assimilation and cultural assertion” (Sanchez 1993; D’Avila 2004). Thus the dynamics within the Latino community were becoming diverse and self assertive, allowing for Latinos to litigate between their own self-identity.

## THE LEGAL TREATMENT OF LATINOS IN LA DURING 1950S

As previous discussed, race is socially constructed and as a result receptive to change and influence. Martinez argues that although Mexican Americans were legally defined as “White,” they “did not receive the benefits traditionally associated with Whiteness (Martinez 342). In the case *Perez vs. Sharp* 1948, Andrea Perez a self identified Mexican was not able to marry Sylvester Davis a Black man, since under law Andrea Perez was white. The courts ruled that not allowing interracial marriage was a violation of the 14th amendment. Interestingly Andrea Perez was denied a marriage license because she considered white despite the fact that she identified as Mexican. Orenstein argues that “Mexicans were white by default- not sue to scientific theory or judicial decree, but by virtue of a treaty between the United States and Mexico” (369). Similarly, in the case of *Hernandez vs. Texas* it argued that the jury was not impartial unless representation of his race was allowed in the jury selection process. The verdict was in favor in *Hernandez*, stating that all races should be protected under amendment 14. Many court cases following such as *Lemon grove vs. Board of education* ruled against the school district on the basis that the Mexican Americans were officially white. The term “Mexican American” was considered “too vague and failed to adequately define a class within the meaning of Rule 23 of the federal rules of civil procedure, governing class actions” (59).

The record shows that the courts and laws constructed the race of Mexican American’s as “White”. Thus, dominant-group-controlled institutions often have defined racial groups imposing definitions on groups as a way to maintain the status quo of racial subordination. Sheridan, like legal scholar George Martinez, suggests that Mexicans were legally white but socially non-white. Thus the law made little difference because it only established empty categories, filled in by discriminatory practice (Gross 196). There was a discrepancy legal and social meaning. I argue that political conflict is generative of racial identity, and that “politics makes race” as much as “race makes politics.” American democracy was reconceptualized with an emphasis on the ways in which ethnic minorities embraced and deferred to “American” ways. All this was one in an attempt not to

appear “Un-American,” a strategy that conflict for Mexican American activist in Los Angeles (Chavez 41). As Latinos were being subjugated to racial categorization, organizations such as League of United Latin American Citizens (LULAC) were determine to serve as a voice for the people. Much studies focus on Mexicans since they composed the majority of Latinos in the U.S. The League of United Latin American Citizens (LULAC) had lawyers arguing racial discrimination against Mexican Americans in jury selection cases in the 1930s (Saldaña-Portillo 822). Gross posits at the same time that they were trying to have Mexican Americans’ census classification changed to “white”, LULAC wanted to distance themselves from “people of color” and Jim Crow practices (Gross).

While studies have discussed the issue of the construction of race within the Latino community, there is lack of focus on the 1950’s. I argue that this decade is crucial to Latino racial politics since it follows of time of racial ambiguity. Evident in Zoot Suit Riots and countless court cases was a discrepancy of what race Latinos fell under. Studies have also presented external defining process but have failed to emphasize how Latino internalized and self identified as individuals. There is also great emphasis on the Mexican community, but failure to mention of the other ethnic groups that fall within the Latino prism. My research will delve into how Latinos in the 1950s self identified and how grass roots organizations helped it evolved. I will also look for patterns that signify to the shift to the Chicano movement and whether this was a collective aspiration for the Latino community.

The Civil Rights Congress progressive civil rights organization

The Civil Rights Congress (CRC) organization commenced in 1945 in New York as a progressive communist party that soon aligned itself with Black civil rights organizations. The organization soon expanded to represent a vast scope of minorities such as Black, Mexicans, Jews, Chinese, and Communist members. In 1946, five chapters were instituted in Los Angeles: Echo Park, Jefferson, West Hollywood, East Los Angeles, and Long Beach. The organization spanned ten years from 1946 to 1956 with a strong following of 5,000 members.

## METHODS

My research project has worked closely with the Southern California Library for social sciences and research, focusing on the Civil Rights Congress (CRC) in Los Angeles. My research focuses on the Los Angeles chapters located in East Los Angeles, Echo Park, Jefferson Park, Long Beach and West Hollywood. From the 28 boxes within the CRC collection, 20 were examined and deconstructed.

The materials found in the Civil Rights Congress collections include police reports, recruitment pamphlets, and letters of grievances, newsletters, and court cases. The substance of the materials focused on the Civil Right Congress, Echo Park and East Los Angeles sub-chapters. There is also material relating to the San Francisco chapter discussing their common ground and unity tactics as it related to Los Angeles. The documents date from the organization's commencement in 1946 to its dissolution in 1956. The majority of archives referenced court cases in which the CRC LA sought as discriminatory and unconstitutional. Attached to most cases are fact sheets and reports given by the foundation advocating for minority rights. The L.A. Committee for Protection of Foreign born, a subgroup of the CRC LA, fought for foreign born residents in the United States who were unjustly criminalized. I examined cases pertaining to Mexican and Mexican Americans and examined whether the CRC LA determined the discrimination against the Mexican community was a result of racism or exclusion from the White majority. These cases referenced in my work cited, were crucial to understanding the racial landscape of that time and the problems facing Latinos in Los Angeles.

I conducted a content analysis of over 170 archival materials, assembled a detailed timeline of events and individuals related to the CRC LA. Furthermore, I accumulated various documents to create a robust picture of CRC LA during its existence. I examined and searched for rhetoric and language that implied or illustrated an exclusion from the White majority. Concurrently, I measured community participation by membership numbers and attendance to rallies and meetings. Another measurement I employed to calculate community involvement was through petitions. Also examining the role of

the organization within its constituency conveys how the CRC LA determined its role within the community.

The archives were placed in chronological order. The chronology serves to convey a change over time and how the organization's priorities shifted. Following the chronology, court documents, recruitment pamphlets, petitions, and so forth were then separated by specific category. Deconstructing each document was the next procedure, examining rhetoric and phrasing that instituted a sense of collectiveness and attachment. Forming trends was a crucial component, connecting names of organization leaders to their platforms. Extracting court cases from the archives allowed for further investigation to the discrimination and racism that was present at the time.

The theoretical framework that structured my research was based on the notion of "Whiteness." Whiteness is based on power relations of privilege and subordination. The framing of "Whiteness" aimed at determining whether grass organization such as the CRC LA, who was meant to represent the "people," supported or rejected the predominant hegemonic thinking. By reading the CRC LA's statement of purpose I was able to determine how the CRC LA dealt with the issue of "Whiteness" in the Latino community. Also, we can infer whether the CRC LA wanted to create a racial identity that rejected or empowered Latinos. Also, the CRC LA served as a template for creating and forging a collective identity within the Latino community by investigating community involvement and political activism.

## FINDINGS

A total of 177 documents were found in the CRC LA collections, that demonstrated how the Latino community, in alignment with other minority groups, sought to redefine itself and fight for their civil rights. The documents broke down into six main categories: government documents, recruitment advertisement, grievance letters and petitions, news articles, newsletters, and letters to organizations.

The timeline in Figure 1 (See figures at the end) is a general breakdown of the CRC LA. From 1945 to 46 we see the creation of the CRC, instituted by William Bender until

Anne Shore seceded power at the end of 1946. Six chapters were created in Los Angeles; Echo Park, Jefferson Park, East Los Angeles, West Hollywood, and Long Beach. From 1947 to 1949 we began to see the CRC LA situating itself within the Latino community. Mass rallies and fiestas were being held to promote a sense of community. The CRC LA began to draw on Latino Hollywood stars to recruit more members. From 1950 to 54 is when the CRC LA is most active in Los Angeles. The graph in Figure 2 (See figures at the end) represents the numbers of documents found within each category within a period of time. What becomes visible is that within this scope of time, the total number of documents from 1950 to 54 account for over 2/3 of the total archives. The abundance of archives found represents the peak of the CRC LA. Also at this time the CRC LA had an annual account of 5,000 members and even more unregistered supporters. From 1955 to 56 we see the demise of the CRC as a communist threat decreases and financial burdens force the organization to close. At this time there is still a good amount of grievance letters but a diminished amount of recruitment advertisement by the CRC to find new members.

## DISCUSSION

### THE STRUGGLE FOR POLITICAL AGENCY

Politics and social forces operated to coerce Mexicans to a second-class citizenship. Policies such as the Taft-Hartley act, Smith act and massive deportations of Mexicans were instituted to reinforce Mexican subordination. This discrimination was most exemplary through the cases the CRC LA represented. The Tony De Leon Case of 1950 involved Tony De Leon and five young Mexican men who were brutally beaten by the police. Tony De Leon was arrested without bail and sentence for drinking and belligerency. The CRC LA soon took hold of the case stating the “ police ha [d] violated their civil rights and racially discriminated against the young men.” They further reiterated that this was characteristic of the pattern of the racial genocide committed against the Mexican People. Leaflets were passed and rallies were held by the CRC LA in Boyle Heights and Huntington Park, which were predominantly Mexican

communities. The Mexican community soon rallied behind the CRC LA and the case was dismissed. Thus, the Mexican community countered the discrimination against their race by fighting the politics and state governing over them.

Actions against the government and politics were not unusual for the CRC LA. In 1951, a petition with over 20,000 signatures was sent to mayor Fletcher Brown of Los Angeles. Attached to the petitions was a statement by the CRC LA that exclaimed “we, the residents of East Los Angeles, protest the treatment as criminals of Negro and Mexican people by the police.” They demanded that retribution should be taken on account of the tribulations and discrimination faced by the Mexican and Negro community. The CRC LA demanded a revamping and decontamination of politicians and police officials in power be made to ensure equal protection under the law. The backlash from the White community was unwavering, creating tensions between new reforms and maintaining the status quo. Days after the incident, a Mexican home was bombed. Martinez’s argument that “Politics makes race” as much as “race makes politics” exceeds court cases, transcending into how race and politics at this time were intertwined. Politics were meant to keep Mexicans in subversive while Mexicans used race to demand justice and equal civil rights.

### POST WWII LOS ANGELES, CHANGING RACIAL LANDSCAPES AND IMPLICATIONS FOR SOCIAL CHANGE

Post War II is crucial to Latino racial politics since it follows a time of racial ambiguity and precedes the Chicano Movement in the 1960’s and 70’s. During Post WWII there was a shift in the Los Angeles racial landscape. While White citizens fled to the suburban outskirts, minorities began to form the majority within the city inner-enclaves. Latino communities became reinforced as immigrants moved into the city.

The “We Charge Genocide” was first established by the Black community and CRC. Soon the movement became a platform for Mexicans to vocalize and take action against the atrocities facing their community. The “We Charge Genocide” movement became a representation of the collaboration of between the Black and Mexican community. The “We Charge Genocide” led by the CRC and the community claimed that Blacks and

Mexicans were being “killed solely because of their race.” They defined genocides as “physical, social, and cultural, biological, economic, religious, and moral oppression.” The political action of the CRC and the Mexican community was highly influenced by the Black civil rights movement of that time.

As the Mexican community began to align themselves with the Black community they were began defining their battle one of race discrimination. In a pamphlet passed out by the CRC LA entitled, “WE CHARGE GENOCIDE! (1953).” It protested against the killing of members of the groups such as Augustine Salcido who was shot by the LAPD police. Also, opponents to the CRC and the “We Charge Genocide Movement” were causing “serious bodily and mental harm to members of the group”. Claims such as “Zoot Suit riots bands of Los Angeles citizens” proclaimed by newspapers, antagonize the terrorizing of Mexican communities. The “We Charge Genocide” movement illustrated that the Mexican community were defining their racial identity that eluded them in times past. The CRC L.A. Forged a Collective Aspiration for the Latino (Mexican) Community

The CRC established a consciousness within the Mexican community forging a path of political action. The Charles Cervantes case of 1949 illustrated how the CRC rallied the community to form a united front. Charles Cervantes was brutally beaten and arrested for conspiracy against the government. The CRC LA argues that Cervantes was attacked because his shop had become a distribution point for leaflets regarding a police killing of 17-year-old Augustine Salcido (put out by the American Youth for Democracy and the CRC LA). After the savage attack, the CRC LA and the Latino community rallied funds and posted Cervantes bail charges. Mass rallies were held in protest of the discrimination and a brutality against Charles Cervantes and the Mexican community. Over 40,000 leaflets were passed and over 5,000 people attended the protest. It was not unordinary that the CRC LA to galvanized the Mexican communities to publicize the atrocities occurring to their people.

During the height of the CRC LA from 1950 to 1954 there was a great emphasis on creating solidarity within minority groups. The CRC LA had a visible presence in the Latino

community. A pamphlet was passed out entitled “KNOW YOUR RIGHTS!”(1954). The pamphlet was a result of police forcibly entering Mexican homes and “terrorizing” the Mexican community. Within the pamphlet the CRC LA stated “The Police policy of racism which states ‘shoot first, investigate later when the victim is Negro or Mexican must be halted!” It also publicized, that “The people of Los Angeles will not permit the campaign of intimidation and terror against the Mexican people.” Thus, the CRC LA was defining their motives and as a consequence defining the role of the Mexican community in the fight for justice.

### **EXCLUSION FROM PRIVILEGES OF “WHITENESS” TO RACIAL IDENTIFICATION**

As the Mexican community faced racial prejudice and discrimination they retreated away from its ascribed “White” racial categorization. An example was the “It All Adds Up” campaign spearheaded by the CRC LA in 1951. Written on pamphlets sent to its members the CRC wrote, “The state discriminates against any individual who does not conform to the ideas of the administration of our institution, against individual because they are members of minority groups.” This campaign signified a period of vitalization of Mexicans and minority populations and their discontent with mainstream America. The CRC LA had become more active in the Latino community. Conversely, the Mexican community had organized politically as the CRC LA strengthen and expanded.

As the Mexican community strove for equal civil rights, they simultaneously were categorizing themselves as an opposition to mainstream ideology. Another example was the deportation cases represented by the CRC. Thousands of Mexican men and women were deported even though they had American born spouses and children. In a newsletter to its members the CRC LA stated, “This drive by the California Government is designed to intimidate these people and keep them in subversive.” Mass rallies soon ensued protesting the unjust deportations. Thus, the CRC LA was instrumental in forming a political consciousness within the Mexican community that sought to denounce their white categorization. In a meeting with local members of the East Los Angeles community the CRC LA stated that the



Mexican community protest derogatory labels such as “rat packs” and “pachucos” that are “deliberately creating fear and hatred for the Mexican people and particularly the youth.”

The CRC LA's battle was strengthened by Mexican community solidarity denouncing their “Whiteness.” Rhetoric such as “Mexican people”, “we”, and “raza” become prevalent sharing in a collective identity. Thus, as Mexicans were barred from mainstream America they formed their own identity. Within this new identity many Mexicans found agency, political power, and communal support. The CRC LA became a platform and facilitator for Mexicans in post WWII Los Angeles to define their race in their own terms through a political consciousness.

## IMPLICATIONS

The CRC LA and other political organization did not create collective identities from scratch; rather they redefine existing roles within established organizations as the basis of an emerging activist identity. Theorist Leonie Huddy argues that one's “social identity is highly dynamic: it is responsive, in both type and content, to intergroup dimensions of immediate social comparative contexts” (Huddy134). Thus, members and citizens who associated themselves with the CRC LA were transformed by the organizations principles of fighting for “the promotion of equal and just civil liberties.” Scholars argue the importance of subjective group membership in shaping political attitudes and behavior (Huddy130). We must think of collective identity as a “system of relations and representations” that takes the form of a field containing a “system of vectors in tension” (Johnston and Klandermans 51). These vectors constantly establish “equilibrium between the various axes of collective action and between identities” that an individual declares or is ascribed by them by society (Johnston and Klandermans 51). After the CRC had become situated within the community, members of the Latino community were provided a platform to negotiate between their ascribed identities versus their self-categorization. Turner et al. (1987) has described this motive as a need among group members and individuals “to differentiate their own groups positively from others to achieve a positive social identity” (Huddy 42).

Members of the Latino community in Los Angeles resorted to tactics of social creativity and social change to enhance their group's position in society. Even identities that are “familiar, longstanding, and enforced by law and custom frequently need to be re-imagined by movement activists” (Huddy 42). At the very least, they must be integrated with a movement identity or collective identity based on shared membership. The CRC LA redefined Latinos as active negotiators for their race and civil rights promoting participation and investment into the social movement.

The process of forging a collective identity produced new definitions of racial identification by integrating the past and the emerging elements of the present into the unity and continuity of a collective actor. A collective consciousness is developed when members of a group recognize their status as being part of a deprived group (Stokes 363). It was through the CRC LA that a sense of commonality and collectivity emerged to create active members in the political arena, thus explaining the high rates of political participation against unconstitutional policies and laws. The CRC LA increasingly made public demonstrations of their numbers and commitment to bid for participation; these analyses challenge views of race as “natural” identities (Polletta and Jasper 288). Collective identity is a learning process that leads to the formation and maintenance of a social movement. Thus, race has emerged both within the CRC LA and political discourse in the post WWII era as a noticeable theme of political consciousness and political activism.

Establishing a racial identity and collective identity alters individual participation and investment to an organization. The collective identity of an organization is based on a set of attitudes, commitments, and rules of behavior- “that those who assume the identity can be expected to subscribe to”(Friedman and Doug McAdam157). Huddy argues that being “Latino or Hispanic is tied to a politicized, pan-Hispanic identity.” As a result, Mexican in post WW II era used political organizations to mobilize and politicize grievances (Stokes 366). The CRC Los Angeles instilled a group consciousness that involved identification with both the organization but with one's community. This “ideology regarding the group's relative position in society along with a commitment to collective action aimed

at realizing the group's interest"(Jackson 632). For the CRC LA to be forceful it required participation from the community. Fireman & Gamson (1979) have demonstrated "individuals share prior bonds with others that make solidaristic behavior a reasonable expectation" (Polletta and Jasper 289). Thus the CRC LA was able to unite minority groups under a common bond of subordination from mainstream America.

## CONCLUSION

How Latinos identify themselves today can be attributed to their attachment to their race and investment into their race's collective ideologies. Hank Johnston and Bert Klandermans posit "identification processes are today gradually transferred from outside society to its interior" (50). Identity choice matters because it can enhance the development of in-group cohesion and out-group discrimination (Huddy 139). Also scholars such as Fox argues, "Political values are a more central role in the creation of a pan-Hispanic identity" influencing decision-making of future politics (Huddy 140). Likewise, Gibson and Gouws (1999) found that strong racial identities among individuals increase their perceived need for group solidarity. These findings build on a large body of work that documents the importance of subjective group membership in shaping political attitudes and behavior (Huddy 130). Having a strong affinity to ones racial identification and collective identity influences both their political consciousness and political identity.

### FIGURE 1

1945-6 Creation of the CRC in LA

- The Civil Rights Congress infused black community organizing and the struggle for civil rights with urgency previously absent in Los Angeles. The CRC responded to the torrent of complaints about abusive police behavior, which other civil rights organization, for practical reasons, did not address. The CRC fought effectively for the rights of the working class black Angelinos only from 1946-52
- Formed in NY City in 1946, comprised of members from New York branches of the National Negro Congress, the International Labor Defense and the National Federation for

Constitutional Liberties. Within months, CRC delegates from the central office in New York and local community leaders in Los Angeles established the Los Angeles branch.

### 3.The Problem of Segregation-

- Racial minorities- Oriental and Mexicans (non-whites)
- Most commonly in California such covenants are directed against Negroes and "Mongolians", or "non-Caucasian" generally, but they frequently exclude also certain subdividons of the white race such as Mexican and Armenians.
- Race restrictive covenants have been held enforceable by the State courts. California courts have held that covenants many not restrict the alienation of property t any race by restriction on occupancy valid. Hence in this stated, a Negro, a Chinese, or Mexican may acquire title to residential property, which they many not legally occupy.

### 1947-9 Expansion- situating in the community

1. William R. Bidner executive director of mobilization for Democracy. This organization emerged from rallies and conferences in the summer of 1945. -Letter to Lester Cole from the Holy wood reporter – Mexican American Civil Rights Committee dance
2. Cases Handled by the Civil Rights Congress- All Mexican- American related
  - o Armenta Case- "Tomoasa Armeta a14 year old Mexican American girl residing in west Los Angeles, attended Emerson Jr. High School. The majority of students in the school are Caucasians and come from wealthy families. A few are deeply prejudice against Mexicans and taunt and abuse them. AS A result of this, Tomasa became involved in a school fight. The probation officer threatened to take Thomasa to a ward of Juvenile Court. Mrs. Armenta. Thomasa's mother, who already had on daughter. Who became a ward of the court and subsequently was sent to reform school, without due cause, came to the CRC for assistance. Through Attorney Daniel G. Marshall, who acted in the case, we were successful in getting the charges dismissed against the girl and she was put in a trade school."
  - o Serrato and Vasquez Case- Jesse Serrato, 19yr old Army veteran and Froylin Vasquez, 17 years, both Mexican Americans, were picked up by the police in from of Clearwater

High School on charge of vagrancy, The vice-principal of the school had had called the police to pick up some boys who were being rowdy on the school grounds. The boys left before the police arrived. Serrate and Vasquez were taken to court and because of ignorance, pleaded guilty to the charge, Serrato was sentenced to 15 days and Vasquez was certified to Juvenile Hall. Attorney Louis Licht, from the CRC contacted to work on the case, was successful in clearing the record and freeing Vasquez immediately, and Although Serrato had served his sentence because the family was delayed in coming to the CRC for assistance, the attorney was successful on an appeal in having the charges dismissed and Serra's record cleared.

o Tony De Leon Case 1950- Tony De Leon and Five other Mexican young were pulled over by the police. After De Leon objected to a conversation with eh police he was struck by Officer Coon while officer Chapman pointed a gun to the others. De Leon was charged with being drunk and was held without bail despite the request from the bail bondsman.

o Rodriguez and Gonzalez case-  
The shooting of Joe Gonzalez and Albert Rodriguez, two young Mexican veterans by Officer Keyes and Kessler on the night of April 12th and the subsequent frame-up of these two boys on the charge of assault with a deadly weapon was prevented when the Mexican CRC committee, took upon the case and secured that services of Leo Gallagher as an attorney for the two boys After a jury trial which was deadlocked with a 9 to 3 vote to free the boys a delegation, organized by the CRC, visited the District Attorney's office and insisted that charges be dismissed, because of the admitted prejudice of the three jurors. As a result and because of the lack of true evidence for the charge, the boys were freed.

o Lincoln Park Case- The charge of murder and rape was leveled against a group of five Mexican American boys in the case of a woman who was found murdered in Lincoln Park. The Mexican Civil Rights Committee, CRC LA, after preliminary investigation, were convinced that those boys were not involved in the case. After further thorough investigation and aided in securing attorney for the boys, the Mexican Committee succeeded in clearing all five boys of all charges.

3. 1948- Civil Rights Congress Conference- Fight Back

Now!

4. Call to Action- Newsletter: Mass Rally  
o Listen to the CRC- 15 min broadcast/ Advertisement I the Daily News/ 40,000 leaflets

5. 1949- Civil Rights Congress Board Minutes:  
o "Important to have concentration in the Negro community. This doesn't mean to the exclusion of activity in the Mexican-American, as a primary concentration."

o Literature- "Know your Rights"  
o Committee on Minorities is established to be composed of representatives from all CRC chapters and committees, and from other org.

o Not to start Chapter in community, but with a committee. A chapter will be instituted until community as for one. - Did Mexican community asked for representation

o Suggested: that chapters "adopt" deportees living in their area- referring to Mex. Immigrants

6. Brutal beating of Cervantes  
o A frequent occurrence in Bunker Hill-Victim tells savage police assault: "it is possible the police knew Cervantes's shop was a distribution point for leaflets about the police killing of 17 year old Augustine Salcido...put out by the American Youth for Democracy and the Civil Rights Congress" -Daily People

1950-54 Collaboration

1. Labor Mass Meeting, 1950  
• Protest against "violations of civil rights are the order of the day in Los Angeles"

2. Deportation Cases:  
• Thousands of Mexicans, many with American born wives and children deported daily. This drive by the Federal and local Government in collusion with the big growers of California is designed to intimidate these people and keep them in subversive.

3. 1951, Campaigning for an "immediate 30c wage increase, paid holidays, paid sick leave, paid vacations and equal rights of all workers to promotion based upon seniority and ability, without regard for race or color."

• About 75% of the workers are Negro or Mexican-

Americans, with great majority being women

4. “It All Adds Up: To discrimination---against any individual who does not conform the ideas of the administration of our institution, against individual because they are members of minority groups. “

- Recruitment: Join! Support! CRC...HELP KEEP AMERICA FREE

5. First introduction of “We Charge Genocide!”

- Petition – crimes against Negro people. The book tells who are responsible for these crimes and why.

- Weapon against Jim-crow, discrimination and terror

6. CRC rallies public against threatened deportation of 250,000 Mexican Laborers and Farm Workers

7. Daily Word: Unity in the struggle

8. The Case of the Wedding Party Arrests

- The people are becoming angered over these attacks on the Mexican and Negro communities. This attempt at intimidating an entire community will stop only when the people join together in large enough numbers to put a stop to them.

9. Tony De Leon- 18 year old Mexican- American charged with being drunk, held without bail and was beaten by the police

- Civil Rights Congress: “ It is significant that only Mexican-American youths in the case were outraged and violated in their civil rights. This fits into increasing pattern of genocide committed against the Mexican people. Through understanding of the genocide is needed. This worst of crimes must not be permitted in our community. Regarded as “racial prejudice.”

10. Petitions to mayor Fletcher Brown

- “We, the residents of East Los Angeles, protest the treatment as criminals of Negro and Mexican people by the police”

- Backlash from the white community

11. Resolution:

- Home occupied by a Mexican-American family was bombed

12. “We Charge Genocide”-killed solely because of their “race”

- Genocide as define in CRC: effected by physical, social, cultural. Biological, economic, religious, and moral oppression.

13. CA Conference: Call...To trade unions, fraternal and religious groups, and political, social, and cultural organization. Representative of the Negro, Mexican, and Jewish minority groups.

- Joe Johnson, Mauricio Terrasaz, Carmen Lorenza from Assoacion nacional Mecixana Americana in attendance/ sponsors

- 450,000 strong in LA

- Suffer discrimination, persecution, and illegal deportation, separating them from their American born spouses and children

14. EL Sereno case history

- Police interrupted party:“you Mexicans don’t know hot to behave. You ought to pack up and move out of this neighborhood, you don’t belong here.”

15. 1952-Los Angeles chapters are recruiting more than 200 new members per month for several months- projected membership in 2yrs is 4100

- Functioning Chapter in LA: East Hollywood, Echo Park, Valley, West Hollywood, Jefferson (Fredrick Douglas), and Long Beach.

16. Mass deportations cont.

17. 1953-WE CHARGE GENOCIDE!

- Killing members of the groups- Augustine Salcido- shot by LAPD police

- Causing serious bodily or mental harm to members of group- “zoot suit” riots bands of LA citizens urged on the news papers, roved around the city terrorizing the Mexican communities

- Inflicting on the group, conditions of life calculated to bring about its physical destructions- There are more cases of tuberculosis in the Mexican communities ...directly from the bad living conditions

- Mauricio Terrazas- attorney in support of CRC LA

18.KNOW YOUR RIGHTS!

- Police forcibly entered into a Mex. family house- newspapers displaying headlines as “rat packs” and “Mexican hoodlums”

18. 1954-Police Terrorize Mexican-American community

- The people of Los Angeles will not permit the campaign of intimidation and terror against the Mexican people

- “THE POLICE POLICY OF RACISM WHICH SAYS ‘SHOOT FIRST, INVESTIGATE LATER’ WHEN THE VICTIM IS NEGRO OR MEXICAN MUST BE HALTES! –Rallies between blacks and Mexican Americans

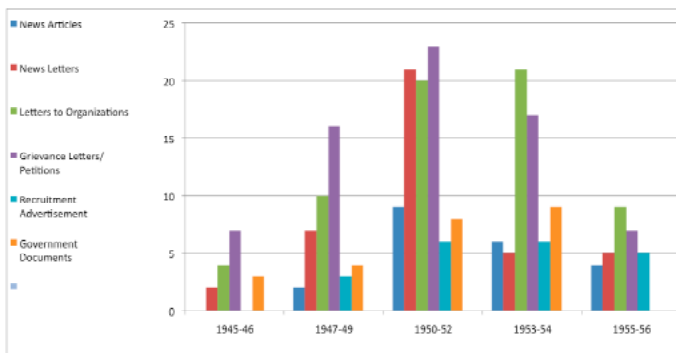
19. Dear Editor of the Los Angeles Examiner

- Hysterical attacks in Mexican-American youth
- Derogatory labels of “rat packs”, “pachucos” you are deliberately creating fear and hatred for the Mexican people and particularly the youth.
- The fundamental problem is race prejudice and economic inequality.”

1955-56 Demise of the CRC

1. Fiesta- south Vermont- recruitment
2. Throngs hail “EL Grito” in weekend ceremonies-“The meaning of Mexican Independence to youth”
3. Financial stress forces CRC to close

**FIGURE 2**



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# HUMANITY VS. ILLEGALITY: POST-9/11 PRINT MEDIA DISCOURSE ON MEXICAN IMMIGRATION



## GUSTAVO LOPEZ

*American Studies &  
Ethnicity/Political Science  
Mentor: George Sanchez, Ph.D.  
Department: American Studies &  
Ethnicity/History*

*McNair Scholars Program  
University of Southern California*

The history of American public attitudes towards Mexican immigrants is complicated as it shifts between periods of tolerance and scapegoating, leaving migrants in an ambivalent position. Economic downturns and national tragedies tend to trigger anti-immigrant sentiment. One such tragedy that had severe consequences for the perception of Mexican immigrants, were the terrorist attacks of September 11, 2001. Though various scholars have examined how discourse around Mexican immigration reflects attitudes present in society, not much research has been done on how 9/11 specifically impacted those discourses. This study examines the shift in the discourse around Mexican immigration in print media since 9/11, specifically in the *Los Angeles Times* (LAT). A second objective of the study is to assess the normalized ideologies present in American society regarding Mexican immigration that are reflected within print media discourse. The first phase of the study consisted of collecting all front-page articles from the LAT that dealt with Mexican immigration and were published between 9/11/2000 and 9/11/2002. Once compiled, the articles were submitted to a content analysis of terms used to describe Mexican immigrants, which was guided by Critical Discourse Analysis. The study found that there was a significant decrease in the number of articles written that referenced Mexican immigration in general, but more importantly, an even sharper decline in articles that had an affirmative slant in their representations of migrants. Furthermore, post-9/11 articles were shown to focus on the ‘illegality’ of migrants while de-emphasizing their humanity thus framing them as undeserving of rights.



# INTRODUCTION

The city of Los Angeles (LA) has the greatest undocumented population in the United States. Approximately sixty percent of the one million undocumented migrants living in LA are of Mexican origin (Pastor and Ortiz). Persons of Mexican ancestry compose a significant portion of the undocumented population; however, popular perception associates Mexican descent with the entire undocumented immigrant population (Pastor and Ortiz, 2010). As the country suffers through an economic recession the American public, including politicians, are looking for someone to blame for the country's economic and social problems. That blame falls disproportionately on immigrants. The dehumanizing treatment of Mexican immigrants parallels the discrimination of other minority groups throughout history. The voices of undocumented workers and other disenfranchised groups are not heard in mainstream discourse. Instead, the public is exposed to misconceived depictions of undocumented workers that portray them as lazy, abusers of public services, and criminals.

This study analyzes the categorizations of Mexican immigrants within the Los Angeles Times (LAT) to understand the meanings and associations of the terms employed within the immigration debate. There are a number of reasons for selecting the LAT for this study. The LAT newspaper has the widest circulation in California and is considered one of the top newspapers in the country. It presents relatively moderate positions on immigration and is considered the best publically recorded representation of the attitudes and public opinions of residents and leaders in Los Angeles and California. This print media source is a high-quality representative publication of mainstream media in the United States.

## PURPOSE OF STUDY

The purpose of this study is to chronicle the change in the discourse surrounding Mexican immigration within print media in a post-9/11 context. The guiding questions of the study are: How has the discourse around immigration changed since 9/11? Are there any new trends in how immigrants are portrayed? Which terms commonly used before 9/11 are still

employed? Which terms have been generally discarded? Does a change in the narrative contribute to increased immigration enforcement efforts?

The number of both citizens and undocumented immigrants of Mexican descent within the United States is on the rise. For this reason research on how these two groups are perceived and integrated into society is imperative. The topic of immigration into the United States is racialized as a non-white issue and is often associated with the Mexican population. The discourse around immigration has tangible consequences for people of Mexican descent in the United States. Exclusion based on citizenship replaces previous forms of racism and justifies abuses against undocumented migrants, a vulnerable population. Through an analysis of the language surrounding the immigration debate, this study aims to demonstrate how discourse is used to dehumanize undocumented migrants.

## LITERATURE REVIEW

This review assesses the literature regarding the popular images of Mexican immigrants within the United States. More specifically, it looks at how the discourses and terminology used in the immigration debate affect and reflect public opinion, the formation of public policy, and the level of enforcement.

Restrictions on immigration based on national origin are part of United States history. The specific countries targeted and affected have changed over time. The justification used to support these restrictions has varied, from blatantly racist rationale to protecting American culture. Historically, legislation restricting immigration and increasing immigration enforcement has been passed during times of national crisis or economic recession (Santa Ana, 2002). During times of national hardship, Americans more readily accept depictions of immigrants as burdens on state resources, criminals, or threats to the national culture (Acuña, 2007). Citizenship is used as a means to preserve resources and privilege in American society and results in the exclusion of the undocumented. The pattern is reversed in times of economic prosperity when immigrants are tolerated and often actively recruited by various businesses to come to the United

States. This cyclical inclusion and exclusion of immigrants has been a defining characteristic of public opinion on immigration and subsequent legislation.

## **MEXICAN IMMIGRANTS AS RACIAL OTHERS**

Through a process known as ‘Othering’, groups of people are categorized and defined in a way different from the dominant group (Struve, 2008). Once a particular group is differentiated from the norm, it is exploited by the dominant majority (Struve, 2008). The dominant group itself is not defined explicitly. In fact, that is precisely one of the advantages of a hegemonic power structure. However, the dominant group can be understood by looking at what it is not- those framed as ‘other’. The dominant group is thus not working class, not female, not people of color, not Lesbian, Gay, Bisexual, or Transgender, not disabled, and not an immigrant or denizen (Smith, 2007). By taking the inverse of these societal positions we can begin to define the dominant or ‘normative’ group as middle class, male, white, heterosexual, able-bodied, a citizen, etc. The dominant group produces the normative discourse and holds the most power in society.

Persons of Mexican ancestry are one of the many groups that have been ‘othered’ and marginalized from mainstream America. Mexicans—whether born in the United States or Mexico—have been racialized and deemed perpetual “foreigners” or “newcomers” to this country (Sanchez, 1993; Davila, 2008; Struve, 2008). Public discourse is inclined to categorize Mexican American and Mexican immigrants under the same label, regardless of legal status. Misperceptions of Mexican immigrants have consequences for all persons of Mexican descent living in the United States.

Anti-immigrant sentiment stems from the idea that migrants are threats. One threat posed by migrants is their subversion of national culture and values. Another threat is that migrants are thought to threaten the economic wellbeing of U.S. citizens by taking resources and jobs from ‘native’ Americans. Fueling the negative depictions of migrants is the fear that a non-white population will alter the country’s Anglo-American Judeo-Christian values. This rhetoric is aimed at stopping the demographic shifts of non-whites who threaten the dominance of White-Americans. Davila (2008) states that Latino immigrants

are generally non-white, “[a]nd it is this very fact that creates most anxiety, and that causes nativist anti-immigrant positions to be imminently racially driven, and hence consequential for blacks, as they are for Latinos and anyone who is not considered to be unquestionably ‘normative’ or Anglo-American” (p. 226).

In his book *Strangers in the Land*, John Higham defined nativism as the “intense opposition to an internal minority on the ground of its foreign (i.e., “un-American”) connections” (as cited in Sanchez, 1993, p.16). During economic downturns, nativist sentiments arise particularly among poor whites. A meritocratic rhetoric depicts the United States as a place where anyone can achieve the ‘American Dream’. When members of the ‘normative’ group are impacted by economic downturns they experience anxiety in failing to reach that goal. Whites, although afforded racial privilege, see their economic situation deteriorate and often blame non-whites for their misfortune (Sanchez, 1993). Anti-immigrant sentiment is largely motivated by a fear of change in both racial and economic power structures within the United States.

## **EXAMPLES OF PREJUDICE IN PAST JOURNALISM**

In the history of the United States, blatantly racist and biased coverage have been commonly accepted within print media. One example is the coverage of the San Joaquin Valley Strikes of 1933 (Acuña, 2007). In 1933, migrant farm workers arrived to the San Joaquin Valley in central California to pick cotton only to be refused survival wages for their labor. As a result, approximately 18,000 workers and their families began a strike. The growers used various methods of intimidation to end the strike, including killing protestors (Acuña, 2007). The majority of newspaper coverage represented the strikers as threats. One Letter to the Editor published in the *Los Angeles Times* read, “From the south San Joaquin Valley come accounts of cotton pickers on the ranches being threatened by mobs of ruffians who motor from place to place urging terrified pickers to strike for a 66% raise in wages” (Acuña, 2007). This characterization depicted strikers as a subversive force and failed to comment on the violence and tactics being perpetrated against the strikers by the planters (Acuña, 2007). Similarly, reporting has contributed to anti-immigrant sentiments throughout United States history.

As Acuña (2007) indicates, “[n]ewspapers played an enormous role in manufacturing and promoting the politics of fear during the Depression”. Although explicit cases of prejudice are much less common in contemporary journalism, the writing is still informed by the rhetoric of the past. Many of the same ideologies and ideas persist but in more ‘benign’ or ‘sanitized’ forms (Santa Ana, 2002).

## REMNANTS OF THE PAST IN THE CURRENT FRAMING OF MEXICAN IMMIGRATION

The negative and derogatory representation of Latinos continued into the 20th century and still occurs today. A more recent case of biased reporting was the lack of attention given to Latinos and Latino immigrants during the 1992 Rodney King riots in Los Angeles. Although Latinos composed a large part of the residential communities affected by the riots, their presence was largely ignored in media coverage. Images of Blacks looting Korean-owned businesses continued the understanding of race within a binary framework. In this case, Koreans replaced Whites as the opposing race negating the role of other racial groups. Latinos were both, victims and perpetrators of violence, property damage, and looting. During the riots, Immigration and Naturalization Services deported over 2,000 Latino immigrants who were arrested in the chaos (Sanchez, 1997). Sanchez (1997) proposes that the lack of coverage of Latinos occurred because their role in the riots “disturbs strongly held beliefs in notions of community, belonging, and race in this country” The ways race was thought about and discussed in the past continues to influence present social values (Santa Ana, 2002).

In his book *Brown Tide Rising*, Otto Santa Ana (2002) discusses a shift in public opinion of Latinos in the 1990’s that led to the passage of Proposition 187 in California. Santa Ana (2002) argues that for forty years the Latino populace in the United States was perceived as a ‘sleeping giant’- potentially powerful because of its size but passive and non-threatening to the established order. As economic conditions began to deteriorate, the discourse and metaphors changed. One of the most powerful metaphors, cited by Santa Ana (2002), is the use of the ‘dangerous waters’ metaphor. Words like ‘flood’, ‘drowning’, ‘waves’, and ‘tide’ permeated the LAT and other media when

describing immigration during this time (Santa Ana, 2002). Water is measured by volume as opposed to individual units and is not human. The media portrayed this image of ‘dangerous waters’ in contrast to a ‘drowning body,’ which represented the United States. The juxtaposition of human and non-human images dehumanized Latino immigrants, making it easier for the public to see them as a threat that must be ‘stemmed’. Metaphors helped create a negative public perception of Latinos that translated into support for anti-Latino propositions, namely Propositions 187, 209, and 227 (Santa Ana, 2002).

Leo Chavez (2001) also focused on print media’s role in the creation and maintenance of public discourse on immigration. Chavez (2001) focused his research on magazine covers that dealt with immigration. He analyzed three and a half decades worth of magazine covers with various political orientations and target audiences that had national circulation. Specifically, Chavez (2001) looked at the symbols and messages employed by the covers. The first part of Chavez’(2001) work categorizes the covers into either ‘affirmative’, ‘alarmist’, or ‘neutral’ in their depictions of immigrants or the immigration debate. He found that the majority of magazine covers on Mexican immigration that he examined were ‘alarmist’ in their take on immigration.

## 9/11 AND PUBLIC OPINION ON IMMIGRATION

When the commercial passenger jet airliners hit the Pentagon and the World Trade Center on September 11th, 2001, the implications reverberated throughout the entire country. As President George W. Bush declared a War on Terror, the United States entered a new phase in the history of public discourse on immigration. The events of September 11th and the current economic recession have once again triggered the cyclical demonizing of immigrants within public discourse (Acuña, 2007; Sanchez, 1993; Struve, 2008; Chavez, 2001). After the attacks, immigration was reframed as a ‘national security’ issue. In 2003, all government organisms dealing with immigration were integrated into the newly formed Department of Homeland Security (DHS) (Legomsky, 2007). By framing immigration as a ‘national security’ issue, the national government could justify abuses of the human rights of immigrants. A second trend in the narrative surrounding immigration is the increasing

association between immigrants and criminals. Continued public misconception and use of national security as well as crime-control lexicon in print media regarding immigration creates an atmosphere where these ideas are linked, leading to a demand for immigration enforcement.

## METHODS

The objective of this study was accomplished through a content analysis of the Los Angeles Times (LAT), a print media source. Founded in 1881, the LAT serves as the local newspaper for Los Angeles. Los Angeles is the largest city in California and has the largest population of people of Mexican descent outside of Mexico. Mexican migrants generally do not earn high levels of income or wealth. On the other hand, the LAT is a multimillion-dollar operation with control over the discourse it transmits. There is an aspect of class struggle in the relationship between these groups. Also, Mexican migrants are racialized as the 'other' and pushed to the margins of society largely because of their race. Marxist Theory as well as Critical Race Theory guided the analysis of articles within this study. These two theories, in addition to Critical Discourse Analysis, were appropriate and useful lenses for examining the discourse around Mexican migration to the United States.

### CRITICAL DISCOURSE ANALYSIS

The primary subject of study in this study is public discourse as represented by print media. For the purpose of this study the researcher defines discourse as the way in which people converse about the world. Such discussion can come in any number of forms, including print media, debates, speeches, and legislation. Santa Ana (2002) states that public discourse constitutes public opinion and worldview, therefore language used in discourse grants the onlooker a glimpse of people's worldview and the values present in society. Hall (1993) describes a pattern of ideology, which consists of "the mental frameworks—the languages, the concepts, the categories, imagery of thought, and the systems of representation—which different classes and social groups deploy in order to make sense of, define, figure out and render intelligible the way society works". These

sites of conversation are crucial in the formation and negotiation of mainstream values. Discourse necessarily contains and reflects ideologies present in society (Struve, 2008).

It is significant to note that although discourse does contain ideology, the texts that display discourse can be interpreted in various ways. The process by which terms and phrases are interpreted "relies on a shared understanding of 'mental maps' that underlie the meaning attached to signs and codes for relating the signs to conceptual maps" (Chavez, 2001). Membership in social groups exposes people to the connections between words and meanings, although their acquisition is often unconscious. Meanings, however, often vary depending on the context of the texts in question (Chavez, 2001). Looking at how language works and making the unconscious connections and conceptual mappings evident, allows for a 'more informed' reading of discourse that would add to its analytical significance (Hall, 1997). Through this deeper level of interpretation the reader can go beyond the basic meaning of a discursive event and tie it to larger themes and narratives (Chavez, 2001).

Critical Discourse Analysis (CDA) is one theory that looks at conceptual mappings in order to make their underlying ideologies evident. CDA includes various methodologies that "focus critically on both macro and microstructures of discourse to examine word choice, naming, framing, metaphors, and other linguistic devices that assist those in power in the construction of self and other" (Smith, 2007). This type of analysis views discourse as a social practice where there is a negotiation of meaning between the discursive event as well as the structures that frame that event (Smith, 2007). Discourse practices show naturalized ideological assumptions (Santa Ana, 2002). Critical Discourse Analysis seeks to make these naturalized mental maps explicit and therefore makes the ideologies embedded within them open to critique. There is a direct relationship between power and the construction of knowledge and truth (Foucault, 1981). The dominant groups in society control the means of producing discourse such as print media, television broadcasting, and political rhetoric. Therefore, it is imperative to expose and critically analyze the ideology behind discourse. This will prevent the reinforcement of unequal divisions of power.

## SELECTING ARTICLES FOR THE STUDY

There are two primary data sets that were gathered and analyzed. These data sets were acquired through a search within the Proquest database for the LAT. The first subject of analysis was a data set consisting of every front-page article discussing Mexican immigrants or immigration in general published in the LAT from September 11th, 2000 to September 11th, 2001. Gathering articles from one year before the terrorist attacks is imperative to this study as they serve as examples of the language being used in the immigration debate pre-9/11. Also, they offer a foundation from which to compare post-9/11 rhetoric. The articles had to include either the words “Mexico”, “Mexicans”, or their respective variations. This search was then filtered so that the data set would only include articles containing a number of key words associated with Mexican immigration. These terms included: undocumented, unauthorized, illegal, alien, worker, laborer, border, and migrant. This process guarantees a collection of information that is pertinent to the subject under study. The second set of articles serves as a representative section of the discourses that surrounded the immigration debate post 9/11. It allows for a comparison between pre and post-9/11 rhetoric. The articles served as an excellent sampling of the frameworks, metaphors, and terms used concerning immigration, within the LAT. Through the analysis of these data sets and a comparison with the pre-9/11 narrative on immigration chronicled by scholars such as Otto Santa Ana and Leo Chavez, this study intends to demonstrate how a shift in public discourse has led to an environment that supports increased immigration enforcement.

Articles chosen for this study needed to have at least three distinct references to Mexican immigrants, Mexican immigration or the United States/ Mexico border. A reference constitutes an article mentioning or commenting on any of the previously stated topics including variations on the terms used in the phrases (i.e. immigrant, migrant, undocumented, alien, unauthorized, worker, laborer, illegal, foreigner). The terms, phrases, and metaphors used for this study include those that are specifically tied to the aforementioned references. However, in articles dedicated solely to Mexican immigration no such connection is necessary. Such a connection takes place when a

term is used in the same sentence as Mexico or Mexican or is used to describe immigrants, immigration, or the border. The terms used were quantified to demonstrate the prevalence of particular trends in language.

## ACCESSING THE SLANT OF THE ARTICLES

For the purposes of this study, the researcher categorized articles that reference Mexican immigration as affirmative, neutral or alarmist in their representation of Mexican migrants. These categorizations are based in part on those employed by Chavez (2001). The articles are categorized into these three groups in order to compare the frequency of positive, negative, or neutral portrayals of Mexican immigrants in the year previous to 9/11 and in the year directly following the event. Affirmative articles use language relatively devoid of terms latent with nativist ideology, emphasize the benefits immigrants provide the United States, or engender sympathy from the reader. Articles of an alarmist nature tend to label immigration a national security issue or emphasize concerns about population growth, the lack of assimilation of Mexican immigrants, or depict immigrants as criminals. Additionally, such articles may contain a higher frequency of dehumanizing terms, such as ‘illegals’ or ‘alien’, to describe this group. Lastly, neutral portrayals either do not have a clear slant to their categorization of Mexican immigrants or are balanced in their coverage.

## LIMITATIONS OF STUDY

The primary limitation of this study is time. The research, analysis and interpretation of data sets as well as the writing of findings occurred within a nine week span. The number of print media sources that could be analyzed had to be limited accordingly. Because it is not possible to look at and interpret every article on the subject of Mexican migration to the United States in that time period, a high-quality and well-circulated newspaper was selected to represent the print media coverage on immigration. However, there are many obstacles that come with using a single print media source. The primary goal of the LAT is to obtain profits. The newspaper is both a product and service that provides news and advertisements but also contains biases. Additionally, “[i]t presents events in language that is conceptually

accessible to the reader, that is, it presents ideology” (Santa Ana, 2002). Although these are definitely concerns in terms of the validity of a study, the fact that the newspaper transmits ideology is why it can serve as a reflection of public sentiments and values. Some critics deem research that uses CDA as an ideological interpretation. Due to inherent predispositions of the researcher, CDA is often deemed an illegitimate form of analysis. However, CDA offers a critical perspective to academic inquiry that acknowledges its own subjectivity and uses it to analyze discourse in a more methodological manner than simple everyday reading. The method employed is valuable because it provides an avenue to look through the perspective of marginalized groups that do not control the flow of discourse. Through CDA, research abuses in the language of popular representation used to justify the misuse of power can be identified and altered. My perspective as a son of Mexican migrants allows for the critique of normalized assumptions present within rhetoric used in the immigration debate. The decisions made in the categorization process were subject to the perspective of the researcher and were thus subjective. Nevertheless, these decisions and the content analysis of the article texts are guided by CDA and previous work on the subject. What is presented in this study is an informed reading of the terms and lexicon present in the Los Angeles Times post-9/11. There are certainly other ways of interpreting the discourse around Mexican immigration. This analysis is informed by a systematic examination of the discursive events using Critical Discourse Analysis, a proven framework.

## RESULTS

For this project a total of 70 articles relating to Mexican immigration were collected and analyzed. The distribution of the articles divided by month is shown on TABLE 1. Forty-six of those articles were published prior to September 11, 2001 and Twenty-four were published after that date. For the data set of Pre-9/11 articles, 29 had a Neutral stance on immigrants and immigration, 7 were alarmist, and 10 were affirmative. For the Post-9/11 data set, 10 of the articles were neutral, 13 were alarmist, and only 1 was affirmative. These results are displayed in TABLE

2. In evaluating the data sets of Los Angeles Times articles for this study, it is clear that the use of ‘illegal’ and ‘unauthorized’ as a means of describing immigrants is still prevalent in the media; this, despite efforts by immigrant and refugee rights activists to reframe immigrants as ‘undocumented’.

After 9/11 there was a decrease in the attention paid to immigration reform because national security became the primary focus of discourse on immigration. What was written about immigration had a decidedly more negative or ambiguous tone. The following is a more in depth content analysis of a number of articles that are representative of the articles collected and analyzed in this study. Examples of articles that fall under alarmist, neutral, and affirmative depictions of Mexican immigrants are included.

## DISCUSSION

### PRE 9/11 ARTICLES

#### ALARMIST

THE NATION; ‘90s Saw a Tide of New People; Census: Foreign-born population reaches 30 million, the highest U.S. level since the 1930s. Immigrants are bypassing traditional locales and settling in a host of new states; [Home Edition] Aug 6, 2001.

This article was categorized as alarmist because of the way that it portrayed immigrants. It reduced immigrants to mere numbers and voiced concern about demographic shifts and the assimilation of immigrants entering the United States. Using statements such as “The Mexican-born U.S. population has grown more than tenfold in 30 years, from about 760,000 in 1970 to almost 8.8 million in 2000”, the piece presents the numbers of foreign-born residents in the United States as an immediate threat and burden. By citing increases in the foreign-born population, permanent residents and others, it emphasizes possible negative effects on the country without equal consideration of their contributions. The article states that this increase in the foreign-born population “remade the state’s identity and economy while igniting a host of political and social issues”. In this case, remaking the state’s identity is considered

to be negative. Immigrants are seen as changing the face of the nation, including the numerical majority and power of Anglo-Americans (Sanchez, 1997). Thus this shift is considered a threat to the 'national culture', which is informed by the dominant white culture, in addition to limiting the resources for U.S. citizens. Consequently, one of the concerns of the article is the assimilation of foreign-born residents. Steven A. Camarota, director of research at the Center for Immigration Studies was quoted in the article saying that, "[w]e need a policy more based on skills, that allows somewhat fewer immigrants overall, which would facilitate assimilation." Many efforts to curtail immigration or have the foreign-born population assimilate into American culture are based on fear of the racial other and an attempt to preserve the privileges that come with citizenship. Like this article, many pieces both before and after 9/11 (though more instances occurred after) cited demographic shifts and demonstrated the fears described in this paragraph.

#### NEUTRAL

THE NATION; THE FOX VISIT; Bush to Weigh Residency for Illegal Mexican Immigrants; Diplomacy: President responds to Fox's plea for a plan to help those already in the U.S.; [Home Edition] Sep 7, 2001.

A number of articles discussed the attempts at immigration reform by Presidents George W. Bush and Vicente Fox. These articles tended to be balanced in their coverage of the debate and existed both before and after 9/11, although they were more prevalent in the earlier period. The piece published on September 7, 2001 specifically talks about how Vicente Fox's speech during his White House visit contributed to an increased receptivity towards a provision that legalized undocumented immigrants. There were constant references to a 'normalization' of immigration status for Mexican migrants in the United States in addition to guest worker programs. Also, Fox's speech spoke about how the families of Americans also had immigrant roots thereby attempting to bridge these immigrants and citizens. He hoped that through the development of Mexico the causes of immigration would be addressed; possibly even encouraging persons of Mexican ancestry in the United States to return to Mexico. At the same time other voices, particularly those of

conservative Republicans, emphasized the need for enforcing the U.S.-Mexico border. The author of the article acknowledged the difficulty of passing immigration reform but was optimistic of the bilateral cooperation between the presidents of the United States and Mexico.

#### AFFIRMATIVE

THE NATION; A Future Out of the Fields; As a young farm worker, Juanita de la Cruz overcame principal's disdain to earn an education. Now, she tries to help others.; [Bulldog Edition] Aug 19, 2001.

This article looks at the story of Juanita de la Cruz, a child of migrant workers who obtained a doctorate in education. She became the head of the Miami-Dade public school system's program to get homeless children in schools. Her childhood and the many obstacles that she faced including survival and a pursuit for an education were described. By portraying the hardships that she endured, the article shows the reader the humanity of Mexican immigrants including that of their children. Juanita de la Cruz' family came to the United States from Reynoso, Mexico when she was only 18 months old, having no say in the move. The article begins by describing her interaction with her principal in 8th grade. She had A's and B's but missed many days of school because of the lifestyle her family was forced to have in order to survive. Her principal had to decide if she would pass the 8th grade. The article reads, "He told me I was too stupid and would never amount to anything," said Juanita. He told her she couldn't graduate to the ninth grade. Despite the potential she demonstrated and her extraneous circumstances, the principal decided not to allow Juanita de la Cruz to go on to the next grade, creating a new obstacle for her to overcome. Although this was a huge blow for her, she persevered. She and her family continued as migrant workers and she had to drop out of school. She taught herself by reading books and served as a teacher for other children of migrant worker families. In southern Florida she passed an exam and got a high school equivalency certificate. Afterwards, she attended community college, going to school during the week and working with her family on weekends. She went on to receive a Bachelor's degree from the University of Miami and her doctorate from Nova Southeastern University.

Her struggles, failures, and ultimate success paint a holistic picture of her as a human being, a concept that was lost in most other articles that discuss immigration. The article shows the difficulties that migrants and their children face in attempting to have a decent standard of living or access the same opportunities many Americans take for granted. The piece complicates the image of immigrants as criminals and uneducated, and allows readers to think about immigration in a different way.

## POST 9/11 ARTICLES

### ALARMIST

A YEAR AFTER; U.S. Foreign Policy Assertive, Divisive; Reaction: America's unilateralism has eroded the post-Sept. 11 global solidarity as nations grow disillusioned, critics say; [HOME EDITION] Sep 1, 2002.

Fox's vision of a more open border understandably fell victim to national security imperatives after Sept. 11.

Fox asked Washington to grant legal status to some of the millions of undocumented Mexicans who work in the United States and preferential visa status to aspiring immigrants.

The article discusses how the United States' response to 9/11 has impacted international relations in primarily negative ways. '[T]ransnational crime' and 'border security' are considered 'festering problems' which creates images of organic, brooding and sinister issues that must be exterminated. Although immigrants themselves are not mentioned in this list of problems, the 'stemming' of 'illegal immigration' would be the natural extension in trying to destroy these inhuman threats. With regard to immigration, the article uses the terms 'Mexican immigration', 'undocumented Mexicans', and 'open border'. Although, immigration and undocumented are among the more benign conceptualizations of migrants, the choice in word pairings and the discussion of security as a whole places the article in an 'alarmist' conceptualization of immigration. By describing the undocumented population of Mexican ancestry in the United States as 'millions of undocumented Mexicans', the author re-emphasizes the foreignness of a population residing and going about their lives in the United States. Also, the use of 'millions' to quantify the whole of the undocumented migrant population reduces them to numbers. The negative connotations

of 'open borders' and their conceptualization as a threat to national security and sovereignty add to the 'alarmist' portrayal of Mexican migration. This puts into question the intentions of Mexican president Vicente Fox who seeks 'preferential visa status' for his compatriots.

### NEUTRAL

The World; NEWS ANALYSIS; Domestic Feuds Derail Bush-Fox Diplomacy; [HOME EDITION] Aug 11, 2002.

Similar to the previous article, the phrase 'undocumented Mexicans' emphasizes foreignness. Additionally, the author employs 'illegal immigrant workers' to describe migrants. The term 'illegal' dehumanizes and criminalizes immigrants by representing them as 'law-breakers'. Also, the author uses the word 'undocumented', which is a better alternative to 'illegal', but is not devoid of problems (Lakoff & Ferguson, 2006). According to Lakoff and Ferguson (2006) although undocumented seems more compassionate, the term is negative and it implies that they should have documents. Like the neutral article previous to 9/11, this piece mentions possible immigration policies and the persons who support those initiatives. As this article does not have a clear slant as to its position within the immigration debate, the researcher classifies it as a neutral characterization of immigration.

### AFFIRMATIVE

COLUMN ONE; Graveside With John Doe; \*Imperial County has the sad task of handling bodies of the many who die along a perilous border crossing. Those who cannot be identified get a pauper's burial.; [Home Edition] Nov 23, 2001.

The sole affirmative article published after 9/11 was about an increase in the number of deaths of migrants trying to cross into the United States. As the United States increased its border security, migrants were forced to take riskier routes to enter the country. This resulted in more fatalities like in the desert of the Imperial Valley in Texas, which is the site discussed in this article. The article laid out the risks and tragic deaths of migrants. Because many of migrants do not carry identification in case the Border Patrol stops them, it is very difficult to identify dead bodies found. Many families in Mexico or other



countries never hear from their relatives again. Unidentified bodies are buried in Imperial Valley County. By describing their hardships, the article not only emphasizes their humanity but also evokes sympathy from the reader. By referring to migrants as 'victims', their portrayal as criminals or threats to the United States is reversed. The piece also discusses the lack of knowledge of the risks involved in crossing the border, "because migrants often have no idea of the perils they confront. Most of Imperial County's migrant victims die in the desert". Thus the article frames immigrants as people in need of 'border safety' not 'border security' diverting from the way Mexican immigration is talked about, particularly after 9/11.

### THE CASE OF FRANCO GONZALES

The story of Franco Gonzales is situated between the two periods analyzed, serving as an excellent example of the trends found throughout this study. There were two articles written about Franco Gonzales, an undocumented migrant from Mexico, who returned \$203,000 that fell out of an armored car. A pre-9/11 article and a post-9/11 article show the stark difference in the way each article represented this undocumented migrant. Thus it reflects the changes in the discourse around immigration since 9/11.

THE NATION; Man Has Honest Answer to a \$203,000 Question; Ethics: After cash falls from armored truck, a dishwasher searches his heart and calls police; [Home Edition] Aug 29, 2001.

The first article published on Franco Gonzales' story emphasizes the theme of him as an 'honest man'. The article states that Franco feared that someone would kill him in order to obtain the money he discovered indicating that there were plenty of risks involved in returning the money. To prevent that risk, he looked for a black bag to 'hide the transparent bag holding the cash'. In the second article, covering the money from view was described as an effort to 'conceal the loot' which implies a more sinister or criminal intent. Franco was also shown to grapple with the decision of whether to keep or return the money. This thought process complicates his image as purely honest but also makes him more human and thus easier to relate to. The

article highlights a particular moment where Franco decided what he would do after the case of the missing money appeared on a news channel. As Franco described, "The announcer asked whether there was anyone in Los Angeles who was honest enough to hand in so much money". At that point Franco knew what to do. Citing his honest Catholic upbringing, he decided to return the money. There were other risks that Franco had to take in returning the \$203,000. There was a \$25,000 reward for returning the money but Franco was not sure if he could receive it because of his undocumented status. Additionally, he had concerns over whether Immigration and Naturalization Services would be contacted. However, everything worked out and he was able to receive the reward. The reactions to Franco's act, as expressed in this article, are best exemplified by the following quote, "I find it really hard to believe in this day and age that we have someone honest enough to turn in \$203,000," said police Sgt. Rick Sanchez. "He upholds the highest honor of anybody". This article shows a Mexican migrant in a positive light, which emphasizes the humanity of a group that all too often is reduced to numbers.

COLUMN ONE; Ballad of the Poor Samaritan; Some praise an illegal immigrant for returning \$203,000. Others say he's a fool. Meanwhile, he's still a dishwasher.; [HOME EDITION] Aug 29, 2001.

Although the overall story about this honest Mexican migrant who returned \$203,000 attempts to be affirmative in nature, he is constantly described as a 'fool' and is considered to be 'lacking ambition to obtain the American Dream'. Although the fact that Franco's actions were honorable, the way in which he is discussed does not emphasize this. By portraying him as self-deprecating and unintelligent, the article frames migrants and even this potential heroic figure as ignorant or uneducated. Another concerning trend in the articles' language is how Franco is constantly connected with crime even though his action was worthy of reward not punishment. The author indicates that Franco's story could easily inspire a 'narco-corrido', or a Spanish folk song specifically discussing the dealing of narcotics, insinuating that he could have just as easily kept the money and been a criminal. Additionally, in the article he is characterized

as an 'illegal immigrant dishwasher' who had to 'conceal the loot'. Also, the author says that Franco saw no contradiction between this act of honesty and 'crossing the border illegally'. The author is clearly drawing a connection between crossing the border illegally and stealing money. Furthermore, the article entertains the idea that Franco lacked ambition, which resulted in him 'missing the dream that drove him to the United States in the first place'. This statement suggests that not only should he have taken the money but it was somehow un-American not to do so as Americans are ambitious, particularly in their pursuit of the American Dream. Thus, the article suggests that Franco's foreignness led him to an honest but un-ambitious act that makes him ill fitted for the United States system of meritocracy. Finally, the image associated with the article shows Franco with a picture of the house that he is having built for his parents in Mexico that is referred to as a shell, or incomplete project. This image plays on fears of immigrants coming to the United States only to further the economic situation of their home country. It also furthers the idea that he has little or nothing to show for his moral act thus justifying depictions of him, and by extension Mexican immigrants, as un-ambitious 'idiots' who will continue to be mere 'illegal immigrant dishwashers'.

Though it may be coincidental that the version of the story previous to 9/11 was affirmative in its depiction of Mexican immigrants while the one written after 9/11 was alarmist in nature, a similar shift occurred for other topics. Articles written about the children of Mexican immigrants reaching success previous to 9/11 depicted the parents as self-sacrificing while an article after that date categorized the parents as an obstacle to their children's academic success that needed outside help to make that dream a reality. Since the case of Franco Gonzales is not an isolated one, conclusions can be drawn from the shift in the discourse that occurred in the way this particular story was told.

## CONCLUSION

As the focus of discourse shifted to increasing border security as opposed to debate about immigration, the

descriptions of migrants increasingly de-emphasized their humanity. The drastic decrease in the number of affirmative articles is very telling of the time and also highly concerning. In the Los Angeles Times, any positive mention of Mexican immigrants after 9/11 was simply no longer considered to be acceptable discourse as is evidenced by the single affirmative article published. The terrorist attacks led to a sense of patriotism that exacerbated already present anti-foreign sentiments. Thus even though Mexican immigrants were in no way related to 9/11, their characterization as the 'other' was reinforced to new levels that kept them from being considered equals or even human. In the name of nationalism, lines were drawn in public perception between the mainstream and the 'other', which was re-categorized as the 'enemy' or perennial threat to the American nation. This discourse of Mexican immigrants as threats without the counterpoint of positive representations contributed to an atmosphere that permitted migrants to be treated as less than human. Thus increased levels of immigration enforcement and criminalization were considered justified in a debate devoid of equal considerations of the pros and cons. These frames still persist and dominate discussion on immigration reform limiting the way in which the immigration 'problem', or as Lakoff and Ferguson (2006) propose the 'economic disparity between countries problem', can be solved. If Mexican immigrants continue to be framed as 'illegal', they will continue to be viewed as unworthy of rights, thus limiting them to a marginal place in society.

In the future, the researcher plans on conducting a more in depth version of this study namely by extending both the time period as well as the number of media outlets analyzed. This would include a large-scale survey where participants would be asked to respond to terms and segments of articles that are representative of the discussion on immigration within the print media written both immediately before and after September 11, 2001. This research is significant for educators, academics, journalists, and consumers of print media, policy makers, and also those who operate media outlets. It will assist readers and authors in understanding the role that the subjective way in which issues are framed has real consequences on public opinion and possibly public policy. It is the hope of the researcher that

this work will contribute to a new way of looking at immigrants that does not demonize them or reject their humanity.

## APPENDIX A

### TERMS OFTEN USED TO DESCRIBE IMMIGRANTS

Immigrant/Immigration: Immigrant(s), this does not include names of organizations such as Immigration and Naturalization Service (INS) or National Network for Immigrant and Refugee Rights (NNIRR)

Migrant/migration: Migrant(s)

Undocumented: lacking documentation, not having entered the U.S. legally. According to Lakoff and Ferguson (2006), although undocumented seems more compassionate, since the term is a negative it implies that they should have documents.

Alien: extraterrestrial, a person or creature of a foreign nature that enters the U.S. Leads to people being considered unworthy of rights or humane treatment. See Santa Ana (2002, 2007), Chavez (2001), Lakoff & Ferguson (2006).

Unauthorized: a person entering the U.S. without proper legal authorization. Similar to 'illegal'.

Worker: worker(s), someone who works; (includes any specific occupations such as dishwasher, bus boy, construction worker, etc.), for this project this will be in reference only for Mexican immigrant workers. This frame reduces immigrants to only workers, which does not take into account the other parts of their lives such as family and community members. See Lakoff & Ferguson (2006).

Laborer: laborer(s), farm laborer(s), day laborer(s), for this project this will be in reference only for Mexican immigrant laborers, also includes references to labor law/policy. It has similar implications to worker. See Lakoff & Ferguson (2006).

Illegal: immigrants are sometimes portrayed as criminals,

lawbreakers, or any such variations, which indicate that they have broken laws and therefore deserve punishment and to have their rights taken away. This way of framing immigrants dehumanizes them as they themselves are considered 'illegal' not just their actions consequentially they are always considered a potential threat. This also includes references to crossing the border 'illegally'. See Santa Ana (2002, 2007), Chavez (2001), Lakoff & Ferguson (2006).

Foreigner: foreigner(s), someone who comes from a different country, territory, or nation, someone who does not belong. It is sometimes used to separate residents in the U.S. from the mainstream as well.

### METAPHORS OFTEN USED TO DESCRIBE IMMIGRANTS

Criminal: immigrants are sometimes portrayed as criminals, lawbreakers, or any such variations, which indicate that they have broken laws and therefore are deserving of punishment as well and should give up their rights. Also includes fugitives and sometimes gang members. Suspect/guilty. See Santa Ana (2002, 2007), Chavez (2001), Lakoff & Ferguson (2006).

Trespasser/invader: immigrants are sometimes portrayed as trespassers or invaders on sovereign U.S. territory that then seek to control the territory on which they reside making them a threat and their migration itself almost an act of war. See Santa Ana (2002, 2007)

Disease: immigrants are sometimes portrayed as a cancer, or as disease-ridden which emphasizes the fact that they are unwanted and increasing. See Santa Ana (2002, 2007)

Animal: immigrants are sometimes portrayed as beasts, animals, creatures, or exhibiting qualities of such (includes specific animals i.e. 'immigrants as cockroaches'). See Santa Ana (2002, 2007)

Dangerous Waters: immigrants are sometimes portrayed as waves or tides, which are representations that dehumanize immigrants. See Santa Ana (2002, 2007).

## OTHER SIGNIFICANT LANGUAGE USED IN ARTICLES

**National Security:** Immigration policy has become increasingly intertwined with national security.

**Border Security:** References to the importance of or increasing levels of border security.

**Terrorist Attacks of 9/11:** September 11, 2001, 9/11, terrorist attacks.

**Open Border:** The border is often referenced as being ‘porous’ and opponents to strict border security are labeled as wanting open borders. Such statements demonstrate a fear that if the borders of the United States were not enforced, large numbers of persons from Third-world countries would come to the U.S. and threaten its sovereignty. **Immigration reform:** uses of the phrase ‘Immigration reform’ or ‘Comprehensive immigration reform’, these instances are also included under the category of Immigrant(s)/immigration.

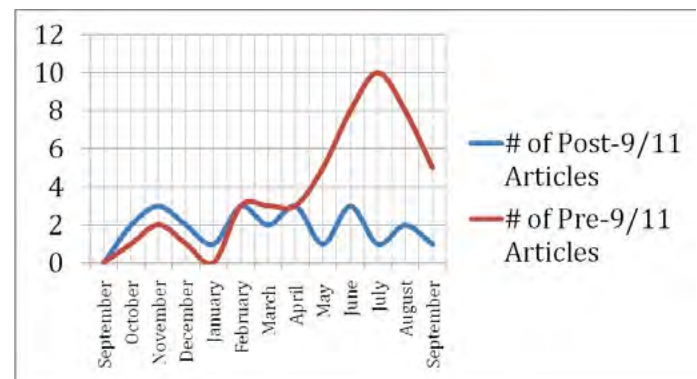
**Guest Worker Program:** A program designed for people from a foreign country to enter the U.S. to work legally for a set number of years then return to their home country. One example is the Bracero Program. George W. Bush proposed such a program but it lost importance and support after 9/11. These programs are often riddled with abuses, as a worker’s legal status is dependant on the employer making it difficult to report such offenses. This type of program also reduces people to labor and does not take into consideration that they are people capable of building families in the U.S. See Portes & Rumbaut (2006)

**Amnesty:** This term, which is similar to legalization, has a stigma since it implies forgiveness for past crime. The term places undocumented immigration in the same category as regular crimes thus framing immigrants as criminals. Also, because criminals are considered to require punishment, many people consider amnesty a reward for breaking the law instead of a punishment. See Lakoff & Ferguson (2006).

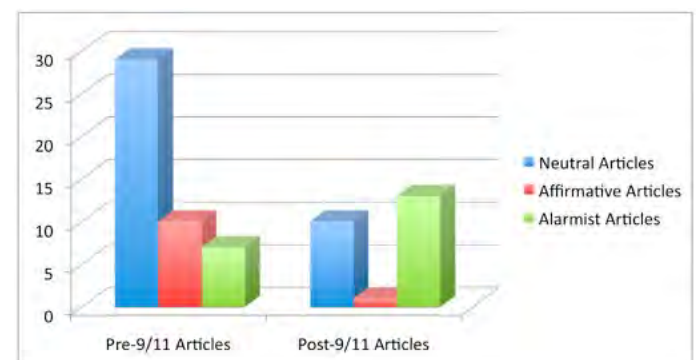
**Legalization:** legalize, grant legal status, etc., citizenship, paperless, papers, permanent residency.

**Economy:** Immigrants are often portrayed as burdens on the economy. However, the case is considerably more complicated. Many businesses are dependant on immigrant labor. Also, immigrants pay taxes even though that money goes disproportionately to the Federal government when most of the expenses for social services used by immigrants are covered by State and local governments. Thus the impact of immigration is relatively small. See Portes & Rumbaut (2006)

**TABLE 1: ARTICLES ON MEXICAN IMMIGRATION BY MONTH**



**TABLE 2: NUMBER AND SLANT OF ARTICLES**



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# VARIATION OF WIDTH, ASYMMETRY, AMPLITUDE AND FREQUENCY OF SOLAR P-MODES DURING THE SUN'S MAGNETIC ACTIVITY CYCLE



## JORGE RODRIGUEZ

*Physics*

*Mentors: Edward Rhodes, Ph.D.*

*Department: Physics/Astronomy*

*McNair Scholars Program*

*University of Southern California*

The mechanism of the sun's magnetic activity cycle is one of the major questions that have persisted in solar astronomy for the past three decades. It is believed that by studying structural properties of the sun such as the activity cycle, we will be able to make important advances in understanding the solar interior and solar evolution that can then be applied to other more distant stars. In this project, the author will use a global helioseismic approach to examine width, asymmetry, amplitude and frequency parameter shifts of high degree and high frequency pressure modes within the sun and compare them to corresponding changes in the level of solar activity for the year 2001. The data used consists of three-day time series power spectra generated by a group at the University of Southern California and initially collected by the Global Oscillation Network Group. This network consists of six identical telescopes positioned around the world in order to maximize the continuity of solar observations and decrease down time. These power spectra were then renormalized, averaged with respect to the azimuthal order  $m$ , and fit to both symmetric and asymmetric theoretical profiles. Differences in frequency, width, amplitude and the asymmetry parameters are compared to computed activity differences using a linear regression. Understanding how different mode parameters change with the solar cycle is paramount to furthering our knowledge of the solar cycle, and of stellar evolution and structure in general. Other similar examinations and inversions of pressure modes have led to recent discoveries regarding internal solar structure and processes that are now known as the hallmarks of Helioseismology.

# INTRODUCTION

## HISTORY

Astronomy has been a topic of scientific interest for centuries, and the star nearest to us (our sun) has always been of particular interest. In the mid-20th century, as observational technology continued to improve, scientists and astronomers began to notice specific features of the sun as well as some of its major surface dynamics. Among these early observations of the solar surface were those performed by Leighton, Noyes and Simon (1962), who claimed that the entire photosphere was oscillating within a period of five minutes. The study we now call helioseismology is a relatively new science that began its development in 1970 when Roger K. Ulrich first suggested that these five-minute oscillations extend much deeper into the sun. He suggested that this cyclic pattern of the entire solar surface is actually an integrated result of many smaller waves or “modes” that extend much deeper into the sun. Furthermore, he suggested the waves were caused by pressure gradients in the upper convective zone of the solar interior. These pressure modes, or “p-modes” that are like ordinary spherical sound waves in nature, vibrate in various resonance cavities within the sun. This phenomenon has led helioseismologists to make the popular comparison of the sun to a ringing bell. It is this discovery that has allowed us to study the structure of the solar interior by examining the behavior of the p-modes.

Since these fundamental discoveries were made, helioseismologists have acquired a wealth of data characterizing these modes. This data can be analyzed and inverted in various ways to study properties of the solar interior. In addition to allowing us to examine the specific properties of the sun, this data also allows us to study physical properties of conditions that cannot be reproduced in any lab on Earth. Some major areas of interest in terms of solar interior exploration have included various thermodynamic properties, the depth of the convective zone, radial angular velocity variation, and general composition (i.e. Helium abundance). The work that we will be doing will be concerned primarily with an observational result that appeared in the mid-1990's, specifically dealing with temporal shifts in mode parameters as they are related to the sun's magnetic activity

cycle (also known as “the solar cycle”).

## STATEMENT OF PURPOSE

The purpose of this project is to examine various parameters of high degree and high frequency pressure modes and how they change over the solar cycle. These parameters will include, in addition to an analysis of the frequencies that were previously examined for this particular data set, mode widths, amplitudes, and asymmetries. I will be using m-averaged three-day power spectra computed from observing runs performed by the Global Oscillation Network Group (GONG). The observing run occurred at the maximum of the most recent completed solar cycle (during 2001), a period during which average solar activity is increasing. After the peaks in the power spectra are fitted with both symmetric and asymmetric theoretical profiles, the data will be analyzed using a subtraction method. This will allow for the attainment of the temporal changes in the mode width, amplitude and asymmetry that can then be compared to changes in the level of solar activity using a linear regression model. This will be the first study to look specifically at the changes in these parameters of p-modes of degrees from 0 to 1000 at high frequencies (from about 1000 to above 7000 $\mu$ Hz). Finally, this study will offer minimal speculation as to the unanswered question of how changes in various mode parameters come about. It will also offer high quality observational results that may be used to further explore the mechanism that is causing the various mode parameter shifts.

## RESEARCH QUESTIONS

How do different parameters of solar pressure modes (specifically mode widths, frequencies, amplitudes, and asymmetries) change with the varying levels of magnetic activity characteristic of the progression of the solar cycle? What can these shifts tell us about the mechanism of the solar cycle? Also, does the theory that states that increased magnetic activity has a damping effect on p-modes within the sun, hold when compared to shifts and correlations that will comprise the results of this study?

## HYPOTHESES

As is consistent with the idea that increased solar activity has a damping effect on pressure modes within the sun, we expect to find that mode widths become larger with increased solar activity. That is to say, we expect to find that the widths are positively correlated with solar activity. Also consistent with the damping effect, we expect to find that the amplitudes decrease with increasing solar activity, and so are anti-correlated. In terms of the asymmetries, a small body of previous work with low degree modes has suggested that systematic temporal variations may become apparent in our study.

## LITERATURE REVIEW

### RECENT WORK ON SOLAR CYCLE-RELATED PARAMETER SHIFTS

The first ever sign of the correlations between changes in frequency and the changes in solar activity were discovered by Martin Woodard and Robert Noyes. They compared the changes in solar irradiance as measured by the ACRIM instrument to changes in low degree mode frequencies and discovered a definitive trend. The data they compared were from the years 1980 and 1984, close to solar maximum and minimum respectively. This allowed them to see a fluctuation in the average frequencies of about  $0.42\mu\text{Hz}$ . Later, it was confirmed that low degree mode frequencies are in fact positively correlated with changes in solar activity, as they had demonstrated.

In 1990, Libbrecht & Woodard found that the frequencies of intermediate degree p-modes also change over time in relation to the solar cycle, and that the magnitude of these shifts depended strongly on the frequency. In this pioneering study, the authors began to hypothesize about what it is about the change in solar activity that causes these frequency shifts. They believed it to be a periodic change in the structure of the sun and, because the magnitude of the frequency shifts depended on the mode frequency, they inferred that whatever relevant structural change was causing the shifts was occurring near the surface. Libbrecht & Woodard (1990) also examined even frequency splitting coefficients for the modes and found

similar frequency dependence, further exposing the character of what they referred to as near-surface “perturbations.” Since then, a parallel result has been discovered for low and high degree p-modes, although less work has been done with the latter. It is the general result of Libbrecht and Woodard’s (1990) findings, these apparent temporal shifts of mode parameters, which we will attempt to expand on in our study.

In the last 20 years, various studies have been done to explore the effects of the solar cycle not only on acoustic mode frequencies, but also on other structural properties such as wave propagation speed and radially varying solar rotation. It is the hope that studying the details of these p-mode shifts along with the other changes that distinguish the solar cycle (such as the periodically fluctuating number of sunspots and changes in the magnetic field strength), will prompt a way to refine current theories regarding the workings of the solar cycle mechanism. One such study was done by Golreich et al. (1991) and examined the changes in magnetic field and entropy of the sun in order to discern the cause of temporal p-mode frequency shifts. Another study by Antia et al. (2001) examined solar cycle related changes in sound speed by looking at frequency splitting coefficients that have previously been used to look at radially varying angular velocities within the sun.

More recent studies have focused on using increasingly accurate data sets and various analysis techniques to discover new features of the frequency shifts and more rarely, the shifts of other mode parameters. By virtue of being newer studies, they feature newly produced data that has not yet been analyzed in this way. Two such papers were written by Elsworth et al. (1994) and Bhatnagar et al. (1999). Elsworth et al. (1994) uses similar methods of analysis on data from the Birmingham Solar Oscillation Network (BiSON), while Bhatnagar et al. (1999) analyzed data from the GONG. Both of these are ground-based networks of telescopes equipped with specialized instruments, positioned around the world. These types of studies provide continually interesting results as some of the newest and most accurate instrumental additions to the arsenal of solar observation tools, including the Solar and Heliospheric Observatory satellite, which has only been in operation for a little over one solar cycle.

Recent studies that are most closely related to the focus



of this study are those done by Dr. Edward Rhodes. In the last ten years, Rhodes has shifted his focus to helioseismology, concerning the variation of p-mode frequencies with solar cycle. Even more specifically, he focuses on high degree and high frequency modes and the effect of anti-correlation at higher frequencies (above 5000 $\mu$ Hz). This is especially exciting as it has only been within the last 12 or so years (just more than a solar cycle) that high degree oscillations have been accurately distinguishable. In a recent conference proceeding, Rhodes emphasizes the importance of analyzing data gathered for high degree modes in addition to low and intermediate degree modes in order to obtain a more complete understanding of various solar phenomena and internal structure, including sound speed and the equation of state. The result of his 2003 study, which is most pertinent to my work, is included in the section that addresses temporal frequency shifts with the progression of the solar cycle. His findings in this area were that shorter observation periods yield more visible changes and allow increased sensitivity to short term changes with solar cycle, rather than observing changes occurring over long periods of time. He showed that not only were the frequency shifts of higher degree modes ( $l > 5000$ ) anti-correlated with changes in solar activity, but they were also more sensitive to these changes (Rhodes et al., 2003).

The main similarity between this study and Rhodes' work described above, is the use of three-day time series power spectra of modes ranging in degree from 0 to 1000 and ranging in frequency from 1000 to above 7000 $\mu$ Hz. However, because this study does not only look at frequency shifts, we must mention other studies that have looked at mode width and power in order to provide a basis for our work. One of the earliest studies that looked at how mode line widths changed with differing levels of solar activity was a study done by Jeffries et al. (1991), which used South Pole Ca K intensity data. In terms of temporal shifts affected by solar cycle, Jeffries et al. (1991) found that for modes with degrees between 80 and 100 and with central frequencies of about 3000 $\mu$ Hz, mode widths were larger when there was increased activity on the sun and smaller when there was less activity (examining data for 1981 and 1987, respectively). The study further hypothesized that mode power would also decrease systematically as the level of solar activity increased.

Another study, conducted by Elsworth et al. (1993), used data collected by the BiSON to look at low-degree p-modes and how their power varied with changing levels of solar activity during the solar cycle that occurred between 1981 and 1992. To do this they used a measurement of the area under the Lorentzian peak, which is defined as the product of the mode height, width and  $\pi/2$ . They found that, for all  $l$  values measured, there was a  $35 \pm 5$  percent decrease in mode power from solar minimum to solar maximum. However, they claimed not to find significant variation in the widths, and so attributed this extreme power difference to a corresponding decrease in the amplitudes. As a result they concluded that higher levels of activity may affect the strength of p-mode excitation, or the increased occurrence of various magnetic phenomena causes increased absorption and damping that decreases the observed mode power.

A study performed by Komm, Howe, and Hill (2000) used measurements of mode width and amplitude derived from three-month time series produced by the GONG. They found significant changes in the width, amplitude and area of the pressure modes during times of differing levels of solar activity. Similar to Elsworth et al. (1993), they found that changes in these various measurements were not dependent on the degree  $l$ . Komm, Howe, and Hill (2000) found an average of a 3 percent increase in the width, a 7 percent decrease in the amplitude, and a 6 percent decrease in the mode area when examining the time frame of the solar minimum in 1996 to October 1998. These findings are consistent with the suggestion that various magnetic phenomena occurring in the photosphere and upper convective zone absorb p-mode energy and therefore enhance an apparent damping effect.

The asymmetry of the spectral peaks we are examining is thought to be caused by the interference of modes that have different phases and are moving in different directions within a certain resonant cavity. The model for this type of wave behavior, which is also related to the damping of p-modes, is a Fabry-Perot interferometer with a source that is close to the cavity. As it is put by Duvall et al. (1993), "A phase difference between an outward direct wave and a corresponding inward wave that passes through the cavity gives rise to the asymmetry." This study further suggests that to ignore the asymmetries is to

introduce a significantly large systematic error. It has not been until recently that researchers have begun looking at how the asymmetry parameter changes over time. One recent study performed by Jimenez, et al. (2007) used contemporaneous data from five different ground and space-based data sources to examine asymmetry shifts for low degree ( $l \leq 3$ ) modes. The study, completed only two years ago, was the first to show the existence of temporal changes of the asymmetry parameter. We aim to extend these results by examining temporal asymmetry shifts within our own data set, thereby extending the results to higher degree and high frequency modes.

## METHODS

### DATA

Currently, there are many different sources that research groups performing helioseismic research may utilize to obtain their data. Many of these sources are ground-based telescopes or networks of multiple identical telescopes that are equipped with instruments fashioned especially for collecting solar oscillation data. The data that we will analyze consists of power spectra produced from three-day time series observing runs that are generated by the Global Oscillation Network Group. The “GONG” network is a project of the National Solar Observatory, an organization devoted to advancing solar research and knowledge. This group also collaborates with a larger network of scientists, including Dr. Edward Rhodes’ research group at the University of Southern California, in order to process and analyze the data that is obtained.

The time series data are composed of full disc Dopplergrams that are decomposed into hundreds of thousands of various individual modes. Dopplergrams are created by taking two images of the full solar disc at a set time interval and then subtracting the earlier image from the later one in order to see what parts of the image have shifted towards us and what parts have shifted away as time progresses. Of course, we must initially account for the shifts that will be apparent due to the solar rotation. This rotation will cause the image to have the appearance of fading from dark to light in a general trend across

the solar disk. When we correct for this effect, we are able to see the minute details of how the solar surface is fluctuating, with light and dark points speckled across the solar surface. From these Dopplergrams, researchers may use existing software to consolidate the granulated images into useful images that contain information pertaining to individual waves, specifically into something called power spectra.

The creation of power spectra from raw time series data is equivalent to forming pictures of the numerous distinct modes that are manifested on the surface of the sun. This process was completed by another research group at University of Southern California, from which we obtained these raw power spectra and began to analyze them. In the power spectra, we see energy concentrated into ridges at certain frequencies for various wave degrees and radial orders. Contained inside each of these ridges is pertinent information about the frequency, linear width, asymmetry and amplitude of each mode. Particularly, we will use these data to look at how these properties change over time. These shifts will then be compared to changes in the level of solar activity, as measured by an array of solar activity indicators.

### DATA ANALYSIS

Various methods have been employed in the studies previously mentioned, however we employed the most up-to-date methods that exist for this kind of work. In our case, another group at the University of Southern California had already put the data we receive into the form of power spectra (of three-day time intervals). After obtaining the power spectra data, we renamed it to fit our naming conventions and averaged the data with respect to the azimuthal order  $m$ , which corresponds to the characteristic number of longitudinal nodes of each spherical harmonic wave. The  $M$ -averaging is done for all modes of degree  $l=0$  to  $l=1000$  and all relevant values of the radial order,  $n$ , in order to improve frequency resolution and reduce noise in measurements at the higher frequencies that we are interested in.  $M$ -averaging is a process that is familiar to helioseismologists who are examining the details of global oscillations (Gough, D.O. 1996).

Next, the spectra are renormalized in order to account for any downtime that the observing instrument had (i.e. gaps

in otherwise continuous time data) and to reduce error that is introduced by this downtime. This is done to adjust the values of the amplitudes by a factor that is directly related to the duty cycle values (number of minutes for which there is data divided by total number of minutes in a given run), as missing data can have the effect of decreasing the magnitude of the amplitude measurement.

We then fit the m-averaged, renormalized spectra to both symmetric and asymmetric theoretical profiles as described in Rhodes et al. (2003). The fitting method we employed is known as the “Windowed, Multi-Peak, Averaged-Spectrum” Method or WMLTP. This method is designed to include as many as nine line profiles and its accuracy is increased when the theoretical profile is convolved with the actual temporal window function of each observing run. This method can be employed using a symmetric or asymmetric profile, the asymmetric profile is more accurate as it better corresponds to the asymmetric forms that more realistically characterize p-mode spectral peaks. This process serves the purpose of fitting the individual peaks contained within the ridges of the power spectra in order to obtain measurements of various properties of the individual modes. These properties include the frequency, width, asymmetry and amplitude of each mode. At this point, we may begin to look at the temporal width, asymmetry and amplitude differences by using a simple subtraction script that extracts the specified parameter and its error from both files, and subtracts earlier values from later ones. This allows us to see how the mode parameters change over time.

Subtraction is performed for all 27 three-day date ranges (and one two-day run) in the 83 day dynamics run that occurred from March to October of 2001. These differences are then binned, a process that takes the numerous data points produced by the subtraction and compacts them to approximately 25 binned points at distinct frequencies that more readily convey temporal trends when graphed. The activity differences for the three-day averages of the dynamics run are also calculated separately. Activity differences are calculated for 10 solar activity indicators. These include the International Sunspot Number, American Sunspot Number, 10.7cm Radio Flux, Magnetic Plage Strength Index, Mount Wilson Spot Index, |B| corr, Magnesium

II core to wing ratio, Equivalent Width absorption line, and two Solar Extreme Ultraviolet Monitor channels. Two that we examine more closely in the results section of this paper are the International Sunspot Number and the |B|corr., which refers to the magnitude of the of the sun’s magnetic field, averaged over the entire solar disc. These two have been chosen because they correlate well with the various parameters we are examining, and they are representative of the other eight solar activity indicators. After the average activity differences are calculated, the two sets of differences (those of the specified mode parameter and activity indicator) for each binned frequency may be compared. These two sets are compared using a linear regression model that produces slopes, slope errors, intercepts, intercept errors and correlation coefficients for the data sets.

## RESULTS

After having performed the linear regression, we were able to examine the slopes, correlation coefficients and intercepts produced by the program. The slopes and correlation coefficients allow us to see the comparison between the changes in the level of solar activity and the changes in the particular parameter that we are looking at (i.e. width, asymmetry, frequency or amplitude). This regression is central to our analyses. From it, we were able to examine trends and phenomena that became apparent in the graphs of the various regression results in order to add depth to our analysis and thus, our understanding. The discussion of these results requires us to look at trends in the results of the regression analysis, as plotted against frequency. For the purpose of this initial discussion, we will confer the results that came of our regression of the symmetric case including 351 data points, keeping in mind that the asymmetric fit results produced very similar results in terms of general curve behavior.

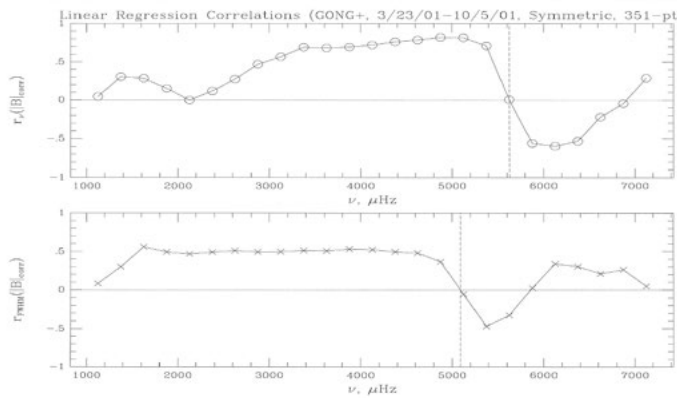


Figure 1 a. (top) Correlation coefficients of the frequency and  $|B|corr.$  activity indicator, plotted vs. mode frequency. b. (bottom) Correlation coefficients of the widths and  $|B|corr.$  activity indicator, plotted vs. mode frequency.

The pattern of the curves representing the correlation coefficients for the widths (labeled as FWHM for full width at half maximum) vs. frequency is particularly striking. When compared to the frequency shifts as shown in Figure 1a, we are able to see that the width shifts shown in Figure 1b are even better correlated with solar activity (as indicated by the  $|B|corr.$  in this case) than frequency at frequencies below about  $2500\mu\text{Hz}$ . More importantly, the width correlation exhibits a curve very similar to that of the frequency curve, whose behavior, or “signature,” is well established by previous work. Both remain positively correlated until they reach a frequency of about  $5000$  to  $6000\mu\text{Hz}$ , where they become anti-correlated. One noticeable difference in this behavior is that the width curve seems to stay level before going negative, while the frequency curve demonstrates a more complicated behavior, increasing to a point and decreasing only slightly before dropping off.

This “zero-crossing frequency” also seems to be on average about  $600\mu\text{Hz}$  higher for the frequency correlation curve than it is for the width correlation curve. Also, depending on the independent variable (the activity indicator), the frequency correlation may or may not show a second definite zero-crossing from negative to positive. However, the width correlation coefficients show this result quite plainly. The fact that the change in the widths is positively correlated (up to about  $5000\mu\text{Hz}$ ) with solar activity tells us that widths do in fact become larger as the level of solar activity increases. This is consistent with the notion that the increased magnetic activity that is characteristic of the increased solar activity has a significant damping effect on the pressure modes that we are studying. The anti-correlation effect

that we see for the width shifts at higher frequencies is consistent with the one we see for the frequencies shifts (although it occurs at a consistently lower frequency). This may suggest that the width and the frequency shifts are closely related, and that whatever phenomenon is causing the anti-correlation at high frequencies is affecting both parameters.

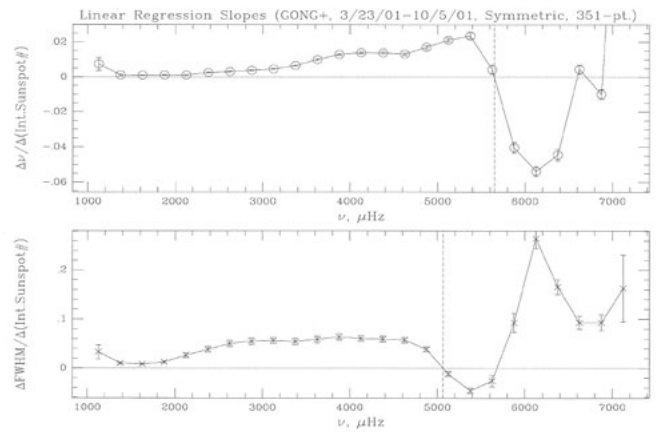


Figure 2 a. (top) Slopes of the frequency and International Sunspot activity indicator, plotted vs. mode frequency. b. (bottom) Slopes of the widths over International Sunspot Number activity indicator, plotted vs. mode frequency.

We are able to see similar trends for the slopes in Figure 2, which also indicate a correlation, but with the International Sunspot Number (up to about  $5000\mu\text{Hz}$  for the widths and  $5600\mu\text{Hz}$  for the frequencies) and varying anti-correlated behavior thereafter. As we saw with the correlation coefficients, the anti-correlated behavior of the widths seems to be more consistent than that of the frequencies for our data set. One parameter for which we were not able to attain a significant result during the time allotted by the research institute was the amplitudes. As observed by examining the plot of the amplitude slopes in the third panel of Figure 3, there is one overwhelming result (occurring between about  $2000$  and  $4000\mu\text{Hz}$ ) that has effectively erased any interesting behavior that we might have been able to see at other frequencies. If more time was available, it may have been best to normalize this behavior in order to better see the finer details of the curve. Also, Figure 3 allows insight into how similar the curves for the various solar activity indicators behave when compared to each other by showing the plots of slopes in 3a and 3b for the  $|B|corr.$  indicator, which can be compared to the plots in 2a and 2b for the International Sunspot Number case.

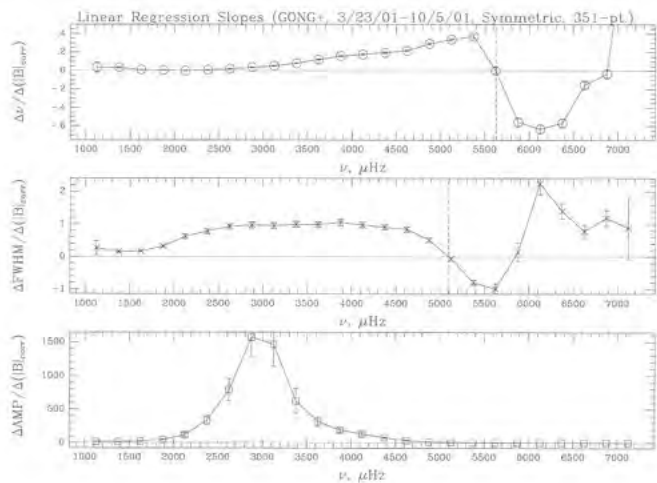


Figure 3 a. (top) Slope of the frequency shifts over the changes in  $|B|_{corr}$ , plotted vs. frequency. b. (middle) Slope of full-width-at-half-maximum shifts over the changes in  $|B|_{corr}$ , plotted vs. frequency. c. (bottom) Slope of the amplitude shifts over the changes in  $|B|_{corr}$ , plotted vs. frequency.

We have also included the results for the slopes of the asymmetry parameter as compared to the International Sunspot Number in Figure 5b. In addition to the slope curve, we have chosen to include some of the raw values of both the asymmetry and the activity indicator, with the days between which the observing run that produced our data occurred indicated by two downward pointing arrows (Figure 4a). In the graph of the raw asymmetry values we have included a curve showing the values at high activity, marked by “X” points, and another indicating the values at low activity, marked by “O” points as shown by the label on the left hand side. The two times that we chose to represent widely varying levels of activity are also indicated by the two arrows on the plot of the International Sunspot Number values.

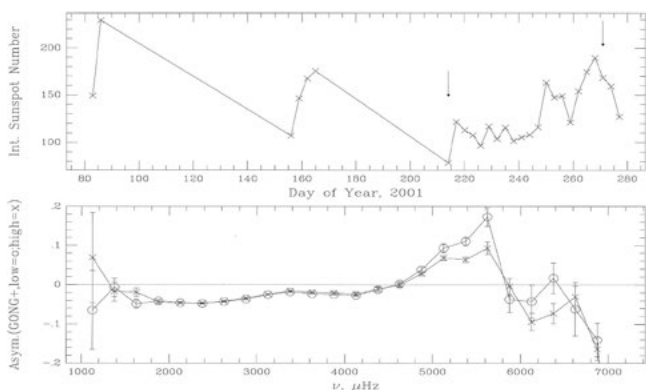


Figure 4 a. (top) Plot of the raw values of the International Sunspot Number during the year 2001. b. (bottom) Plot of the values of the asymmetry parameter at high (X points) and low (O points) levels of activity within our data set. The two points from which these data are taken are indicated by the two downward facing arrows shown in Figure 4a.

We also include a plot of the changes in the asymmetry vs. the changes in the International Sunspot Number in order to show the negative trend in the slope (Figure 5a). Moreover,

while the slope curve in Figure 5b of the asymmetries has a shape similar to the slope curves of both the widths and the frequencies, it appears to have been shifted downward (in the negative y direction) so that the entire curve is below zero and all of the binned slope values are negative. This suggests a varying degree of anti-correlation that also appears to exhibit the steep decline that we see in the widths and frequencies when they cross zero. In contrast, the slopes of the asymmetries seem to stay very close to zero, although below it, until the slopes become more negative above about 5000 $\mu$ Hz. After this dip, the curve begins to climb again in a manner that is again similar to the behavior of the frequency and width slope curves. This kind of behavior, as shown in the accompanying figure, is highly similar across different activity indicators.

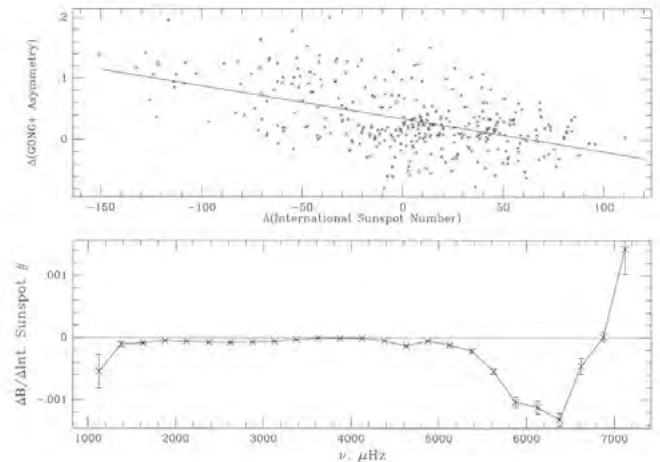


Figure 5 a. (top) Plot of changes in asymmetry parameter vs. the changes in the International Sunspot Number with the linear regression line drawn over the points. b. (bottom) Slope of the asymmetry parameter shifts over the changes in International Sunspot Number, plotted vs. frequency.

## LIMITATIONS

One limitation inherent in this study is that it only looks at one 83-day run within one year at solar maximum. Therefore, we are not able to compare our results with years or even time frames that would have exhibited different levels of average activity and different degrees of activity changes. Also, all of our analyses looked at regression results as function of frequency; some might argue that it is more relevant to look at those parameters as a function of degree. Other sources of error in our measurements include atmospheric effects (as the telescopes are ground based), unexpected downtime that may

not have been accounted for and that would cause the data to be discontinuous, and human error.

## FUTURE AREAS OF STUDY

Data has not yet been analyzed for other years or time frames in a similar fashion and these kinds of results for high degree and high frequency p-modes have not yet been attained. For this reason, it would be in the interest of a future study to explore data from other years, using similar methods, in order to better frame the results. This would provide grounding for the results and allow for a comparison of how these measurements change in different years throughout the solar cycle. It would also prompt insight into what might be causing the varying and apparent phenomena. Other studies may consider exploring the parameters studied here using different data from other sources, i.e. the Michaelson Doppler Imager aboard the Solar and Heliospheric Observatory satellite. Data from this and future sources will provide even more accurate results as instruments become more advanced and the amount of down time in a given observing run approaches zero. Lastly, it is likely that our group will continue to further explore amplitudes shifts of the modes for this particular data set by normalizing the extreme curvature that we have found in order to better see and understand any trends that may exist.

## CONCLUSION

In conclusion, we have demonstrated that there is, in fact, a systematic relationship between the level of solar activity and the widths and asymmetries of pressure modes in our data set ranging in degree from 0 to 1000 and in frequency from approximately 1000 to 7000 $\mu$ Hz. The affirmation or negation of the existence of any kind of similar systematic trend for the amplitude parameter will require further investigation. We have also shown that the behavior of the width and asymmetry correlation and slope curves show a basic similarity to those of

the frequency curves. In the case of the asymmetry curve, these values remain negative but display the same steep drop and subsequent climb that is characteristic of the frequency curves. The width curves appear even more similar as the steep drop they experience also cross zero, only at a frequency that is consistently about 600 $\mu$ Hz lower than that of the frequency parameter zero-crossing frequency. The finding that p-mode widths do increase with increasing solar activity provides evidence of the damping relationship that others have predicted exists regarding increased solar activity and pressure modes within the sun. Thus, this study has opened the door for a holistic approach to analyzing pressure mode parameter shifts with solar cycle. If continued, this study may produce results that will allow us to better understand the phenomenon that causes these shifts and perhaps the entire solar cycle mechanism.

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# PROGESTERONE INHIBITS ESTROGEN-MEDIATED NEUROPROTECTION AGAINST EXCITOTOXICITY BY DOWN-REGULATING ESTROGEN RECEPTOR- $\beta$



## Erin Lee

*Biology/Spanish*

*Mentor: Michel Baudry, Ph.D. and Claudia Aguirre, Ph.D. Student*

*Department: Neurobiology and Neuroscience*

*McNair Scholars Program*

*University of Southern California*

Alzheimer's Disease (AD) is more prevalent in women than in men, suggesting that the depletion of female steroid hormones, such as progesterone (P4) and estrogen, in post-menopausal women aggravates the risk of developing AD. Based on several *in vitro* and *in vivo* experiments on neurodegeneration, 17 $\beta$ -estradiol (E2) and progesterone (P4) have been found to be neuroprotective against a variety of insults. However, when E2 and P4 were combined, P4 generally reversed E2-mediated neuroprotection. Recent studies indicated that administering E2 for 20 h to cultured hippocampal slices and then adding P4 for 4 h eliminated the neuroprotective effects of E2 against NMDA toxicity. In this study, we examined the role of the two major subtypes of estrogen receptors, ER $\alpha$  and ER $\beta$ , in E2-mediated neuroprotection against NMDA neurotoxicity in organotypic hippocampal slices. Treatment with E2 did not modify ER $\alpha$  mRNA and treatment with P4 reversed E2-induced increases in ER $\beta$  mRNA and protein levels. However, P4 treatment reversed E2-mediated increase in ER $\alpha$  protein levels. Experiments with an ER $\alpha$  agonist, PPT, or an ER $\beta$ -specific agonist, DPN, indicated that E2-mediated neuroprotection against NMDA toxicity was mediated by the activation of ER $\beta$  but not of ER $\alpha$  receptors. Our results show that E2-mediated neuroprotection against NMDA toxicity is due to the activation of ER $\beta$  receptors. Particularly, P4 treatment following E2 treatment results in the down-regulation of ER $\beta$  mRNA and protein. The understanding of the underlying mechanisms of estrogen-progesterone interactions is important in order to yield a safe and effective treatment for postmenopausal women at risk for developing neurodegenerative diseases.



## INTRODUCTION

According to the 2009 Alzheimer's Disease Facts and Figures report, 5.3 million people in the United States are living with Alzheimer Disease (AD), which is the 6th leading cause of death. In addition to the large death rate among America's oldest age groups due to this disease, the costs of the disease to society are estimated to be over \$148 billion per year. Currently, there exists neither a cure nor an effective treatment for this neurodegenerative disease.

On average, menopause begins when women are approximately 54 years of age (Arias and Smith, 2003). One prominent characteristic of menopause, or the ceasing of menstruation, is a depletion of female sex hormones, such as estrogen and progesterone. Several studies have shown that women over the age of 65 have a much higher prevalence of AD than men (Henderson, 1997; Gao et al., 1998). Ergo, since AD is most commonly diagnosed in postmenopausal women, it has been hypothesized that a deficiency of primary female sex hormones may increase the likelihood of these women developing neurodegenerative diseases.

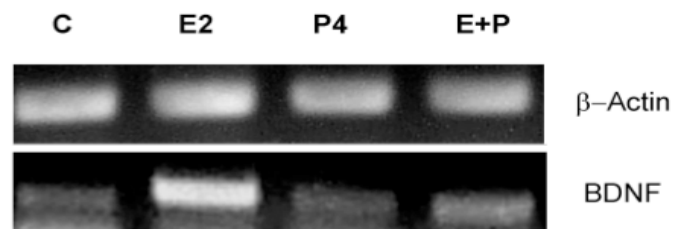
In order to counteract the decline in levels of ovarian hormones, physicians have prescribed hormone replacement therapy (HRT). In 1999, approximately 37.6% of all postmenopausal women in the United States received HRT (Keating et al., 1999). However, researchers from the Women's Health Initiative have concluded that women taking conjugated equine estrogens combined with medroxyprogesterone acetate, a synthetic progestin, not only were not protected against AD but had increased risks for several diseases as compared to the placebo group (Rossouw et al., 2002). This finding is quite paradoxical since both estrogen and progesterone have been found to be neuroprotective in a variety of experimental models of neuronal damage (Aguirre & Baudry, 2009; Nilsen & Brinton, 2002). Thus, it is still critical to develop an effective treatment to counteract the depletion of female sex hormones. In order to do so, we must first understand the interactions between estrogen and progesterone in experimental models of neurodegeneration.

## REVIEW OF LITERATURE

### GONADAL HORMONES AND BDNF

A large body of evidence indicates that gonadal hormones, such as estrogen and progesterone, directly target multiple regions within the central nervous system (i.e. the hippocampus and the cortex) (Baulieu et al., 1996). Based on several *in vitro* and *in vivo* experiments on neurodegeneration, 17 $\beta$ -estradiol (E2), a main form of estrogen, has been shown to have neuroprotective properties against neurotoxicity (Aguirre & Baudry, 2009). In addition, several experiments have also demonstrated potent neuroprotective effects of P4 against glutamate-induced cell death (Nilsen & Brinton, 2002) and traumatic brain injury (Roof et al., 1997). However, when E2 and P4 are combined, P4 has been shown to reverse E2-mediated neuroprotection (Aguirre & Baudry, 2009; Rosario et al, 2006).

In addition to the neuroprotective effects of estrogen, estrogen has been found to stimulate the production of the neurotrophin, brain-derived neurotrophic factor (BDNF). BDNF is a member of the neurotrophin family of growth factors and is abundant in hippocampus, cortex, and basal forebrain, areas critical to learning and memory. Among other functions, BDNF supports the survival of existing neurons and participates in growth, differentiation, and synaptic plasticity at existing synapses (Hofer et al., 1990). It has been proposed that E2-mediated neuroprotection is mediated by increased production and release of BDNF (Figure 1) (Aguirre & Baudry, 2009).



Aguirre, CC, Baudry, M., 2009.

**Figure 1:** Estrogen leads to an increase in BDNF

### ESTROGEN RECEPTORS AND AGONISTS

Since progesterone and estrogen are both neuroprotective, it is critical to understand why, under certain conditions, progesterone can reverse the neuroprotective effects

of estrogen. This prompted us to investigate the differential roles of the two major types of estrogen receptors – ER and ER – in E2-mediated neuroprotection. This literature review will focus mainly on these receptors and their respective functions in relation to plasticity. In order to study the effects of different receptors, specific agonists binding to each type of receptors are generally used. An agonist is a ligand that binds to a receptor and mimics the effects of the endogenous molecule that activates this receptor. 17 $\beta$ -estradiol is an agonist that binds equally well to both estrogen receptors. However, in order to differentiate between the effects of ER and ER, two different agonists that bind selectively to the two receptors have been identified – DPN, an agonist for ER, and PPT, an agonist for ER.

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## ESTROGEN RECEPTORS AND

Estrogen Receptor (ER)

Several studies indicate the importance of ER in memory function, suggesting a critical role of this receptor for age-related cognitive decline or neurodegenerative diseases, such as AD. In particular, a spatial learning deficit was observed in ER KO mice (i.e., mice lacking ER); this deficit was reversed by reintroducing ER through lentiviral transduction of a

plasmid coding for ER. The study was limited to female ER $\alpha$  KO mice because they exhibited learning and memory deficits compared to wild type (WT), unlike male ER KO mice (Foster et al., 2008). These results suggest that the learning deficits found in female ER KO mice are not only due to the lack of ER during development, an organizational effect, but also due to the disruption in ER function in adults. However, it is still unclear whether the beneficial effects of adding ER to these KO animals is occurring through the natural ER pathways or through another compensatory pathway.

Other studies have examined the roles of estrogen receptors on cognition using the specific agonists DPN and PPT. For instance, a recent study found an effect of ER agonist but not of ER agonist on the modulation of NMDA receptors (NMDAR) in hippocampus (Morissette et al., 2008). NMDA receptors are a class of glutamate receptors that has been implicated in increased spine density and cognition. The researchers saw a decrease in the NMDAR subunit, NR2B, in hippocampus following ovariectomy. Estradiol and PPT, but not DPN treatment reversed this effect. In cortex, decrease in NR2B was observed following E2 treatment but not with either DPN or PPT (Morissette et al., 2008). Another study focused on ER subtypes and  $\text{Ca}^{2+}$ /calmodulin-dependent kinase II (CaMKII) signaling to discover the mechanisms underlying estrogenic effects on cognitive function (O'Neill et al., 2008).

CaMKII plays an important role in neuronal differentiation and cognitive processes and is highly responsive to  $\text{Ca}^{2+}$  levels. Under normal conditions, this kinase is inhibited until  $\text{Ca}^{2+}$ /CaM binds to its autophosphorylation domain and permits kinase activity. In this study, E2 rapidly induced CaMKII autophosphorylation in an ER- and  $\text{Ca}^{2+}$  influx-dependent manner. In addition, PPT induced autophosphorylation in a dose-dependent manner, while DPN treatment did not modify CaMKII phosphorylation. Together, these data propose a central role for ER in E2-mediated effects on learning and cognitive processes.

Estrogen Receptor (ER)

In contrast to these studies supporting a role for ER in cognition, other laboratories have favored ER as being

the more important subtype of the two receptors for synaptic plasticity. There has been a handful of recent evidence relating ER to plasticity, and to learning and memory. To begin in a broader sense, estrogen, acting through both receptors, plays a key role in the activation of neural circuits involving the ventromedial nucleus of the hypothalamus (Sá et al., 2009), and more generally in both neuroprotection and neurodegeneration altogether (Aguirre & Baudry, 2009). At the University of Albany, researchers found that administering E2 into the hippocampus of rats 10 minutes after training enhanced performance in a hippocampus-dependent task, indicating the critical role estrogen plays in mediating some hippocampal functions (Walf & Frye, 2008).

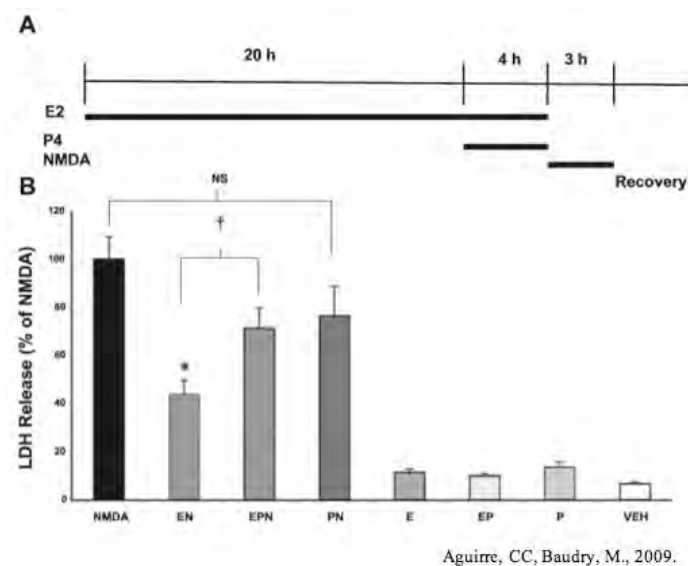
More specifically, the rapid effects of ER activation in hippocampus were found to mediate some of the functional effects of estrogen. Administering agonists specific for ER, rather than ER, resulted in enhancing effects on hippocampal processes similar to those of E2. These effects were eliminated when ER expression was knocked out in transgenic models. Thus, E2's actions appear to be mediated through rapid, membrane-mediated effects and intracellular estrogen receptors in hippocampus (Walf & Frye, 2008). In a recent study, Liu et al., (2008) reported that ERβ was critical for hippocampal synaptic plasticity and learning and memory by using specific agonists for ERβ and examining both electrophysiological models and behavioral models of synaptic plasticity and learning and memory.

By increasing cell firing in hippocampus, a brain structure that plays an important role for cognition and affective behavior, E2 has been shown to enhance cognitive performance. Researchers have speculated that the isoform of estrogen receptors may be important targets for E2's effects on hippocampus-mediated processes. Another study has linked ER to synaptic plasticity against acoustic trauma in mice (Meltser et al., 2008). In particular, the role of ER in auditory trauma was studied by utilizing agonists of ER to test for its effects on BDNF production. Activating ER by adding DPN to wild type (WT) mice, not only led to a slight increase in BDNF protein, but also led to a significant increase in BDNF mRNA. Adding DPN to mice deficient in ER (ER KO) and aromatase

(ARKO) led to a relatively larger increase in the production of BDNF protein as compared to WT mice. Thus, these researchers concluded that ER protects the auditory system against acoustic trauma, presenting the first evidence that directly correlates ERβ expression to the protection of auditory function. Although this research was done in the auditory system, this evidence provides support for the role of ER in plasticity and BDNF activation (Meltser et al., 2008).

#### Progesterone's effects on estrogenic neuroprotection

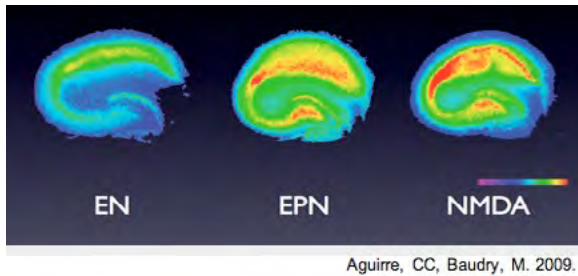
A substantial amount of information has been acquired regarding the mechanisms underlying estrogen's protective effects, mainly through the use of ovariectomized animal models. However, in humans, menopause is characterized by the loss of both estrogen and progesterone, implicating the loss of both estrogen and progesterone as a possible cause of increased risk for developing AD. Much less research has focused on progesterone and its relationship with estrogen in neurodegenerative models. Nevertheless, progesterone has been found to possess neuroprotective effects in various experimental models. For instance, in hippocampal neurons, progesterone reduced neuronal vulnerability to glutamate, FeSO<sub>4</sub>, and A toxicity (Singh, 2006).



**Figure 2: P4 mediated reversal of E2-induced neuroprotection against NMDA toxicity in OHSC**

- (A) Treatment protocol timeline for hormones and NMDA
- (B) Lactate dehydrogenase (LDH) release in the medium measured 24 h after NMDA treatment (Aguirre & Baudry, 2009)

However, further studies have shown that administration of progesterone reverses estrogenic neuroprotection. In particular, while E2 was neuroprotective against N-methyl-D-aspartate (NMDA) toxicity in cultured rat hippocampal slices, adding P4 for 4 h after pretreatment of E2 for 20 h led to a reversal of E2-mediated neuroprotection against toxicity (Aguirre & Baudry, 2009; Figure 2; Figure 3).



**Figure 3: Pseudo-colored propidium iodide (PI) uptake data**

Effects of E2 and P4 on NMDA-induced neuronal damage assessed with PI uptake: NMDA treatment resulted in increased levels of red and yellow fluorescence intensity, and estrogen attenuated this increase. P4 reversed the protective effects of E2 (Aguirre & Baudry, 2009).

A similar conclusion about progesterone's effects can be drawn from another experiment in which researchers discovered that progesterone blocks estrogenic neuroprotection against kainate neurotoxicity in middle-aged female rats. The effects of estrogen and progesterone, both alone and combined, on hippocampal neuron survival following kainate lesion were studied in 14-month-old female rats entering the end of their reproductive stages. The results showed that adding estrogen to ovariectomized rats led to a reduction of neuron loss (Carroll et al, 2008). However, this reduction was blocked by co-administration of continuous progesterone. Both of the preceding experiments yield crucial data that provide new insight into factors that regulate estrogen neuroprotection. On a larger scale, estrogen neuroprotection has clear implications for hormone replacement therapy in postmenopausal women.

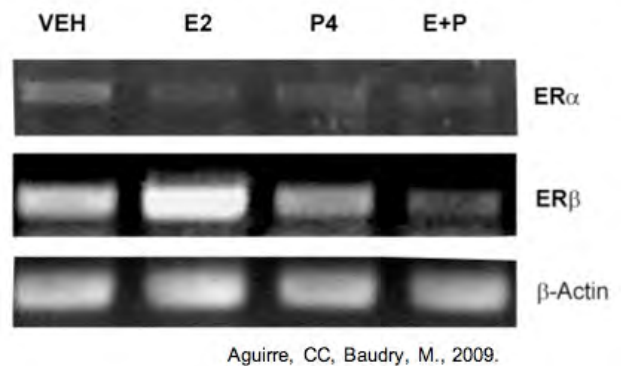
#### Qualitative Meta-analysis

While it has been shown that progesterone may reverse estrogenic neuroprotection, the exact biological mechanism underlying this interaction is unknown. We do not have enough

data to conclude which receptor, ER or ER, is responsible for mediating neuroprotection by estrogen. While some reports indicated the importance of ER splice variants for estrogen therapy, others disregarded them and focused on the role of ER in neuroprotection. The mechanism underlying the reversal of estrogenic neuroprotection by P4 treatment is similarly unknown. One speculation was that P4 treatment results in down-regulation of ER mRNA and protein, but there has not been solid published evidence yet. Therefore, it is important to understand the underlying mechanisms of estrogen-progesterone interactions in order to develop a safe and effective treatment for postmenopausal women at risk for developing neurodegenerative diseases such as Alzheimer disease.

#### Progesterone Reverses Estrogen-Mediated Increase in ER mRNA

The following polymerase chain reaction (PCR) data are currently in the process of publication by Claudia Aguirre and Dr. Michel Baudry (Figure 4). Based on this experiment, it can be concluded that progesterone reverses estrogen-mediated increase in ER mRNA, although ER mRNA levels are unaltered by hormone treatments (Aguirre & Baudry, 2009). This result was seen in parallel with the reversal of estrogenic neuroprotection against NMDA toxicity by progesterone, suggesting that this effect may be due to the down-regulation of ER.



**Figure 4: P4 reverses E2-mediated neuroprotection against NMDA toxicity by down-regulating ERβ mRNA.**

## SPECIFIC AIMS

The objective of this project was to investigate the roles of the two main subtypes of estrogen receptors – ER $\alpha$  and ER $\beta$  in E2-mediated neuroprotection against NMDA toxicity in cultured hippocampal slices. In order to differentiate between the effects of estrogen receptor (ER $\alpha$ ) and estrogen receptor (ER $\beta$ ), we used specific agonists for each type of receptor. The ER $\alpha$  receptor agonist used was diarylpropionitrile (DPN) and the ER $\beta$  receptor agonist used was Propyl Pyrazole Triol (PPT). It had been concluded, based on our previous research, that progesterone (P4) reversed estrogen-mediated neuroprotection against NMDA toxicity. Our lab has also obtained data showing that adding P4 reverses E2-induced ER $\alpha$  activation. Therefore, we investigated whether there exists a link between neuroprotection and E2-induced ER $\alpha$  activation. In short, our research question was: Is ER $\alpha$  necessary for neuroprotection?

The hypothesis of this research project was that E2-mediated neuroprotection against NMDA toxicity is caused by activation of ER receptors. To further validate this claim, we also speculated that activating ER $\beta$  would increase BDNF protein levels. The ultimate goal of this project is to provide more insight into the mechanism for P4-mediated suppression of E2-mediated neuroprotection. Moreover, the discovery of such a mechanism will bolster our current understandings of the interactions between progesterone and estrogen, thereby aiding in the development of an effective HRT for postmenopausal women at risk of developing neurodegenerative diseases.

## METHODOLOGY

The following materials and methods were based on those utilized in the laboratory of Claudia Aguirre and Dr. Michel Baudry at the University of Southern California (Aguirre & Baudry, 2009).

### ANIMALS

Laboratory rats were handled and treated according to the principles and procedures set forth by the National

Institutes of Health Guide for the Care and Use of Laboratory Animals. The Institutional Animal Care and Use Committee of the University of Southern California approved all protocols performed. Timed pregnant Sprague-Dawley rats were acquired from Charles River Laboratories in Wilmington, Massachusetts and kept in the vivarium in a temperature- and light-controlled environment with a 12 h light to dark cycle. This project required the use of rat pups, ranging from 8 to 10 days old.

### PREPARATION OF CULTURED HIPPOCAMPAL SLICES

Organotypic hippocampal slice cultures were prepared from postnatal day 8-10 Sprague-Dawley rat pups (Stoppini et al., 1991; Figure 5). Immediately after decapitation, brains were removed from the cranium and placed into chilled cutting medium [Earle's minimum essential medium (in mM), HEPES, 25; Tris-base, 10; D-glucose, 10; MgCl<sub>2</sub>, 3; pH 7.2]. The cutting medium was placed in four small Petri dishes, which were secured on a bucket of ice to keep the media chilled. After isolation of the hippocampus from each hemisphere of the brain, 400- $\mu$ m-thick transversal slices were cut using a McIlwain tissue chopper. Slices were placed into chilled cutting medium and separated under a microscope. Six slices from the midsection of the hippocampus were then plated onto a 0.4- $\mu$ m culture plate insert (Millipore, Billerica, MA, USA) in six-well flat bottom tissue culture plates (BD Falcon, San Jose, CA, USA). Cultures were maintained in 1mL of steroid-deficient maintenance medium containing 20% heat-inactivated charcoal stripped horse serum (Sigma, St. Louis, MO, USA), Earle's balanced salt solution, Basal Medium Eagle (Sigma), (in mM): NaCl, 20; CaCl<sub>2</sub>, 0.2; MgSO<sub>4</sub>, 1.7; L-glutamine, 2.7; HEPES 27; NaHCO<sub>3</sub>, 5; D-glucose, 48; ascorbic acid, 0.5; 0.5% penicillin/streptomycin; 0.01% insulin (Sigma); pH 7.4. The hippocampal slices were kept in an incubator at 35°C with 5% CO<sub>2</sub>, and cultured for 14 days with complete medium exchange every 3 days prior to experimentation.

### TREATMENT OF CULTURED HIPPOCAMPAL SLICES

In order to allow for recovery from sectioning damage, cultured hippocampal slices were maintained in an incubator,

in vitro, for 14 days prior to treatments. After those 14 days of incubation in fresh media, appropriate treatments (vehicle, hormones, agonists, and NMDA) were administered to the slices in serum-free medium for the indicated duration of time. 17-Estradiol (E2) was diluted in dimethyl sulfoxide (DMSO) to a stock solution of 10  $\mu\text{M}$ , and was further diluted in culture medium to a final concentration of 10 nM and applied for 24 h. Progesterone (P4) was diluted in the same way as E2 and was administered at a final concentration of 10nM. Control samples received vehicle (dimethylsulfoxide, DMSO) treatments in similar hormone-deprived conditions because the hormones were all diluted in DMSO to begin with. Using DMSO as a control was necessary to exclude the possibility that the observed effects could be due to this solubilizing compound. Estrogen receptor agonists DPN (ER agonist) and PPT (ER agonist) were diluted in phosphate buffered saline (PBS) to produce different concentrations. PPT was diluted to a final concentration of 1  $\mu\text{M}$ , 100 nM and 10 nM, while DPN was diluted to a final concentration of 100 nM, 10 nM and 1 nM. P4 was administered to slices at a final concentration of 10 nM for 4 h after treating slices with E2, DPN, or PPT. NMDA (50  $\mu\text{M}$ ) was applied for 3 h following hormone treatments. Vehicle controls were conducted parallel to the treatments and received 0.1% DMSO in serum-free medium.

## CELL VIABILITY ASSESSMENT

At the end of the series of treatments, hippocampal slices were collected to determine extent of cellular death. The two methods utilized to gauge the amount of cell death were propidium-iodide uptake, using whole tissue slices, and lactate dehydrogenase release in the medium surrounding the tissue. Slices used for neuroprotection assays were washed with serum-free medium and underwent a 24-h recovery period in serum-free medium containing propidium iodide (PI; 4  $\mu\text{M}$ ; Calbiochem, San Diego, CA, USA). Propidium iodide is a molecule that binds to the nuclei of dead cells, and intercalates between DNA bases. Once the dye is bound to nucleic acids, the molecule fluoresces, allowing us to measure the amount of cell death. After fluorescent microscopy, the medium was collected to measure the amount of lactate dehydrogenase (LDH)

released using a spectrophotometric assay. An elevated level of the enzyme, LDH, can be used as a marker of cell membrane damage.



**Figure 6: Hippocampus (CA1, CA3, and DG)**

<http://www.bristol.ac.uk/synaptic/info/pathway/hippocampal.htm>

Quantification of the raw PI images was performed on Photoshop CS2 by manually selecting regions of interest corresponding to CA1, CA3, and dentate gyrus (DG) of the hippocampus (Figure 6). Pixel intensity values were then recorded on Microsoft Excel. The absolute intensity was calculated using total pixel intensity in the analyzed regions. Values were recorded as a percentage of the values found in slices treated with NMDA (50  $\mu\text{M}$ ) for 3 h to induce maximal cell death.

## WESTERN BLOT PROTOCOL AND ANTIBODIES

After the treatments and cell death measurements, the slices were collected and homogenized by sonication. An aliquot of the homogenate was then taken to determine the protein concentration by the Bradford method (BioRad, Hercules, CA, USA). Samples were prepared for immunoblotting by dilution 1:1 in Laemmli buffer with 5%  $\beta$ -mercaptoethanol (BioRad). Twenty to forty micrograms of proteins were loaded onto 15% sodium dodecyl sulfate-polyacrylamide gel electrophoresis gels along with both Precision unstained and stained molecular weight markers to approximate protein molecular weights (BioRad). Following electrophoresis, proteins were electroblotted onto NitroPure nitrocellulose membranes (Osmonics, Minnetonka, MN, USA). Western blot membranes were washed with TBS-Tween (0.05%) and blocked with 5% non-fat milk. Two primary antibodies were used to detect proteins— 1:500 anti-BDNF and 1:10,000 anti- $\beta$ -actin antibodies. After washing several times with TBS-Tween, secondary antibodies were used – anti-rabbit for BDNF and anti-mouse for  $\beta$ -actin. Immunoblots were then visualized autoradiographically using enhanced chemiluminescence.

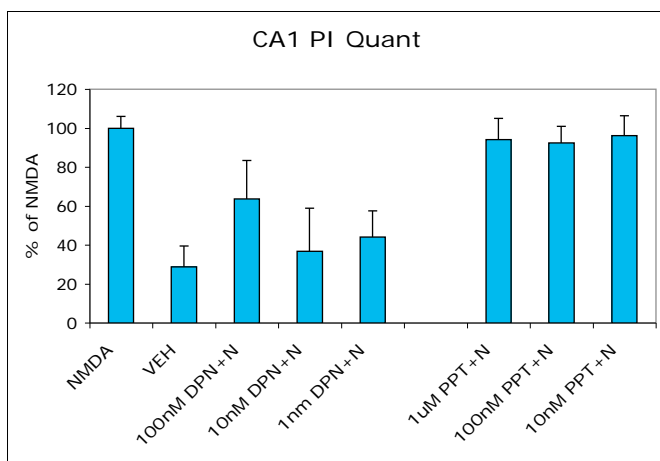
## ANALYSIS OF DATA

To quantify the images obtained from the propidium iodide (PI) uptake assay and Western blot film, optic density analysis was performed using Image J software. The three regions of the hippocampus quantified for the PI assay were CA1, CA3, and dentate gyrus (DG) (Figure 6). For the PI assay, results were reported as a percentage of NMDA-induced cell death. For the Western blot, results were reported as a percentage of vehicle control (i.e. BDNF production). The final calculations and graphs were obtained using Microsoft Excel.

## RESULTS

### E2-MEDIATED NEUROPROTECTION AGAINST NMDA TOXICITY IS DUE TO THE ACTIVATION OF ER .

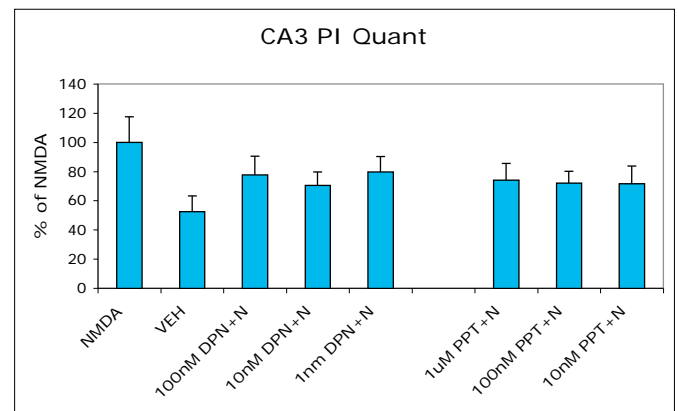
In order to determine whether activation of different estrogen receptors resulted in neuroprotection against NMDA toxicity, organotypic hippocampal slices were treated with each respective agonist (DPN for ER $\alpha$ , PPT for ER $\beta$ ) for 24 h before being treated with NMDA for 3 h. Analysis of PI uptake in slices treated under various conditions is shown in figures 7 through 9. The three major regions of the hippocampus are CA1, CA3 and dentate gyrus (DG) and were analyzed in the study (Figure 6).



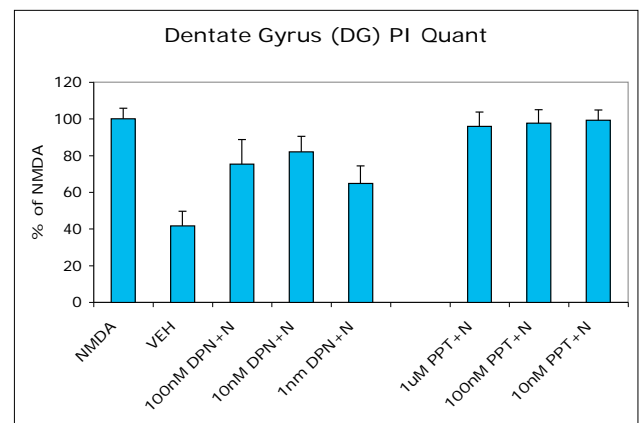
**Figure 7:** CA1 Propidium Iodide (PI) Quantification

Figure 7 illustrates the quantification of Propidium Iodide (PI) uptake in CA1. The results for this region of the hippocampus were the most statistically significant and robust

in comparison to the other regions. In comparison to NMDA treatment, which produces maximum cell death, DPN was shown to protect slices most effectively compared to PPT. In fact, 10 nM DPN, the ER $\alpha$  agonist, completely prevented NMDA-mediated neurotoxicity. This illustrates that 10 nM is the optimal concentration of the three tested – 100 nM, 10 nM, and 1 nM. Figure 8 shows the quantification for the CA3 region. However, we cannot draw a clear conclusion from the results, since both agonists do not seem to be neuroprotective. Figure 9 shows the quantification for the dentate gyrus (DG) region. The results are quite similar to those in Figure 6, and DPN was shown to protect slices most effectively. PPT, the ER $\beta$  agonist did not provide any protection against NMDA-induced cell death. In fact, results indicate even more cell death than in NMDA-treated slices.



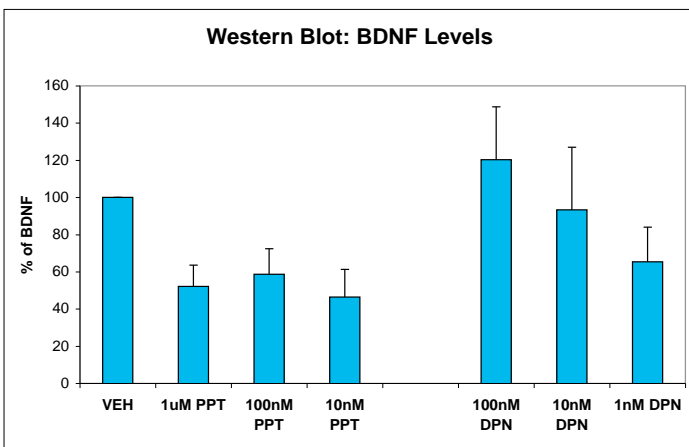
**Figure 8:** CA3 Propidium Iodide (PI) Quantification



**Figure 9:** DG Propidium Iodide (PI) Quantification

## ACTIVATING ER INCREASES BDNF PROTEIN LEVELS (PRELIMINARY RESULTS)

In order to further validate the role of ER in neuroprotection, we conducted a Western Blot analysis to determine the levels of BDNF induced by each agonist. The data shown in Figure 9 are preliminary, for they are based on only one experiment. We are currently working on repeating the experiment at least two more times to be able to draw a solid conclusion. According to Figure 10, adding DPN, the ER agonist, led to an increase in the amount of BDNF produced in a dose-dependent manner. Specifically, 100 nM DPN seemed to increase the amount of BDNF in comparison to vehicle. However, adding PPT, the ER agonist, seemed to decrease the production of BDNF. Once again, these results are preliminary for this dataset is based on one experiment.



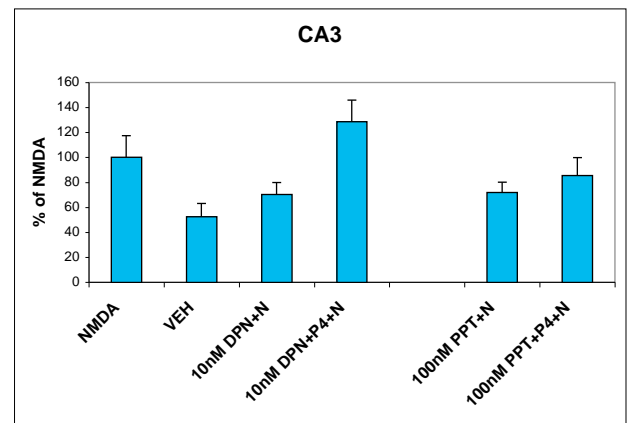
**Figure 10:** Western Blot: BDNF Levels (Preliminary)

## P4 REVERSES ER-MEDIATED NEUROPROTECTION AGAINST NMDA TOXICITY

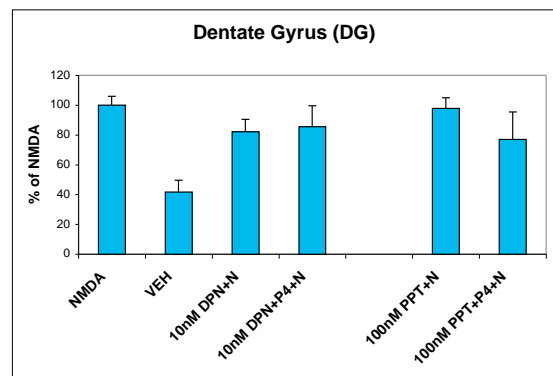
In order to determine whether P4 reverses the effects of ER or ER on NMDA toxicity, organotypic hippocampal slices were treated with either DPN or PPT for 24 h, and P4 was added to each respective medium during the final 4 h of the 24 h treatment period. Analysis of PI uptake in slices treated under those conditions is shown in figures 11 to 13. Similar to the previous analysis of PI uptake, the three major regions of the hippocampus (CA1, CA3, and DG) were examined. Unlike the previous PI uptake data from figures 7 to 9, only the optimal concentration was used for each respective agonist (i.e. 10 nM

for DPN and 100 nM for PPT).

Figure 11 shows the quantification for the CA1 region, indicating the neuroprotective effects of 10 nM DPN in comparison to 100% cell death, produced by NMDA. Interestingly, DPN provided a complete protection against NMDA toxicity. However, when P4 was added after DPN, the neuroprotection induced by DPN was completely eliminated. When 100 nM PPT was added, not much neuroprotection was induced and adding P4 had no effect. Figure 12 shows the quantification for the CA3 region. The results for the treatment with DPN were similar to those in the CA1 region, except that the level of neuroprotection and the level of reversal of neuroprotection by progesterone were not as drastic. However, contrary to the results from the CA1 region, 100 nM PPT was slightly neuroprotective, and P4 also slightly reduced these neuroprotective effects. Figure 13 shows the quantification for the DG region. Treatment with 10 nM DPN produced a small amount of neuroprotection, and P4 treatment had no significant effect on DPN-induced protection. PPT treatment did not provide any protection and there was no significant effect following the addition of P4.



**Figure 12:** P4 and agonists in CA3



**Figure 13:** P4 and agonists in DG



## DISCUSSION

One of the major characteristics of menopause is a precipitous decline in female gonadal hormones as well as cognitive deficits, suggesting a possible link between age-related hormonal deficiency and cognitive changes. More specifically, estrogen and progesterone (P4) have been deemed as the most prominent of the female sex hormones that become depleted during this stage in a woman's life cycle. Numerous studies have shown that the two hormones are neuroprotective against a variety of insults, when administered separately. However, when these two hormones are combined, progesterone has been shown to drastically influence estrogen-mediated effects. For example, while administering P4 has no effect on spine density, co-administering it with E2 prevents E2-induced increases in spine density (Murphy & Segal, 2000). Likewise, while E2 treatment led to neuroprotection against glutamate toxicity, adding progestins to E2 led to an increase or decrease in neuroprotection, depending on which type of progestins was used (Nilsen & Brinton, 2002).

In order to investigate the mechanism underlying these phenomena, researchers have begun studying the roles of specific subtypes of estrogen receptors, such as ER $\alpha$  and ER $\beta$  in synaptic plasticity, learning and memory and neuroprotection. While ER $\alpha$  has been shown to be necessary for some cognitive processes, there is a wealth of data indicating ER $\beta$  as being critical as well. Since there still exist discrepancies in literature regarding the relative contribution of these receptors, we cannot rule out one or the other as being the most critical receptor regarding enhancement of learning and memory.

In our study, we utilized agonists (DPN for ER $\alpha$ , PPT for ER $\beta$ ) for the two receptors in order to discover which receptor is essential for neuroprotection. Since the hippocampus is one of the first areas of the brain to suffer damage in patients with AD and is essential for learning and memory, we chose to use organotypic hippocampal slice cultures (OHSC) as our experimental model. The OHSC model maintains the cytoarchitecture and synaptic circuitry of the *in vivo* situation, but also allows us to accessibly administer soluble drugs as treatments for a functional analysis of hippocampal properties. The three main regions (CA1, CA3, and

DG) of the hippocampus were analyzed. Neuronal degeneration was produced by the neurotoxin NMDA. In hippocampus, each region responded differently to NMDA toxicity: CA1 was the most sensitive, followed by CA3, and DG (CA1>CA3>DG) (Davolio & Greenamyre, 1995). This high sensitivity in CA1 can account for the differences we observed in each region. Although results were inconsistent for CA3 and DG, results for CA1 have been consistent in clearly showing substantial modifications in cell death and neuroprotection.

The primary conclusion that can be drawn from the PI assay results obtained with ER agonists is that E2-mediated neuroprotection against NMDA toxicity is due to the activation of ER (Figure 7-9). To further validate this conclusion, we used Western blot to investigate the effect of agonists on BDNF production. By analyzing BDNF levels, we are able to indirectly measure the amount of neuroprotection induced by each respective treatment, assuming that an increase in BDNF levels results in neuroprotection. So far, we can speculate that activating ER $\alpha$  increases BDNF protein levels, while activating ER $\beta$  may decrease BDNF protein levels (Figure 10). Unfortunately, because our results for the Western blots are from one experiment, it is too early to draw a solid conclusion. When we added P4 with the optimal concentrations of each respective agonist, we found that P4 reversed ER $\alpha$ -mediated neuroprotection against NMDA toxicity (Figure 11-13). Thus, we can speculate that progesterone may counteract estrogen-mediated neuroprotection by decreasing levels of ER $\beta$  receptors and down-regulating ER $\beta$ -induced BDNF production.

Since we understand that progesterone counteracts estrogenic neuroprotective effects under certain conditions, such as against NMDA toxicity, it is crucial to inquire deeper into the mechanism behind such a phenomenon. By doing so, we can begin to develop a safe and effective means of HRT for postmenopausal women who are prone to neurodegenerative diseases.

## CONCLUSION

Based on previous studies indicating that P4 reverses E2-mediated neuroprotection against NMDA toxicity, and

P4 down-regulates ER mRNA and protein levels, this study aimed to understand the interaction between activation of ER and estrogenic neuroprotection by using specific agonists for ER and ER $\beta$ . Our results show that activating ER leads to neuroprotection against NMDA-induced toxicity. In addition, because it was previously shown that increased BDNF is correlated with E2-mediated neuroprotection, preliminary data suggests that activating ER increases BDNF protein levels. This further validates the primary conclusion that ER is indeed necessary for neuroprotection. When P4 was added following treatments with ER agonists, results from the PI assay showed that P4 reversed ER-mediated neuroprotection against NMDA toxicity, further bolstering the role of ER as opposed to ER. By unraveling the mechanism underlying the interactions between estrogen and progesterone, the primary female gonadal hormones, it is our hope that it will be possible to develop an effective hormone replacement therapy for postmenopausal women at risk for developing neurodegenerative diseases.

## ABBREVIATIONS:

AD: Alzheimer Disease

CaMKII: -Ca<sup>2+</sup>/calmodulin-dependent kinase II

BDNF: Brain-derived Neurotrophic Factor

DG: Dentate Gyrus

DPN: diarylpropionitrile

E2: 17  $\beta$ -estradiol

ER : Estrogen Receptor

ER : Estrogen Receptor

HRT: Hormone replacement therapy

KO: Knock Out

NMDA: N-methyl-D-aspartate

NMDAR: NMDA receptors

OHSC: Organotypic hippocampal slice cultures

P4: Progesterone

PCR: Polymerase chain reaction

PI: Propidium iodide

PPT: Propyl Pyrazole Triol

WT: Wild type

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# THE BELIEFS AND BEHAVIORS OF PHYSICAL ACTIVITY OF LATINA WOMEN



## Karina Ledezma

*Health Promotion and Disease Prevention  
Mentor: Lourdes Baezconde-Garbanati, Ph.D.,  
M.P.H.*

*Department: Institute for Prevention Research,  
Keck School of Medicine*

*McNair Scholars Program  
University of Southern California*

Studies show that leisure time physical activity of Latinas is lower than their white counterparts, consequently, predisposing them to complications in both obesity and diabetes. Concerned with low levels of aerobic exercise of Latinas during their leisure time, this study sought to identify and analyze the beliefs determinants influencing Latinas to engage in recreational physical activity, and thereby decreasing their risks of obesity and diabetes. The study focused on Latinas currently pregnant, pregnant within the past year, or those considering becoming pregnant in the near future. Women responded to a survey on physical activity, social support and acculturation. Findings indicated that most respondents had favorable views towards exercising, however, the level of house activities were significantly higher compared to recreational physical activity. Respondents indicated that their motivation to exercise is losing weight and staying healthy, however, obesity and diabetes were not recognized as chief contributors to a sedentary lifestyle. Although there was no significance difference between acculturation and physical activity, results showed that assimilation and integration into both American culture, and the country of birth of their parents, may be a potential indicator of increased exercise. Emotional social support, including encouragement and companionship, was also reported to have a potential relationship that may influence higher levels of physical activity of Latinas. With these findings, interventions should be implemented tailored to increasing level of physical activity of Latinas, as well as knowledge on its relationship to obesity and diabetes during their youthful years and in pregnancy. Interventions should furthermore focus on physical activity programs with encouragement, companionship, and advice on translating attitudes into behaviors in order to increase aerobic exercise during leisure time.

# THE PROBLEM AND ITS BACKGROUND

With more than five million meeting the definition of obesity, it is no wonder why today, “Americans are the fattest people on the face of the earth” [1]. If left unchecked, the associated press of The Los Angeles Times predicts that all Americans will one day be overweight [2]. The obesity epidemic has brought a devastating toll on the health of the United States. Today, 30% of Americans are defined as obese [5]. Much worse, the increasing rates of obesity are largely affecting minority populations that may be at risk for poor maternal and child health outcomes. Among all U.S. pregnant women, obesity has affected 36 percent of Mexican-American women [3].

Obesity is also spawning other health implications, including diabetes. Findings from the California Health Interview Survey show that obesity is an independent risk factor causing diabetes and cardiovascular disease, and the rates are twice as high in Latinos than non-Latinos [5,44]. The National Institute of Diabetes and Kidney Diseases and the American Heart Association estimated that 2.5 million Latinos, 20 years and older, were diagnosed with diabetes in 2005 [47]. Sadly, 31% of all Latinos diagnosed with diabetes are consequently affected by cardiovascular disease each year [6,47]. The relationship of obesity and diabetes is so interrelated and intercausal that Dr. Francine Kaufner, from Children’s Hospital in Los Angeles, has coined the term “diabesity,” which is now commonly used to refer to both epidemics highly prevalent in the Latino population.

There is a growing concern for the implications of obesity and diabetes in women of childbearing age. The March of Dimes Prenatal Data Center found that in 2003, 19.6 percent of U.S. women of reproductive age were obese, and in 2006, the rates skyrocketed to 60% among American women [4]. Obesity and gestational diabetes mellitus (GDM) are the most common complications of pregnancy for Latina women. Latina women are two to four times more likely to acquire GDM than in non-Latina women [7]. Maternal obesity can thus cause serious complications for the mother, as well as pregnancy-related problems for the child [4]. Mothers with Gestational Diabetes Mellitus (GDM) increase their risk of infant morbidity, obesity

and glucose intolerance in their children [8]. Additionally, the lifetime risk of diagnosed Type 2 Diabetes was reported to be 52.5% in Latina women born in 2000 [8,43]. Additionally, a past workshop held in 2004 indicated that almost 30% of women of childbearing age (20-39 years) are obese, but the prevalence is higher among Mexican American women [26].

Sarwer et al. found that obesity and GDM both contribute to the risk of large-for-gestational age infants and cesarean section [4]. The adversities of women with obesity and GDM may increase the risk of bearing infants with a weight greater than 4000 grams at delivery [19]. Mothers who develop obesity and GDM during their pregnancies increase the risk for their children being born with congenital anomalies, including skeletal malformations and cardiac defects. Maternal Diabetes may also lead to childhood and adolescent obesity and Type 2 Diabetes [20].

The increasing trends of “diabesity” in Latinos is significantly influenced by physical inactivity, an independent risk factor for cardiovascular disease and weight gain. Nevertheless, obesity and diabetes are widening the gap of prevalence among Latina women of childbearing age [9]. The U.S. Census Bureau of Hispanic health stated that in 2003, not only did Latina women produce 22% of all births in the U.S, but they are even predicted to compose of the largest minority group in the U.S by the year 2030 [10,44]. The American College of Obstetricians and Gynecologists (ACOG) 2002 guidelines recommended that pregnant women should engage in 30 minutes or more of moderate exercise on most days of the week [11]. Adult Latina women are not meeting those guidelines of adequate physical activity in the U.S. and the levels of physical activity during pregnancy are even lower for these minority women compared to their white counterparts. The Behavioral Risk Factor Surveillance System reported that pregnant Latina women were 40% less likely to meet the ACOG recommendations for moderate physical activity [12,46].

Physical activity is measured by domains including leisure time, sports, occupational, housework, active transport, moderate and vigorous intensity. Epidemiological evidence shows that physical inactivity is an independent risk factor for chronic disease and obesity [13]. In addition, Latina women report lower

levels of physical activity during pregnancy [9]. Chasan-Taber et al. found that higher levels of prepregnancy and midpregnancy household/caregiving activities, and midpregnancy sports/exercise were positively associated with a reduced risk for GDM in Latina women. Unfortunately, household chores and child care activities most commonly reported by Latina women are ranked as the most frequent barrier to recreational physical activity [9].

It is estimated that 40% of Latinos have a high prevalence of physical inactivity, especially in the domain of leisure time in comparison to non-Latino whites [15]. It is probable that Latinos may be engaging in other forms of physical activity, such as occupational and household duties, which may not be accounted for by leisure-time physical activity measures commonly conducted by most researchers. Data shows that 65% of Mexican American men and 74% of Mexican American women participate in little or no leisure physical activity [16]. Data from the Health—Promoting Lifestyle Behaviors of Spanish-Speaking Hispanic Adults showed that physical activity was found to be the lowest behavioral dimension of health behaviors in Hispanics [16].

Concerned with the sedentary lifestyles of young Latina women and the health outcomes of their children, the intent of this study is to furnish young Latina women with awareness into increasing their level of physical activity to decrease their risks of obesity and diabetes. With the intent of uncovering the relationship between physical activity and the various barriers and facilitators preventing Latinas from exercising, potential implications for future studies can enlighten Latinas to exercise more in the domain of leisure physical activity.

## REVIEW OF RELATED STUDIES AND LITERATURE

The U.S. Department of Health and Human Services affirms that physical activity is imperative to maintain good health, assist in psychological and emotional well-being, and even decrease the risk of obesity and diabetes. The CDC/National Center for Health Statistics by sex and race/ethnicity

confirmed that from 1997-1999, 8.2% Latinos were diagnosed with diabetes compared to 4.1% of whites [21]. As a result, exercising may become an essential component to decreasing the high prevalence rate and risks of Type 2 Diabetes in the Latino population.

In their study, Larson-Meyer and Dawnine Enette found that aerobic exercise during pregnancy offers significant benefits, such as improving strength, energy and self-esteem there are crucial for mothering activities, as well as decreasing bone mineral density (BMD) to prevent bone loss from lactation [22]. However, most significant to the study was that a “mother’s participation in regular exercise after childbirth may encourage regular physical activity in her offspring” both in frequency and level of activity [22]. Their review of the literature found that “children of active mothers were two times as likely to be active,” which may account for the sharing of physical activities among the family members, and parental support of exercise [22].

## BARRIERS

Surgeon General’s Report on Physical Activity and Health reported that physical inactivity is influenced by low socioeconomic status and race/ethnicity. Latina women are among all minority adolescent and youth to have lower rates of physical activity than their non-Latino white counterparts [23]. Balcazar et al. found that pregnant Mexican American women who become acculturated into US society and slowly neglect their traditional Mexican culture may risk exposure to some physical and psychosocial perils [24].

Physical and social environment has thus been found to inhibit exercising in Latinos. Poor neighborhoods are strongly linked to unsafe environments, causing the a large percentage of Latinos to refrain from exercising outdoors. The March 2000 U.S. Census Bureau reported that 22.8% of Latinos lived in poverty [23]. Hence, their perceptions of safety and fear of crime highly correlate with physical inactivity. Amesty’s study found that some socioeconomic groups with no cars may be more physically active, however are affected most by diseases such as diabetes, where physical activity is suppose to have a positive impact [23].

Embedded within the environment is poverty, literacy, and a safety context that may be attributed to the sedentary

rates in Latina women. Studies show that strong relationships between poverty and physical activity are significantly affected by low levels of education, unemployment, lack of economic resources, and lack of social networks [23]. Crime and sedentary behaviors are related to powerlessness and hopelessness in the low income communities of the Latino population [23]. Eyster et al found that minority women reported feeling afraid of crime and used that as an excuse to not exercise [25].

Despite the prevalence of low income, education, and unemployment in most Latino communities, studies have also found correlations between Latinos and their awareness of indoor facilities for exercising [23]. Apart from the frequent socioeconomic disadvantages and discrimination, other significant barriers in Hispanic health include lack of health insurance and access to health coverage, and “missed opportunities” in which Latinos commonly make the mistake to heed subtle indicators in their health that eventually lead to widespread crises in the Latino community health [26]. Financial access, time availability, scheduling and keeping appointments may also indicate structural barriers preventing low-income pregnant women from receiving prenatal care [27].

## ACCULTURATION

With the recent increase of immigration into the U.S., Latinos are not only increasing the wave of first and second generation adolescents and young adults [28,46], however, Latino children born in the U.S. are accounting for more than 50% of all births in California [29,44]. It is therefore important to look into the dimension of acculturation<sup>2</sup> influencing healthy lifestyle behaviors in Latinos. Crespo et al. found a positive association between higher degree of acculturation and obesity, influenced via the social and cultural factors of physical inactivity and cardiorespiratory fitness (VO<sub>2</sub>max) [30]. Weitz’s study also discovered that fitness levels were higher in least acculturated Latinos [31]. Data on the determinants of acculturation level and physical activity shows that despite country of birth, Spanish-speaking Mexican Americans engage in lower levels of leisure time physical activity than English-speaking Mexican Americans [33]. One study found that Latinos who migrated to the U.S changed their definition of time and work. For instance,

informants reported feeling that they now have to work more hours in order to survive in U.S, therefore, leaving less time with family and leisure exercising [23]. And most immigrants end up adopting the concept of “time is money” [23]. Cantero et al. found that women were more likely to exercise in higher acculturation groups, however, these subjects also had higher socioeconomic status and higher literacy levels [32].

## FACILITATORS

For Latinas of childbearing age, a tangible social network may be a positive determinant for healthy behavior, including exercising. It is said that the extended family has an integral role in the traditional daily lives of Latinas [38]. McGlade et al. found that the intergenerational knowledge transferred from one generation of mothers to the next, including sisters and extended family members, offer advice on healthy behaviors [39]. Mexican women often take responsibility for the health needs of their intimate and extended family members [40], while Mexican fathers range in their positive role during the birth outcomes from highly supportive to minimal effects [41].

There are social and physical environmental barriers that preclude healthy behavioral proclivities in Latina women [38]. Evenson et al. investigated six Latino focus groups to identify environmental policy barriers, including transportation, limited facilities, costs, and safety of opportunities and places to exercise. Their study also attests to the significance of having sociocultural support from husband and family as a facilitator for physical activity, and indicates the absence of community involvement and gender roles in activity to increasing exercise among Latina immigrants [42].

Social support is categorized into three chief components: emotional (encouragement, criticism), informational (information and guidance), and instrumental (maternal, financial, physical resources) [38]. In 2000-2001, Thornton et al. conducted a study in southwest Detroit, where they endeavored to find how the role of social support influenced the physical activity-related beliefs of recently pregnant and postpartum Latinas and their children. Through a community-based intervention program called Promoting Healthy Lifestyles among Women/Promoviendo Estilos de Vida Saludables para

Mujeres [38]. The conclusions drawn from their study were that pregnant and postpartum Latinas respond favorably towards the informational and emotional support to weight, and physical activity, provided by their husbands. Their husbands provided the kind of informational social support, in which most women were encouraged from gaining excess weight to avoid being “fat,” and maintain attractive bodies [38]. Other participants were encouraged by their husbands from endeavoring to watch their weight in order to have “big” or healthy babies [38].

In addition to primary guidance from their husbands, most pregnant participants received beneficial informational support from their mothers. Very little advice was reported given directly from the physician because most women claimed they learned beneficial informational support about maintaining healthy weight from their mothers [38]. Informational support also came from female in-laws who advised pregnant women to eat healthier foods, including fruit, beans, lentils, vegetables, etc, while husbands associated holistic health with eating home-made meals instead of unhealthy meals “in the streets” [38]. Overall, husbands and family relatives provided informational support on increasing physical activity, however, they encouraged limited exercising, such as lifting small weights to prevent from harming the child and mother’s health [38]. Husbands were the predominant source of instrumental support for their wives to engage in exercise by walking in the park, and emotional support to accompany them in playing sports [38].

Additionally, the absence of instrumental support via childcare acts as another barrier for pregnant and postpartum women, because most women reported that not having their husbands watch their children provided an obstacle for them to engage in exercise, especially when husbands discouraged strenuous physical activity for them to endeavor [38]. From this study, informational, emotional and instrumental social support provided by family, especially mothers living in the U.S., and husbands are facilitators in aiding beneficial assistance to pregnant and postpartum women to refrain from gaining excess weight and engaging in physical activity.

## HYPOTHESES

1. Latina women do not believe that exercise is important, and

do not engage in recreational physical activity during their leisure time.

2. Non-Acculturation to the United States is associated with lower levels of physical activity.
3. Lower levels of emotional social support, such as encouragement and companionship, will be a strong indicator of decreased levels of physical activity.

## RESEARCH QUESTION

What are the beliefs and determinants of physical Activity of Latina Women living in Los Angeles?

## PURPOSE OF THE STUDY

The intent of this study is to uncover the relationship between the beliefs and determinants of physical Activity of Latina Women. The study will identify and analyze the barriers and facilitators enabling or debilitating Latinas from engaging in recreational physical activity during their leisure time. Concerned with the sedentary lifestyles of young Latina women and the health outcomes of their current or prospective pregnancy and children, the study also aims to furnish Latinas with awareness of how exercise contributes to behavior preventive towards “diabetes.”

This study focuses on Latina women (18 years and older), first and second generation. These women range from young adults of childbearing age to elderly women who have migrated to the United States from their teens. The women are an at-risk cohort, in critical stages of their lives to adopt healthy behaviors in exercising, if they haven’t done so. Therefore, it is crucial to tailor to Latina women to extend their longevity and health outcomes during their youth, current and prospective pregnancies, as well as the future of their children. Now is the time for them to adopt healthy behaviors through exercise to decrease their risk of obesity, Gestational Diabetes Mellitus, and Type II Diabetes Mellitus.



# METHODOLOGY

## SAMPLE

The data described in this research is a cross-sectional, quantitative study on the beliefs and motivations of physical activity of Latinas of childbearing age. The participants of the study were adult Latina women, 18 year of age and older, residents of Los Angeles. These areas were selected because the predominant population is Latino background. The women in this small generation gap were either pregnant, pregnant within the last year, or were considering and or planning to become pregnant in the near future. Respondents completed a survey translated both in English and Spanish, either online or in person.

## DESIGN AND MATERIALS

The study implemented a questionnaire in English and Spanish. The questionnaire incorporated items from three pre-existing measures: The Physical Activity Questionnaire, Physical Activity and Social Support, and the AHIMSA Scale. Items were classified into selective themes including the level and intensity of physical activity, social support and acculturation.

The Physical Activity Questionnaire and the “How Physically Active Are You?” Survey were developed by the San Diego Prevention Research Center. The first items on the “How Physically Active Are You” Survey used scales derived from the Rapid Assessment of Physical Activity (RAPA1 and RAPA2), which evaluated the level and intensity of physical activity. Participants were asked to rate and indicate the level of light, moderate or vigorous exercise they engaged in on a daily basis. The first 7 items (RAPA 1) were classified under Aerobic measurement, which scored the responses as either sedentary, under- active, under-active regular, or active. Participants who responded “yes” only to the question “ I rarely or never do any exercise,” were scored under sedentary. Those who responded positively to doing some light or moderate physical activities at almost every week were scored as under-activity. Those who agreed to engaging only in moderate exercise less than 30 minutes every day of the week, or vigorous exercise less than 20 minutes every day of the week were scored as under-active

regular. Participants who were scored as active committed to 30 minutes or more of moderate exercise everyday of the week, or 20 minutes of vigorous exercise every day of the week. The items that followed were from RAPA2, which measured strength and flexibility of physical activity.

Items from the Physical Activity Questionnaire were the next set of pre-existing measures in the survey. The Physical Activity Questionnaire, divided into three sections, was designed to find the physical activity in the everyday lives of the Latina respondents. Section A measured “Home Activities.” The questions pertained to activity patterns in and around the home. Respondents were asked to rate their involvement in each home activity on within the past 12 months, from “none” to “more than 4 hours a day” on a regular weekday and weekend. Section B items were relevant to “Activity at Work.” Section C contained items related to “Recreation.” These questions reflected how they spend their leisure time within the past 12 months. Respondents indicated the number of times they spent swimming, walking for pleasure, running, jogging, watering or mowing the lawn, impact aerobics, playing sports, and other conditioning exercises. Choices range from “none” to “6 times a week or more.”

The next sample of questions pertained to the Physical Activity and Social Support, also developed by the San Diego Prevention Center. Items measured the level of involvement, encouragement and support received from mothers, father of child, friends, and or other relatives. Respondents indicated how strongly they feel about the amount of support they receive in relation to companionship, advice, and or encouragement to exercise more frequently.

Participants were then asked questions regarding their level of acculturation. The AHIMSA2 scale was used. The AHIMSA scale measured their level of assimilation, integration, ethnic interaction, cultural heritage, and ethnic factors from the perspective of the female respondent. The answer choices were the same for all 8 items: the U.S. (indicating assimilation), the country my family is from (indicating separation), both (indicating integration), and neither (indicating marginalization).

Items that follow asked questions pertaining to family history of diabetes and GDM. These questions were used to help in assessing if the female respondents are at greater risk

of acquiring diabetes, insulin intolerance, and or obesity during their youth, or during and after a pregnancy. Respondents were also asked to indicate their age, level of highest education, average annual income, date and place of birth. The sociodemographic questions were used to assess any correlations in the amount of economic resources, and other environmental and cultural factors that may act as barriers in the health of the young women and their future pregnancy.

The Body Mass Index (BMI) asked respondents for their weight and height, was collected by self-report. It was assumed that the women respondents recruited via email indicated their proper weight and height in the online survey. After proper adjustments and measurements, the researcher found the corrected BMI level by applying the National Institute of Health's calculation of BMI. The standard definition from the NIH corrected the levels of BMI context in all the women, including those found with average weight, overweight, and obese. A distinct BMI scale was used to correct for the weight and height measurements of the women who were currently pregnant. This study implemented BMI into the questionnaire to help find correlations between level, amount, motivation, and proclivity of physical activity with the risks for overweight and obesity during their youth, current pregnancy, and or future pregnancies.

The study implemented chi-square analyses for RAPA1, Physical Activity and Social Support, and the AHIMSA scales. SPSS was used to draw proper and potential relationships between recreational physical activity during leisure time, and the level of acculturation and social support.

## **RATIONALE BEHIND THE SAMPLE SIZE AND CRITERIA**

The focus of the study is to investigate the determinants of sedentary behaviors in most Latina women, and their beliefs and motivation influencing them to refuse engaging in recreational physical activity. The study will draw conclusions based on their attitudes and perceptions to suggest improvements for intervention programs tailored to increasing exercise in Latinas.

# **CONCLUSION**

## **RESULTS**

The study collected a total of 114 respondents in the distribution of the survey. The means and standard deviation behind the sociodemographic backgrounds of the study are displayed in Figure 1 and Table 1 in the Appendix (throughout this paper, for all figures and table data mentioned, refer to appendices included at the end). Out of 64 of the women who responded to their birthplace, 27.2% were foreign-born migrants from Mexico. The next largest number were those born in the U.S., representing 23.7% of the respondents. Only 3.5% were from Central American and 1.8% were from South America. Tables and Figures, included in the Appendix, further illustrate the results of this study. Findings reveal that out of 97 women, the mean age was  $25 \pm 7.22$ , indicating that almost all of the respondents were of childbearing age. The collected data from the survey also showed that the mean height was 5 ft 3in.  $\pm$  2in., and the mean weight was 148 lbs  $\pm$  31 lbs. This Table also illustrates that the mean BMI for non-pregnant women was  $25.28 \text{ kg/m}^2 \pm 7.59 \text{ kg/m}^2$ , while the BMI for pregnant women was  $27.81 \text{ kg/m}^2 \pm 4.26 \text{ kg/m}^2$ . The mean BMI for both non-pregnant and pregnant women indicates that the respondents fall under the categorical range of being labeled "overweight," which is defined as having a BMI between 25–29.9  $\text{kg/m}^2$ . Figures 4 depicts a comparison of the BMI from the non-pregnant and pregnant respondents, side by side, to draw an illustrative comparison of the high and unhealthy BMI levels in both groups. Remarkably, the BMI was higher in those who were non-pregnant than those who were pregnant.

The pregnancy status of the respondents was as follow: with a high percentage of 78.1%, most respondents were not pregnant, while 12.3% were pregnant within the past year, and 9.6% were currently pregnant. The sociodemographics are further detailed in Table 3, revealing that the majority of the respondents only completed a high school education (47.4%), and were of low-income (47.4% earned less than \$15,000). The results also showed that most respondents preferred speaking both English and Spanish (58.8%), while Spanish was the second most preferred language spoken (14.9%). Figure 2 illustrates that

although 10.5% of the respondents indicated that they had a family history of GDM, or maternal diabetes, a high 37.5% had a family history of diabetes.

Respondents were categorized based on the questions they answered pertaining to the level, intensity and amount of physical activity. Table 5 details the frequencies and percentages of the physical activity levels in the Latina respondents based on their aerobic activity. Figure 5 also demonstrates the four categories in which respondents were placed under based on their level and amount of aerobic exercise, which are as follow: Active, Under-Active Regular, Under-Active and Sedentary. Chi-square analysis showed that there was significant differences between all four groups. An estimated 38% of the women self-reported that they were in the Active category, agreeing to committing to either 20 minutes of vigorous exercise everyday of the week, or 30 minutes of moderate exercise everyday of the week. Due to the fact that this is self-report, scoring may have been skewed and inaccurate. It is highly probable that women may have perceived other types and domains of activities as inclusive to their daily physical activities, including house ad occupational activities apart from leisure exercise. Only 112 respondents who completed the physical activity sample items were included in the calculations and analyses of the data. For those who responded with “I do 30 minutes or more per day of moderate physical activities, 5 or more days per week” or “I do 20 minutes or more per day of vigorous physical activities, 3 or more days per week” I scored under Active. For those who responded with “I do moderate physical activities every week, but less than 30 minutes per day, 5 days per week,” or “I do vigorous physical activities every week, but less than 20 minutes per day, 3 days per week” I scored as Under-Active Regular. Only 18.4% of the women fell in this category. The next largest group of women were classified as Under-Active, which accounted for 28.1% of all 112 respondents who completed the sample items under the physical activity scale. These women responded to “I do some light or moderate physical activities, but not every week” or “I do some light physical activity every week” I scored as Under-Active, which accounted for 28.1% of the women. For those who responded to “ I rarely or never do any physical activity” I scored as being Sedentary. Women under the Sedentary group

composed of the smallest group of respondents for the physical activity sample items.

As mentioned in the methodology, respondents also answered items pertaining to the level of acculturation they most reflected. Results from the AHIMSA 8 item scale showed that the majority of the respondents answered that they have developed ideas and a behavioral lifestyle reflecting both the culture of the U.S. and the country of their parents’ origin. The respondents were thereby classified under the level of acculturation in which they answered most of their responses to. Figure 6 illustrates the percentages of acculturation levels that described the Latina respondents.

Out of 100 respondents, analyses of the frequencies and percentages for the acculturation items showed that 60.5% of the respondents were in the Integration category. Table 6 depicts the categorical responses. An estimated 19% answered the “U.S.” to most of the items, and were thereby classified under Assimilation. For those who answered the “country where my parents are from” to most of the questions were scored as Separation. Hence, only 7% were placed under Separation, while 0.9% descriptively met the category of Marginalization.

Ninety-nine out of 114 of the respondents answered the item questions under Physical Activity and Social Support. Analyses of the frequencies and percentages pertaining to these items showed that 43% of the participants had low social support levels, and 35% had strong social support. Strong social support indicated that respondents strongly agreed to questions such as: “Chances are I would exercise more if I had a friend or family member to exercise with.” They also indicated that they had friends or relatives who encouraged them to exercise, as well as had at least one friend or relative who would commit to exercising with them, and or preferred to exercise and walk outside only when they had someone joining them, In addition, 8.8% indicated “neither” or “none” for social support. Table 7 and Figure 7 reflect these categorical responses.

## **HYPOTHESIS 1**

The first part of Hypothesis 1 was rejected. As stated in the first Hypothesis, the researcher believed that the majority of Latina women do not regard exercise as important and essential

for a healthy lifestyle preventive towards obesity and diabetes, and are therefore engaging in low levels of physical activity during their leisure time. When asked, “How important is exercising for you?” 69% of the respondents indicated that they believed exercise is either “very important” or “important” to them. Only 18.4% disagreed with the statement. In contrast, the second part of Hypothesis 1 was supported by the responses of the survey. Consequentially, leisure time physical activity was significantly low. There were only 4 categories in recreational activity that had the highest rates under leisure time physical activity, which included the following: walking for pleasure, dancing, watering or mowing the lawn or garden, and home and car maintenance activities. Table 5 illustrates the categories and their percentages. Figure 8 further depicts the low percentages of recreational physical activities in the Latina respondents. An estimated 17% of the respondents indicated that they walk for pleasure 2 to 6 times a week, while 9.7% said they walk for pleasure only once a month or once a week. Under the category of dancing, which included disco, ballroom and salsa, 13.1% said they commit to this activity once a week or once a month, while 8.1% agreed to engaging in dancing 2 to 6 times a week. Eleven percent responded that they commit to watering and mowing the lawn or garden, and 2.7% said they do this 2 to 5 times a week. An estimated 9% said they engage in activity related to carpentry, home and or car maintenance one a week or once a month, and 7.1% said they do this 2 to 6 times a week.

The low levels of recreational physical activities in the Latina respondents may be explained in the higher rates of activities in and around the home that most respondents reported they engaged in. These results are detailed in Table 6. As a result, reports on House Activities were higher than the items under Recreational Physical Activity. According to respondents, 57% agreed to spending 1 to 3 hours a week shopping for food and groceries, while 21.9% engaged in this activity less than one hour a week. An estimated 46% reported spending 1 to 3 hours a week doing laundry and ironing, and 22.8% reported spending less than an hour per week. Another 45.6% reported spending 1 to 3 hours a week, in cleaning the house, while 17.5% committed to this 3 to 6 hours a week. Additionally, 36% engaged in preparing food, cooking and washing in the home 1 to 3 hours a week, and

28.1% committed to 3 to 6 hours a week. Thirty-nine percent shopped or browsed for toys and clothes 1 to 3 hours a week. Lastly, 18.4% of the women reported spending more than 15 hours a week caring for pre-school children or babies, not as a paid employment.

Respondents were then asked the survey item: “What is your motivation to exercise?” Figure 10 depicts the responses. Most responded to both being healthy and losing weight (65% and 54%, respectively). Several women responded separately the category of “to prevent obesity” or to the category “to prevent diabetes” but rarely did they check off both (39.5% and 31.6%, respectively). Fortunately, 54% respondents agreed enjoying lifting weights while exercising. Only 6.1% answered unfavorably towards having no motivation and or enjoying exercising.

## HYPOTHESES 2

Analysis of the findings did not support Hypothesis 2, which predicted to show a favorable relationship between low levels of acculturation and low levels of recreational physical activity. Table 8 illustrates the relationship. For the items in both scales of Physical Activity (RAPA) and Acculturation (AHIMSA), only 99 or 86.6% of the women responded to all questions under both measures, were included in the calculation and analyses of the data. The Integration group had the highest levels of aerobic physical activity, however, chi-square analysis showed this was not statistically significant ( $p = 0.256$ ). Although there was no significant differences, there was a potential relationship between Active and Integrated, as well as Active and Assimilated. As a result, the high frequency of women who reported being Active, were also highly acculturated into American culture, hence, acculturation may represent a potential indicator of higher levels of exercise. Twenty women were thereby both Active and Integrated into the U.S. and the country of their parent’s origin. The next largest group of Active women fell under the Assimilation group, accounting for a frequency of 10. The highest number of respondents were placed as both Integrated and Under-Active. This constituted a frequency of 24. Results thus showed that the most active people were in the Integration and Assimilation group. Additionally, there were 13 women in the Integration group who reported

being Under-Active Regular, while 11 respondents composed the Sedentary group. As for the Separation group, there were only 2 respondents who were Active, and 3 who were Sedentary. There were, however, no respondents categorized under the Marginalized group who also reported being Sedentary or low physical activity levels.

### **HYPOTHESIS 3**

Hypothesis 3 on Physical Activity and Social Support was rejected. There was no statistical significant differences illustrating that higher levels of recreational physical activity are influenced by higher levels of emotional social support. Results, however, showed that emotional social support, including encouragement and companionship to exercise, may be a potential predictor and determinant of increased levels of leisure exercise. Chi-square analysis showed that strong emotional social support had the highest number of Active women (frequency of 18), yet not statistically significant ( $p=0.155$ ). Another 18 of the respondents reported that they were both Under-Active and had low social support levels. Additionally, there was also a high frequency of respondents who had low social support and were Under-Active Regular, which accounted for 11 of the women. While 10 women were classified as Active with low social support, there were 9 women who were Sedentary and had low social support as well. As for those with high emotional social support levels, only 6 were Sedentary, 8 were Under-Active, and another 8 were Under-Active Regular. Results thus showed that a majority of the respondents were either Active with high social support, and Under-Active with low social support. The levels of strong and low social support, in conjunction with physical activity are described in Table 9.

## **DISCUSSION**

The purpose of the study sought to identify and assess determinants and beliefs that may predispose Latina women to exercise more or less during their leisure time. The characteristics of the sample population indicated that most non-pregnant and pregnant women have a BMI over 25 kg/m<sup>2</sup> ( $25 \pm 8$  kg/m<sup>2</sup> and

$28 \pm 4$  kg/m<sup>2</sup>, respectively), and consequently classifying them as “overweight” under the definition of obesity. It is therefore of the utmost urgency for this his cohort of Latina women to engage in more leisure time physical activity, aside from house activity. Not only were the respondents overweight, however, an estimated 38% had a family history of diabetes, and 11% had a family history of GDM. The complications of obesity and diabetes are thus increasing their risks for acquiring one or both diseases in their near future, as well as predisposing poor behavioral proclivities in their youth for childhood obesity and Diabetes Mellitus.

For the focus of the study, sociodemographics were not accounted for into the analysis of physical Activity of Latina Women. However, it should be acknowledge that the majority of the women were of low-income, low educational backgrounds. Hence, the physical and structural environment may play an essential role in providing enough economic resources to these women, including gym facilities, adequate prenatal care and value from physicians and health care professional, as well as safe parks and neighborhoods. The environment thereby encompasses a tangible arena where women can engage in exercise.

Moreover, with a mean age of 25 years, the results indicate that the majority of the women were of childbearing age. Thus, these women are at a crucial point in their lives to begin developing healthier behaviors in becoming more physically active. Based on the findings of this study, we hope to initiate an intervention program based on obesity and diabetes prevention tailored to this sample population. Due to the fact that several Latinas do not engage in sufficient recreational physical activity, future interventions should focus on increasing exercise during leisure time. However, we should also acknowledge that most Latina women commit to higher rates of house activities, including caring for pre-school children and babies, shopping for food/groceries, mowing and watering the lawn/garden, and most importantly, cooking, washing and doing laundry. As a result, interventions should recognize that the majority of both foreign-born and American born Latina women may have a predisposition to engage in a plethora of physical activities in the home, which is certainly not accounted for in several studies that deal with physical activity in general.

In addition, because an estimated 70% of the women of this study had favorable views towards the importance of exercise, this allows a hopeful future for further interventions to launch tailored programs for Latina women to translate their positive attitudes and perceptions about exercising into behaviors preventive towards obesity and diabetes. There is also, however, an imperative urgency to increase the awareness and prevention of obesity and diabetes in Latina women. Although the study showed that Latina women regard physical activity as essential for a healthy life, the problem remains in that the majority do not engage in the recommended guidelines of 20 or more minutes of leisure time physical activity a day. The results indicated that most women self-reported that they were Active, accounting for a high 37.7%, yet the highest amount of leisure physical activity was “walking for pleasure” (16.6%), in comparison to the 57% who reported shopping for food/groceries, and another 45.6% reported both cleaning the house and doing laundry/ironing at least 1 to 3 times a week. As a result, we believe that most of the women classified as Active, which indicated that they spent either 30 minutes of moderate exercise or 20 minutes of vigorous exercise everyday. Hence, these reports may therefore offer an explanation to why there was a significantly higher percentage of women engaging in house activities than recreational physical activity, and thereby classifying themselves as Active. Additionally, only 28.1% reported being Under-Active and 18.4% reported being Under-Active Regular, continually indicating that the rates of physical activity are low in the Latina respondents.

Furthermore, results showed that acculturation may be a potential determinant indicating increased physical activity during leisure time in Latina women. Although chi-square analysis did not indicate a statistical significant difference between higher levels of physical activity and acculturation ( $p = 0.256$ ), the largest sample of Active women were Integrated, signifying being highly acculturated. As a result, the most physically Active women were highly integrated into the cultural beliefs and behaviors of both the United States and the country where their parents were from. The second highest number of Active women were also highly assimilated into the culture, beliefs and behaviors traditional to the United States. These

results clearly indicate that the American way of thinking and living plays a strong determining factor for women to engage in recreational exercise. A possible explanation can be that as most Latinas are integrating and or assimilating into the American culture, they are beginning to recognize that they need to engage in more aerobic physical activity. Hence, the media in the United States, such as billboard and commercial advertisements, may be translating positive and favorable views towards exercising, including the use of gym facilities prevalent in and around Los Angeles. Because most the respondents in this study were foreign-born from Mexico, it seems as though many have already integrated the belief that exercising is crucial for maintaining a healthy life and losing weight. This supports the results for why 64% of the women reported being motivated to exercise because they wanted to be healthy, while 65% reported they wanted to lose weight. Sadly, 39.5% of the women were motivated to exercise to prevent obesity, and a lower 31.6% reported exercising would help them reduce risk of diabetes. Nevertheless, this accentuates the need to increase the promotion of exercising in the U.S.

However, contrast to the 20 Active women placed in the Integrated group, there were 24 Under-Active women who were also Integrated. While the largest sample of Active women were Integrated, the largest sample of Under-Active women were also Integrated. As a result, although the American media may offer an arena of promotions to utilizing the gym, the high numbers of Under-Active and Integrated women illustrates that acculturation may pose a problematic towards exercising. It is possible that as more Latina women are becoming acculturated into American life, they are developing poor nutritional habits and behaviors, such as over-eating, large portions, and over-consumption of fast-food chain restaurants, which are not only highly prevalent around the United States, yet they have become an integral part of American eating and way of life. Nevertheless, it is probable that highly acculturated Latina women are relying on public and car transportation to travel to and from work, home, etc., instead of engaging in walking, as most do in their native country. It is also important to account for the healthy eating habits integral to a large majority of Latina women in their native Latin country. These healthy eating habits include a

high fiber nutrition of fruits and vegetables, which is replaced by high, caloric fat diets and rich-sugary foods, as they accustom to the fast-paced life of stress, over-eating, and over-consumption of easy accessible foods most common in the United States.

Findings also indicated that 18 women, who we categorized as meeting the requirements for being aerobically Active, also had strong emotional social support. This accounted for the largest number of Active women, in comparison to those with low emotional social support or none at all. Although not statistically significant, chi-square analysis showed that the highest number of Active women (engaging in more than 20 minutes of moderate exercise a day or 30 minutes of vigorous exercise a day), reported having a high amount of emotional social support ( $p = 0.155$ ). These results signify that high levels of emotional social support may have a potential relationship with high levels of recreational exercise. The study, however, only focused on emotional social support, which primarily accounts for companionship and encouragement, therefore, the items in the survey reflect only within these parameters. Hence, the women who reported engaging in high levels of physical aerobic activity had at least one friend or relative who would commit to exercising with them. These women also reported having friends and family members who constantly encouraged them to go out and exercise.

Contrast to the 18 Active women who had high emotional support, there were 10 Active women also reported low social support. This high frequency may account for other forms of social support not including emotional social support, such as informational (advice) and instrumental (monetary incentives). Additionally, results showed that women who reported low-levels of social support were either Under-Active Regular or Under-Active, which indicates that they only commit to some moderate exercise, but not every week. Hence, because 18 women with low social support were Under-Active, this reinforces the idea that low levels of social support may lead to decreased levels of exercise. These findings indicate that psychosocial factors may play an influential role for exercising more, however, they do not explain why most Latina women feel that they need to be accompanied or encouraged by somebody in order to engage in exercise. A possible explanation can be the most Latina women

are significantly influenced by the strong social bonds of their Latin culture, and therefore fear initiating something new, such as exercising, without the support, approval, or encouragement from friends and family members. Women who exercised more, most likely had a high social support network of friends and or relatives, who may be constantly encouraging and or accompanying them to find some leisure time to exercise.

Another possible explanation can be that Latina women are simply not being encouraged enough or given advice to exercise more by their friends and family members. Consequently, they may not be engaging in aerobic exercise because they do not find time to do so. Considering the fact that most reported engaging in higher house activities than recreational physical activity, such as watering/mowing the lawn or caring for children, it is probable that time is hindering them from engaging in leisure time physical activity. Nevertheless, most may feel the need to be encouraged and motivated by a friend or relative in order to trade in their house activities for some time of aerobic and recreational physical activity. This, however, entails a thoroughly new analysis and study on attitudes and perceptions towards increased emotional social support and exercise. Hence, there are several assumptions that can harbor this point, however, more qualitative studies need to be done on the attitudes and perceptions of having how emotional social support can increase your motivation to exercise.

Obesity and diabetes have brought a devastating toll on the health implications in the United States. The pandemic has wreaked the health of the nation, and its minority populations, with Latinos being the largest and growing. The rates of "diabesity" (obesity and diabetes) are consequently twice as high in Latinos than non-Latino whites. In the United States, 30% of the women of childbearing age (20-39 years old) are already defined as obese, and the prevalence is higher for Mexican-American women. Additionally, with more Latinos migrating to the U.S. from their country of origin, including Mexico, Central and South America, they are entering into a new culture with new beliefs, ideas, and behaviors. Consequentially, if America does not change its attitudes about increasing physical activity, the rates of Latinos developing poor sedentary behaviors will skyrocket as well. Additionally, Latina women need to become

aware of how obesity and diabetes are causing significant damage to their own health, as well as the health of their future children. Most importantly, Latinas must primarily recognize that physical activity is an independent risk factor for causing obesity and diabetes.

## IMPLICATIONS OF THE STUDY

The results draw a picture of certain concrete and intangible determinants influencing Latina women to exercise more during their leisure time. In light of the findings, Latina women need to become aware that by increasing their recreational physical activity, such as walking more or engaging in more aerobic exercises that increase their heart rate above the normal range; this will then decrease their risks of acquiring obesity and diabetes- significantly affecting their ethnicity.

This study therefore finds it imperative to translate healthy behaviors to their children by first increasing a mother's participation in exercise. One study found that a "mother's participation in regular exercise after childbirth may encourage regular physical activity in her offspring" both in frequency and level of activity [22]. Their review of the literature found that "children of active mothers were two times as likely to be active," which may account for the sharing of physical activities among the family members, and parental support of exercise [22].

Additionally, because there seems to be a potential relationship between higher social support and higher aerobic exercise, it is important for Latina women to look into programs where they can engage in group activity exercises in gyms, parks, schools, and other recreational facilities around their neighborhoods. If we get more Latina to continually commit to exercise, and thereby, meet the recommended guidelines of 20 or minutes of exercise a day, this can possibly bring light into a tsunami effect. In other words, interventions to obesity and diabetes prevention programs can launch physical activity initiatives and goals to influence more and more women to exercise together, or the very least, encourage themselves to participate in more leisure time physical activity. With the potential determinants found in this study, indicating possible

influences for higher levels of recreational exercise, this study warrants significant findings in the near future.

## APPENDIX

### LIST OF TABLES AND FIGURES

Table 1 Means, Frequencies, and Percentages of Age and Body Mass Index (BMI) of Sample Population

Figure 1 Percentages of Birthplace in Latina Respondents

Table 2 Frequencies and Percentages of Characteristics in Latina Respondents

Figure 2 Percentages of Family History of Diabetes and Gestational Diabetes Mellitus (GDM)

Table 3 Frequencies and Percentages of Sociodemographics

Figure 3 Percentages of Status in Latina Respondents

Table 4 Percentages of Body Mass Index (BMI) in Pregnant and Non-Pregnant Latina Respondents

Table 5 Frequencies and Percentages of Physical Activity Levels in Latina Respondents

Figure 5 Percentages of Physical Activity Levels in Latina Respondents

Table 6 Frequencies and Percentages of Acculturation Levels in Latina Respondents

Figure 6 Percentages of Acculturation Levels in Latina Respondents

Table 7 Frequencies and Percentages of Social Support Levels in Latina Respondents

Figure 7 Percentages of Social Support Levels in Latina Respondents

Table 8 Frequencies of Physical Activity and Acculturation Levels in Latina Respondents

Figure 8 Percentages of Recreational Physical Activity in Latina Respondents

Table 9 Frequencies of Physical Activity and Social Support Levels in Latina Respondents

Figure 9 Percentages of Physical Activity Beliefs in Latina Respondents

Figure 10 Frequencies of Acculturation and Physical Activity Levels in Latina Respondents

Figure 11 Frequencies of Physical Activity and Social Support Levels in Latina Respondents



Figure 1

Percentages of Birthplace in Latina Respondents

N = 64

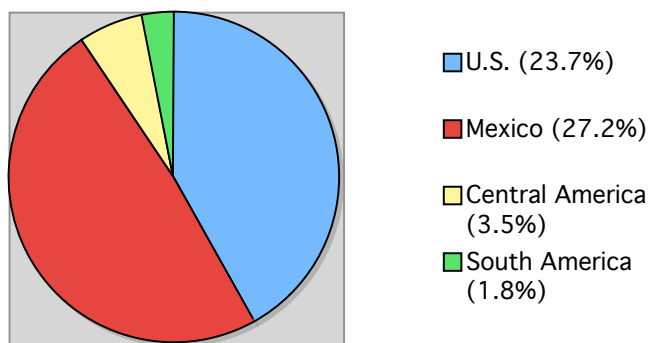


Table 1

Means, Frequencies, and Percentages of Age and Body Mass Index (BMI)

of Sample Population

N = 114

	Frequency	Percentage	Mean	Standard Deviation
Age	97	85.1%	25 kg/m <sup>2</sup>	7.23 kg/m <sup>2</sup>
BMI Not-Pregnant	54	47.4%	25.28 kg/m <sup>2</sup>	7.59 kg/m <sup>2</sup>
BMI Pregnant	7	6.1%	27.81 kg/m <sup>2</sup>	4.26 kg/m <sup>2</sup>

Table 2

Frequencies and Percentages of Characteristics in Latina Respondents

N = 114

Status	Frequency	Percentage
Not Pregnant	89	78.1%
Have been pregnant (past year)	14	12.3%
Currently Pregnant	11	9.6%

Figure 3

Percentages of Pregnancy Status in Latina Respondents

N = 114

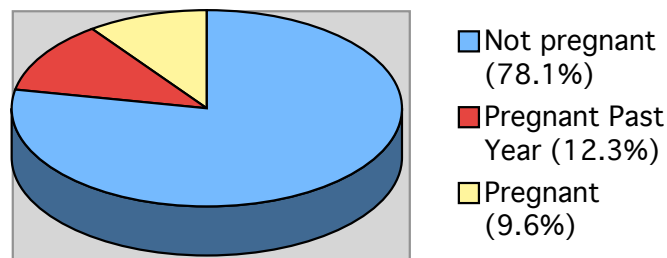


Figure 4

Percentages of BMI (Body Mass Index) in Non-Pregnant and Pregnant Latina Respondents

N = 60

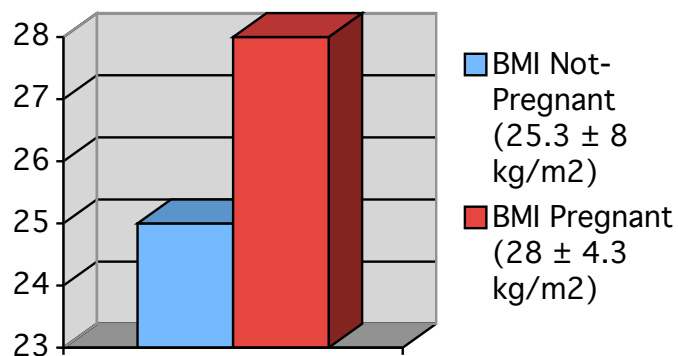


Table 3

Frequencies and Percentages of Sociodemographics

N = 114

	Frequency	Percentage
<b>Education</b>		
Less than High School	15	13.2%
Completion of High School	54	47.4%
College Graduate	31	27.2%
<b>Income</b>		
Less than \$15,000	54	47.4%
\$15,000-\$30,000	30	26.3%
Greater than \$30,000	16	14%
<b>Preferred Language</b>		
Spanish Only	17	14.9%
English Only	16	14%
Both	67	58.8%

Figure 2  
Percentages of Family History of Diabetes and Gestational Diabetes Mellitus (GDM)

N = 114

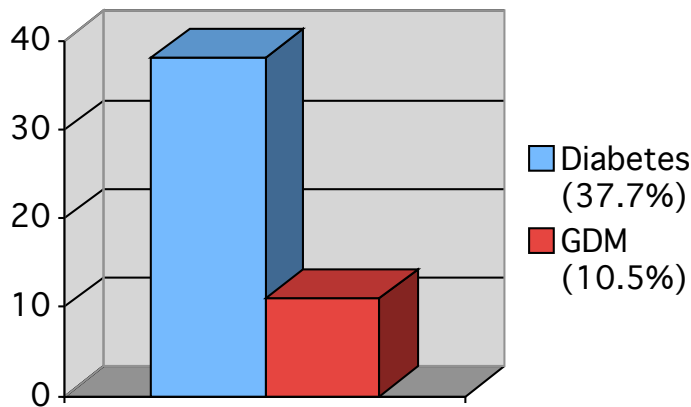


Table 5  
Frequencies and Percentages of Physical Activity Levels in Latina Respondents

N = 112

	Frequency	Percentage
Active	43	37.7%
Under-Active Regular	21	18.4%
Under-Active	32	28.1%
Sedentary	16	14%

Figure 5  
Percentages of Physical Activity Levels in Latina Participants

N = 112

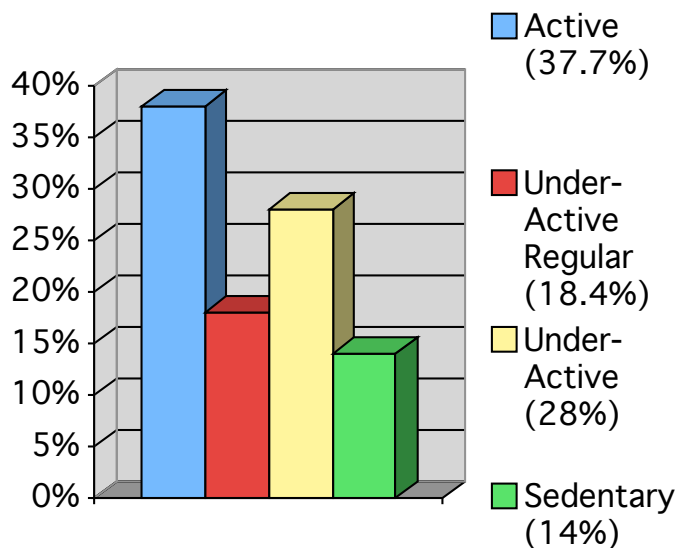


Figure 6  
Percentages of Acculturation Levels in Latina Respondents

N = 100

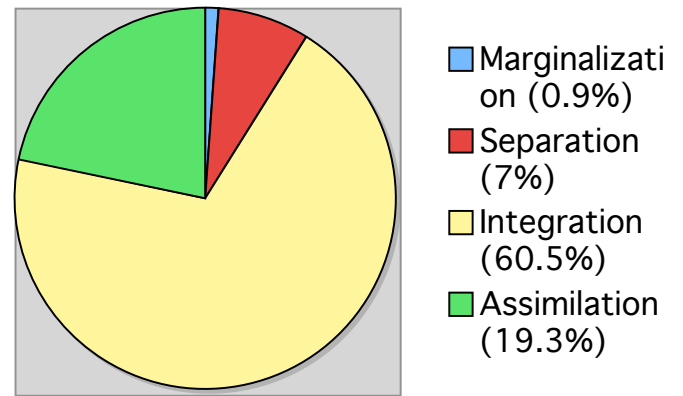


Table 6  
Frequencies and Percentages of Acculturation Levels in Latina Respondents

N = 100

	Frequency	Percentage
Assimilation	22	19.3%
Integration	69	60.5%
Separation	8	7%
Marginalization	1	0.9%

Table 7  
Frequencies and Percentages of Social Support Levels in Latina Respondents

N = 99

	Frequency	Percentage
Strong, High	40	35.1%
Neither	10	8.8%
Weak, Low	49	43%

Figure 7  
Percentages of Social Support Levels in Latina Respondents

N = 99

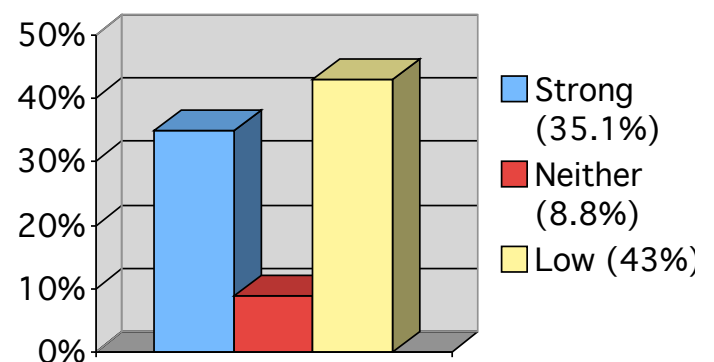


Table 5

Percentages of the Top Four Recreational Physical Activities in Latina Respondents

N = 114

	Once a week or month	2 to 6 times a week
Walking (for pleasure)	9.7%	16.6%
Dancing (ballroom, salsa, disco)	13.1%	18.1%
Watering, mowing the lawn or garden	11.4%	2.7%
Carpentry, home or care maintenance	8.8%	7.1%

Figure 8

Percentages of Recreational Physical Activity Levels in Latina Respondents

N = 114

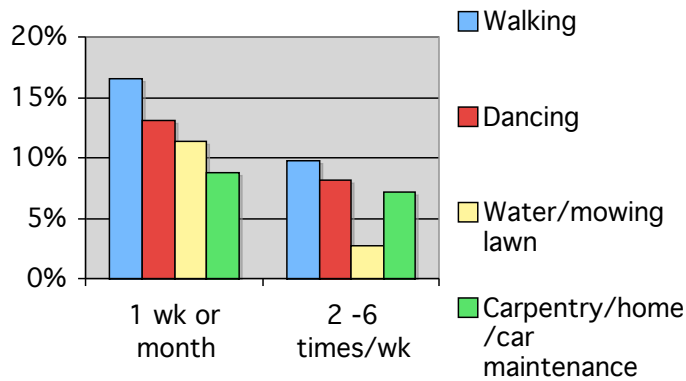


Table 6

Percentages of the Top House Activities in Latina Respondents

N = 114

	Percentages
Cleaning the house	1 to 3 hrs/week= 45.6% 3 to 6 hrs/week = 17.5%
Shopping for food, groceries	Less than 1 hr/week= 22.8% 1 to 3 hrs/week = 57%
Cooking, washing	1 to 3 hrs/week = 36% 3 to 6 hrs/week = 28.1%
Laundry, ironing	Less than 1 hr/week= 22.8% 1 to 3 hrs/week = 45.6%
Shopping or browsed for toys, clothes	1 to 3 hrs/week= 38.6%
Caring for pre-school children or babies	15 hrs/wk = 18.4%

Figure 10

Percentages of Physical Activity Beliefs in Latina Respondents

N = 114

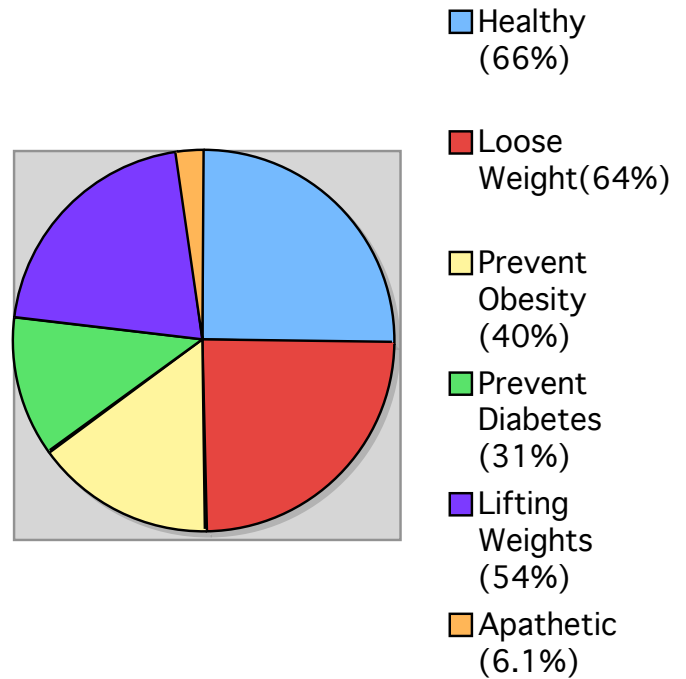


Table 8

Frequencies of Physical Activity and Acculturation Levels in Latina Respondents

N = 99

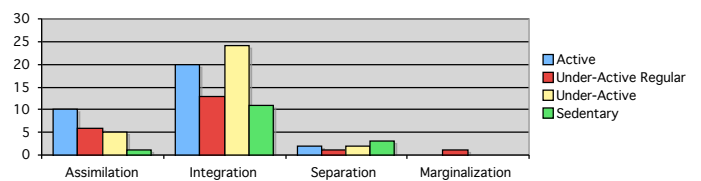
	Assimilation	Integration	Separation	Marginalization
Active	10	20	2	0
Under-Active Regular	6	13	1	1
Under-Active	5	24	2	0
Sedentary	1	11	3	0

Chi-square analysis,  $p = 0.256$

Figure 10

Frequencies of Acculturation and Physical Activity Levels in Latina Respondents

N = 99



Chi-square,  $p = 0.256$

Table 9

Frequencies and Percentages of Physical Activity and Social Support Levels in Latina Respondents

N = 98

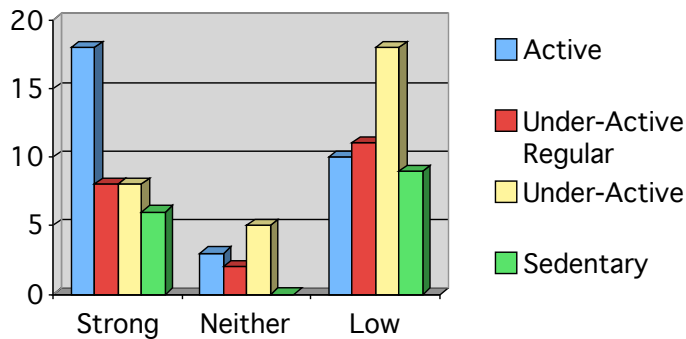
	Strong, High Social Support	Neither	Low, Weak Social Support
Active	18	3	10
Under-Active Regular	8	2	11
Under-Active	8	5	18
Sedentary	6	0	9

Chi-square,  $p = 0.155$

Figure 11

Percentages of Physical Activity and Social Support Levels in Latina Respondents

N = 98



Chi-square,  $p = 0.155$

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# POWER TO THE PEOPLE: HOW COMMUNITY INVOLVEMENT EFFECTS PUBLIC HOUSING REDEVELOPMENT PROJECTS IN LOS ANGELES



## BREANNA MORRISON

*Policy, Planning and Development*

*Mentors: Leonard Mitchell, J.D., M.B.A., and Terry Cooper, Ph.D.*

*Department:*

*School of Policy Planning and Development*

*McNair Scholars Program*

*University of Southern California*

The nation-wide trend to replace public housing projects with mixed-income, mixed-use, developments has left some low-income residents displaced. This study investigates how community involvement affects public housing redevelopment projects in Los Angeles city in order to increase resident engagement and minimize displacement. Involvement was gauged for 15 major public housing developments using community indicators and statistical data like changes in crime rates and civic participation. This study used census and archival data to correlate community involvement, resident satisfaction, and redevelopment efficiency. In addition, a case study of the Jordan Downs redevelopment project in Watts was conducted using field observations and data analysis to collect information on resident satisfaction and the level of community involvement. The results of this research shed light on obstacles that arise when housing authorities attempt to initiate community involvement, barriers to resident involvement, methods to overcome those barriers, and the consequences of excluding residents in the redevelopment process from the start. Redevelopment projects that engaged the residential and surrounding community early on in the process had greater success in achieving community indicators.



# INTRODUCTION

On March 1 2009, the first of a series of community advisory committee meetings took place about the proposed redevelopment of the Jordan Downs housing project. Nearly 40 tenants attended to hear about the mixed income urban village the housing authority is planning to create to replace the blighted project. The plans are to replace the 700 housing units into 2100 mixed income, mixed use units. This committee consists of a group of elected residents ranging from 16 to 60+ to and community advocates to participate in the decision making process of the redevelopment. The housing authority is taking suggestions from these tenants and incorporating them into development plans (Webster 2). How will this level of resident involvement make the progress of the Jordan Downs redevelopment project different from other unsuccessful ones in the area? This study investigates this question by studying trends of successful and unsuccessful redevelopment projects in Los Angeles, and comparing these trends to events occurring with the Jordan Downs redevelopment.

## HISTORY OF HOUSING PROJECTS IN U.S

Public Housing has existed in the United States since the 1930s. The economic crisis of the Great Depression resulted in a severe housing deficit that created a large demand for government owned housing. Many people across various racial, ethnic, and socio-economic backgrounds could not afford to pay rent or for the upkeep of their residences (Parsons 4). Civic unrest and “rent riots” began to explode all over the country as a result of the deficit. The first steps towards public housing resulted from the creation of the Housing Division of the Public Works Administration. This division worked on decreasing unemployment, rehabilitating slums and increasing the buying power of the citizens by creating low-cost housing. Civil disputes and anti-communist opposition, however, restricted the power of the housing division (Parsons 6).

Senator Robert Wagner decided to push for the passing of senate bills in 1935, 1936 and 1937 to address the need for public housing. The federal government officially decided to implement public housing with the creation of the Wagner-

Steagall Housing Act of 1937 (Parsons 7). This act created the United States Housing Authority which gave local authorities 500 million dollars in loans to plan, construct and manage the public housing. The rent of the tenants would be determined by a function of their income, and the federal government would provide subsidies to pay for the rest of the rent to bring it up to market price (Parsons 7).

The Wagner-Steagall Housing Act of 1937 allowed for the government to buy housing and then rent them out to low-income citizens. The creation of public housing not only helped to solve the housing crisis, but it also helped with unemployment by providing jobs to construct the housing (Bennett 126). During the late 1930s, public housing changed from being the responsibility of national governments, to being a local government issue (Parsons 14). Local housing authorities were created for the management and maintenance of public housing sites all over the United States.

Today, public housing across the United States has been deemed as a failure, and in 1996 the HUD’s HOPE VI policy was created to establish national trends for more efficient public housing. One strategy involves tearing down the 100,000 units of housing all throughout the country, to create mixed-income developments (Bennet 2). Mixed income means that residents of various socio-economic backgrounds will be able to occupy the same development. HOPE VI states that one third of the residents should be low-income, one third of the residents should be moderate income, and one third should be middle income. This often means that two thirds of the residents will not be able to move back into the new developments, however. Therefore, through this process, residents have been relocated temporarily or permanently and forced to live elsewhere with housing vouchers while the redevelopment takes place.

Though many see positives and negatives to the redevelopment trends, one definite byproduct is that the number of low income housing units available have decreased with the implementation of HOPE VI policies (Bennett 134). This is significant because it provides more obstacles to the poor who cannot afford market value housing. Without these low-income housing units, many of these disenfranchised will have to severely struggle to find a place to live. As a result, HOPE VI is

undergoing a revitalization to include a one for one replacement policy of low income units in the new developments. Jordan Downs is one of the first projects in the area to include this new guideline in the redevelopment plan.

## **HISTORY OF HOUSING PROJECTS IN LOS ANGELES**

Housing Projects in the city of Los Angeles include 60 public housing and senior sites that now range from San Pedro to the San Fernando Valley. Unlike other housing projects around the country, these projects are low-density communities that are usually built with only one entrance and exit. The physical layout of these projects alone makes them unique as urban fortresses for gang and drug related violence. Though housing projects in other places around the country have gangs, the intensity, longevity, and fatalities established by the gang culture in Los Angeles public housing is unparalleled (Bennett 125-128). The functionality of public housing in Los Angeles has drastically changed, however, since the creation of the housing authority for the city of Los Angeles in 1938.

During the 1930s, there was a need for the government to provide housing assistance for the war-time workers in the city. There was a housing shortage due to rapid population growth and war-time migration which made housing for low-income families in Los Angeles nearly unobtainable. Many of them were forced to live in the streets or in dilapidated, subdivided houses which made 20 percent of the housing stock in Los Angeles “unfit for human habitation” (Bennett 126). The solution to the housing shortage problem was public housing. The first of these to be established in Los Angeles was Ramona Gardens. The all white workers that lived in the early housing projects in Los Angeles described these housing communities as delightful, communal places to live where everyone is friendly and willing to work together. Project residences began to come together about issues of health, education, racism and other issues that they wanted to see improvements with (Bennett 127) .

The dynamics changed when southern whites, African-Americans and Latinos migrated to Los Angeles in floods to search for jobs. This caused a gradual integration of the previously segregated city. The plethora of housing restrictions

against minorities caused the nearly doubled African-American population to live in places like old garages, or movie theaters. Finally, the Los Angeles Housing Authority was forced to integrate all public housing in 1943, and there was no more single-race housing, giving more African-Americans a place to live. As low-income minorities began pouring into the housing projects, many of the white residents left and moved into low-income single family residences. Therefore, despite the integration of housing in Los Angeles, housing projects became nearly homogenous again due to white flight (Parson 34).

Racial tensions and tensions over the disparity of income between whites and blacks erupted in the Watts riots in 1965. This resulted in the nearly complete removal of industry from the area and further deterioration in the city. The federal government did respond by providing more funds for projects in the city of Los Angeles, but these funds did little to solve the growing problems there. In the 1970s and 1980s the federal government felt that public housing was less of a federal problem and more of a local problem and decreased its funding and gave nearly full responsibility to local housing authorities. This resulted in more depreciation in the area. Los Angeles projects were also hotbeds for an emerging gang culture that evolved in the 1980s. These projects became the homes of some of the most infamous gangs and drug dealers in Los Angeles. The gang tensions also resulted in rivalries between various housing projects around Los Angeles as well (Bennet 177).

In the 1990s the influx of Latinos in the area resulted in some minor racial tensions. As a result, inter-project gang rivalries have formed which have led to more fatalities and deaths. The 1992 riots were crucial in establishing a negative tone to the relationship between project residents and Los Angeles authorities as well. Many project residents are untrusting of police and government officials due to the various conflicts that have erupted over the decades.

## **CASE STUDY: JORDAN DOWNS**

The Jordan Downs Housing projects were initially created as 512 temporary public war housing projects for war workers of WWII. Like most public housing sites in Los Angeles, Jordan Downs went from nearly all white to all black by 1945.

Jordan Downs was relocated to 103rd and Alameda with the Housing Act of 1949. By the 1950s, after WWII was over, the projects became established as welfare-state institutions. Due to the red scare, there began to be increased opposition towards the expansion of the public housing programs, and propositions to increase low income housing units were eliminated by the white public. Towards the end of the 1950s, most of the industry that was in the Watts area had moved out due to white flight, and many residents in the area around Jordan Downs were left jobless and in poverty (Parson 57).

Like many other Los Angeles projects, Jordan Downs has played an integral role in the degradation of urban Los Angeles. The grape street Crip gang was born in these projects. The prevalence of drugs, crime, and poverty in the projects caused the Housing Authority of the city of Los Angeles to decide to sell the projects to a private developer. Opposition from the residents and community advocates, however, caused the demolition to be cancelled. This event, however, raised the level of distrust between tenants and the housing authority. During the riots of 1992, the projects were relatively peaceful due to the Watts Truce that the Grape Street Crips obliged to prior to the riots. The resurgence of gang violence came around 2002 in Jordan Downs, due to a decline in police presence and increases in gang tensions. Currently, the residential complex is a majority Latino, and African-Americans are now a minority, which has resulted in some racial tensions as well (Webster 2).

At the end of 2008, the Housing Authority for the City of Los Angeles (HACLA) announced that Jordan Downs would be redeveloped into a mixed-income development with both retail and residential establishments on site. Many residents are worried about affordability, however, because though there will be the same number of low-income units, there are various degrees within the realm of “low-income” which may result in public housing residents still not being able to afford the new residence. The community’s concern is that the redevelopment project may result in the gentrification of the area where the development occurs. Many Jordan Downs residents are aware of the possibility of relocation and have reservations about the redevelopment project (Webster 2).

Though development is not supposed to take place for

about another two years, Maxine Waters, the councilwoman of the district, is demanding that the housing authority involve the community members more in the planning process (Bloomkatz 1). This increase in community participation with the Jordan Downs Housing redevelopment project will have numerous effects on the progress of the development, as well as the redevelopment project as a whole. As a result of the residents’ concerns, the housing authority has already incorporated a one for one replacement in the new development. Redevelopers have also taken community advisory committee members of Jordan Downs around the country to see similar redevelopment projects so that they can see for themselves the potential benefits of the proposed redevelopments (Bloomkatz 1).

Jordan Downs serves as an important case study for my research because of its location and involvement in many of the events that have effected public housing all over the city. It serves as a model prototype for public housing in Los Angeles, but is still unique in the strong community presence in the Watts district, as well as inside of the projects. Community advocates have always been integral in the events affecting the housing projects. Even when the housing authority wanted to sell the projects to a private developer, the outside community advocates played more of a role in protecting the community than the actual residents of the projects. Jordan Downs is also known as a historical landmark in the community, serving as the birth place of national track star Florence Griffith-Joyner and the site of the Watts gang truce. As a result, many of the Watts residents have a strong connection and concern for the well-being of the residents of Jordan Downs.

## **HOPE VI AND COMMUNITY BUILDING**

In the Urban Institutes report on “Community Building in Public Housing”, the authors explain how 20 percent of HOPE VI funds are allocated for community building. Community-building is a way to combat poverty by investing in social and human capital. This includes providing opportunities for the public housing sites to be better integrated into the community through non-profit and private business partnerships, community-led leadership boards, and economic

and social development programming (Dooley 110).

HOPE VI policies have still yet to consistently prove their effectiveness even with community building, however. Many of the mixed-income housing redevelopment projects result in significant resident dissatisfaction despite community building efforts. My hypothesis is that the dissatisfaction is due to the fact that much of the community building focus is on the establishment of community after redevelopment has occurred. This community building is based on establishing productive relationships between the low-income and upper-income residents only after the new development is complete. In the meantime, historical communities have been demolished without much prior warning or consideration due to their isolation and lack of involvement with the redevelopment process. As a result, many people are displaced and only residents that fall under the guidelines of being “in good standing” have the chance to occupy the new developments (Bloomkatz 1).

The community advisory committee for Jordan Downs, established by the Los Angeles Housing Authority for the city of Los Angeles, is unique because it has established involvement prior to the redevelopment to help gain rapport with the residents (Bloomkatz 1). This advisory committee includes youth representatives, community allies, resident representatives, and housing authority members to come up with solutions for resident issues with the redevelopment project. This way, the residents have input in how they want their communities to be built and managed. Also, there is less opposition coming from the residents which may correlate to more resident satisfaction later on.

## **THE HOUSING AUTHORITY OF PORTLAND'S OPPORTUNITY HOUSING INITIATIVE**

Despite its community building efforts, HOPE VI has not resulted in much success. The Housing Authority for the city of Portland has decided to incorporate some of the successful aspects of HOPE VI into their Opportunity Housing Initiative. In this initiative, the HAP desires to transition residents off of public housing by providing more community support. This includes peer counseling, financial counseling and career enhancement. These means of support are incorporated prior to

and after redevelopment. Participation is completely voluntary.

This example may be relevant because it shows the benefits of incorporating the communities' needs prior to redevelopment in aiding in efficiency measured by the success of the residents. There is still no gauge of resident satisfaction, however, and no specific quantifiable data about the benefits of community involvement to the progress of the redevelopment.

### **Minimal Community Involvement Examples**

One example of a redevelopment project that did not involve the community is the Cabrini Green housing Projects in Chicago. In the article “Displacement through discourse: implementing and contesting public housing redevelopment in Cabrini Green”, the author Deidre Pfiffer writes about the Chicago housing Authority's lack of community involvement in the redevelopment, and how it led to legal problems and resident dissatisfaction. The redevelopment project is based on turning a low-income housing project into a mixed income development. Much like with the Jordan Downs Housing Projects, the tenants of the Cabrini Green Projects are forced to relocate during the construction of the projects and are not guaranteed housing when the development is finished (Pfeiffer 1).

The author then looks at how renaming the neighborhood, resident denigration, and relocation efforts are used by the Chicago elite to displace the urban poor living in the area. The Chicago Housing Authority used the media to paint a bleak and less humane picture of the Cabrini Green projects, rallying more public support to tear it down and make a mixed income development. The developers, however, did not aim to get the support of the residents. Less than 10 percent of the residents of Cabrini Green were able to move back, after the redevelopment was over. Others were required to find housing elsewhere using housing vouchers. A lawsuit ensued between some residents that received eviction notices and the housing authority. The residents won and the CHA was required to preserve 2 buildings for residents to live in during the reconstruction.

Though many residents wanted to preserve Cabrini Green because they did not want to lose their sense of community in the area, many were nearly forced to leave due to unlivable living conditions. Many residents felt that the housing authority

maintained these horrible conditions so that more residents would feel compelled to leave. Though the de-concentration of poverty in the area has resulted in some decrease in crime, the presence of community is quickly falling as well. Though the area is mixed income, the diverse group of people does not interact due to fear of each other.

This article is important to my research because it has correlations with the housing redevelopment project of Jordan Downs. Like with Jordan Downs, the redevelopment plans of Cabrini Green were also met with a large resistance from the residents because of fear of displacement and relocation. This article will help give me insight into the effects of minimal participation levels on the development of its citizens. The methodology that the researcher used was interviews with the stakeholders of the redevelopment project including current residents of the mixed-income development. The researcher also used archival research to get more background on the conditions and conflict involved with the Cabrini Green redevelopment.

Since this was an anthropological study, the researcher's main research method surrounded a linguistic technique, Critical Discourse Analysis to analyze how often the various names of the new development came up in interviews and media. She conducted 20 interviews with upper-income residents and 70 interviews with public housing residents and charted how often these specific terms came up in their common vernacular. For the interest of this anthropological study, the interview method was efficient in finding out how often these terms came up in speech. If she wanted to reach a larger resident pool, however, she could have conducted a survey and asked the residents which term they use to describe their housing development, Cabrini Green or New Town.

## **COMMUNITY-INITIATED INVOLVEMENT EXAMPLES**

As a result of HOPE VI policies, in 1996 the Pico Aliso (currently Aliso Extension) projects in East Los Angeles were subject to redevelopment. Like the incident of Cabrini Green, residents were notified of the redevelopment by receiving eviction notices about the impending demolition of their developments. Thirty-six families received notices that they had

60 days to relocate and that section 8 would be available. As a result of the community outrage by the forceful efforts of the housing authority, a community initiated group called Union de Vecinos was formed. Two integral leaders of the group, Leonardo Vilchis and Elizabeth Blaney, had already been working with the community, but were turned away for community support for this subject.

The Union de Vecinos, was therefore forced to only rely on themselves and they refused to leave their homes even past their 60 day deadline. The organization was able to delay the demolition for two years until they were ensured with written agreements that they would be able to continue to reside in Pico Aliso after the development was finished. The efforts were not totally successful, however, because the 577 existing units were replaced with only 421 units at the new name Pueblo del Rio. Of those 421, only 280 were for public housing residents (Leavitt 1).

## **METHODOLOGY**

This research investigates how community involvement affects public housing redevelopment projects in Los Angeles. A case study is also being conducted on the relationship between community involvement and resident satisfaction and efficiency on the Jordan Downs redevelopment project.

## **DESIGN**

The research is a comparative study using mixed methods that are both qualitative and quantitative methods to produce a richer, more comprehensive analysis. Community indicators are used to conduct a statistical analysis to observe a possible relationship between community involvement and the resident satisfaction and efficiency of redevelopment projects in Los Angeles. Though most of the statistical data came from census and archival data that did not date past 1996, surveys were also collected to retrieve some data as well. Finally, we conducted a case study with the Jordan Downs redevelopment project so that the results retrieved from the meta-analysis could be used to predict the outcomes of Jordan Downs and possibly make suggestions for improved efficiency. The study used field

observations and surveys to gather research for the case study with Jordan Downs.

The projects that I studied for this research include:

Dana Strand Village, Estrada Courts, Harbor Village, Jordan Downs, Mar Vista, New Pico, Nickerson Gardens, and Pueblo del Rio (Aliso Village)

## DATA COLLECTION

**Community Indicators:** This study uses community indicators to measure the effects of the redevelopment project on the community. The Urban Land Institute describes community indicators as “steps to assess local conditions, formulate action plans, and build support for implementation.” These indicators are used to measure the economic, environmental and social conditions of an area. There are two types of indicators, system indicators and performance indicators. System indicators measure more technological components of the conditions of an area than performance indicators. This study uses performance indicators to gauge the performance level of the housing authority in improving the conditions of redeveloped communities. Performance indicators are both descriptive and prescriptive, which means not only to they shed light on the present conditions of the community, but they also leave room for suggestions for improvements (Dooley 110).

The most effective community indicators are created with the community and all stakeholders present to come up with changes that they would like to see in the community so that they can monitor the progress of these changes. For the interests of this study, common neighborhood indicators were used which include: household income, employment rate, community involvement, teenage pregnancy rate, demographics, violent crime rate, and community resources. If any of these increase after the redevelopment, this shows some level of effectiveness of the redevelopment process. This research used these only for redevelopment projects and used the archival data for the modernization projects. The redevelopment projects being looked at include: New Pico, Pueblo del Rio (Aliso Village), Dana Strand Village, and Harbor Village. This study combines the results of this statistical analysis with the archival data to indicate a possible relationship between community involvement

and efficiency.

## ARCHIVAL ANALYSIS

The archival data in this research included newspaper articles, government documents and websites and served two purposes in the study. The first was to investigate the level of community involvement with the redevelopment and renovation projects. Articles also shed light on the level of resident satisfaction with interviews in various newspapers. This study collected articles about each of the public housing sites that had to do with resident satisfaction and community involvement and analyzed if there were trends between the level of community involvement and resident satisfaction, and also the level of community involvement and the results of the community indicators.

The archival data was also used to gauge the level of effectiveness for the modernization projects that occurred with the other housing project sites that did not undergo redevelopment. The researchers looked to see if there were articles indicating how the modernization affected the residential and greater community since community indicators could not be used for these projects as well.

## CASE STUDY

A case study was conducted with the Jordan Downs redevelopment project using mixed methods as well. Jordan Downs was chosen because the Housing Authority for the city of Los Angeles is investing a significant amount of their resources in gaining the support of the community prior to redevelopment. It is also in a unique location that is one of the most resource rich in social programs and community allies, but has some of the worst symptoms of urban blight. The housing authority hired a consulting group to survey the desires and fears of the residents for the development and is making efforts to make the development to the satisfaction of all of the stakeholders involved. These efforts are innovative in public housing redevelopment in Los Angeles and make the Jordan Downs redevelopment project unique.

**Field observations:** Field observations were conducted at the community meetings where the concerns and level of involvement of the residents will be discussed. Two observers

were used at each meeting to minimize biases and better validate the results. In our observations we recorded the topic being discussed, who is speaking during the discussion of each topic, the content of the discussion, and whether the discussion has a positive or negative tone based on a scale from 1 to 5. We also analyzed physical observations such as the attire of people attending the meetings, the instruments used to present data at each meeting and the number of people in attendance at each meeting. We did this for two community meetings, one with the Mayors Advisory Council, and the other at the Community Advisory Workshop meeting. The results from our observations from these two meetings will give us insight into how often the needs of residents are being brought up in the meetings, and how much weight the suggestions and concerns of the residents play in the decision making process. These results will also give us more insight into the level of community involvement existing at Jordan Downs.

## RESULTS

The archival research showed that there is a base level of community involvement that all housing projects experience from the housing authority. These include monthly meetings with the housing manager to complain about problems and provide input for decisions made at the projects. There is also a resident advisory board that allows for residents to put input in the Housing Authority's plan for the year. HACLA cannot make the yearly plan without proper consultation from each of the public housing sites. These yearly plans include redevelopments and modernizations. These suggestions usually tend to be more about maintenance and modernization projects than redevelopment projects, however (City of Los Angeles 3).

### HOUSING AUTHORITY'S INVOLVEMENT STANDARDS

Each public housing site has its own Resident Advisory Council or Resident Management Corporation that is run by residents to provide suggestions on what residents' desire for modernization or redevelopment projects. Resident Management

Corporations are non-profits formed by elected representatives of public housing residents. The housing authority contracted with the RMCs for maintenance or ancillary services. These organizations go through intensive leadership training sessions monthly to improve the leadership abilities of the residents.

Residents are still hesitant to trust the housing authority because of mistakes made in the past. Residents from Mar Vista and Rancho San Pedro spoke out at the 2009 agency plan about their fears of rumors about the disposition and demolition of their homes. Mar Vista residents have read on the internet that UCLA will be buying their housing projects for more student housing and Rancho San Pedro residents have heard at planning commission meetings their neighbors' desires for the projects to be relocated. The housing authority reassured residents of both projects that there have been no plans to redevelop or relocate and if they are, they would be the first ones to be notified. The housing authority is making more attempts to be transparent to regain the trust of the residents (City of Los Angeles 3).

### MODERNIZATION PROJECTS

Estrada courts- Had the residents involved in the modernization process by providing labor for construction. The residents claimed that they felt greater pride in the new additions because they helped to create them. There was greater satisfaction with the additions, but when permanent employment was not provided for the residents, they became angry and felt that the housing authority owed them a new source of employment. To take notes from Estrada Courts, Jordan Downs should include plans for permanent employment of residents should be incorporated in the plan to increase resident satisfaction (Housing Authority 2).

Mar Vista- a grass roots organization, By Youth for Youth, got a million dollar grant to provide a family center near the Mar Vista projects. This was in response to the residents' expressed desires for more services in the area. The family center has worked with the youth to provide them with counseling support, especially for high-risk youth. Youth that participate in the family center programs have a 16% incarceration rate, which is much less than other youth in high-risk areas. Jordan Downs should also incorporate on-site social services for youth so that they will

have more of utilization as a result of increased accessibility.

Nickerson Gardens- In 1993, UCLA professor Jacqueline Leavitt took a team of students to meet with residents to help design a proposed redevelopment project to turn the 1066 units into villas and a senior citizen home. The housing authority served as a liaison between the planners and the residents, but Leavitt wanted the planners and designers to have direct contact with the residents to see what they wanted. Leavitt took her students to the homes of the residents in a Resident Advisory Council which consisted of residents wanted to get most involved. All of these residents were mothers who wanted better opportunities for their children. Though there were many problems with the residence, the mothers focused most of their efforts on redeveloping a gym and playground for their children so that their children could have a place to be active near their home and not out on the street. These “tot-lots”, as Leavitt calls them, were designed, planned and funded by the efforts of these mothers who fought against settling for the typical inadequate resources provided by the public sector at that time. When the RAC attempted to move their efforts to receiving funds for a Laundromat on site, the lack of support from the Housing Authority caused the project to be delayed and never come to fruition. After this failed attempt, the proactive initiatives of the RAC declined in the early 1990s (Leavitt 117).

## REDEVELOPMENT PROJECTS

Pueblo del Rio (Aliso Village)- Residents were not involved at all in the initial steps toward redevelopment. A grassroots community group rebelled against the demolition and held up construction for two years until they were guaranteed spots in the new development in writing. The community group, Los Vestidos Unidos, attempted to gather support from the greater community, but other groups in the community were weary about going against the housing authority. When community meetings were finally held to engage residents, they often resulted in hostility and were eventually limited to only residents, while non-residents were prohibited from attendance. Only 10 percent of the original residents moved into the new development. When the housing authority decided to put up fences around the new developments, some residents were

angered because they felt that they were done without proper consultation of the residents. They did not want the fences because they did not want to feel barred off from the rest of the community. The crime rates in the new development did decrease, however, but that was due to the de-concentration of poverty in the area (Richardson 1).

New Pico- These projects were redeveloped into 280 town homes. There were mixed responses to the redevelopment project. Some older residents were content with the new development and new neighbors. Others thought that they were not consulted enough in the redevelopment process and were unhappy with some of the features of the new development. These include more spacious developments and less density (Ramos 2).

Dana Strand- These projects were redeveloped in 2008. The public housing site was redeveloped into single-family homes, town homes and senior citizen homes in a mixed use, mixed-income development as well. Part of the new development is a Life-long Community Center that is administered by the boys and girls club. This on-site community center also has family supportive services and job training that has aided in increasing the average monthly income from \$945 in 2000 to \$1,131 in 2008 (New Dana 2).

Residents were involved in the redevelopment process through a community advisory committee and involvement with the Los Angeles Port Advisory Committee as well. The residents and outside community were involved throughout the whole redevelopment process, and as a result residents have been satisfied with the new development, and there were few delays in the developmental process.

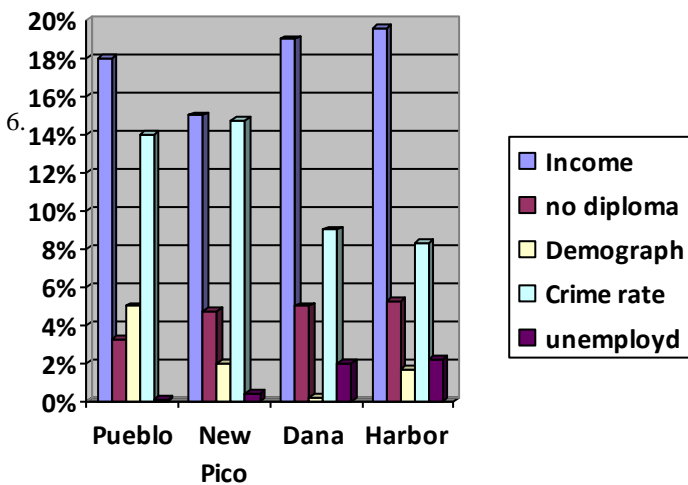
Harbor Village- Developers replaced 400 public housing units with 400 section 8 homes in Harbor City, and 224 for sale homes. The residents were involved throughout every stage of redevelopment. The middle-income and low-income developments look exactly the same at the suggestion of the residents and residents have been extremely happy with the new development. There was also job training for residents who got to participate in the construction of the development, which had a positive effect on the employment rates and income of the residents (Business Wire 1-2).



## COMMUNITY INDICATORS

The community indicators chosen for data collection were used only on the redevelopment projects. The study used commonly used neighborhood indicators that chart the improvement of economic, social and community conditions in an urban area. The researchers found statistics for each of the 4 redevelopment sites one year before redevelopment and compared them to the statistics for each of the indicators one year after redevelopment. These are the indicators:

1. Economy and labor market
2. Demographic change
3. Income and poverty
4. Social conditions- % older than 25 without a H.S diploma, violent crime rate
5. These are the results from the statistics collected from the redevelopment projects.



<http://www.city-data.com> (2003-2008)

## CASE STUDY

The community workshop attended on July 11th had a low community turn out due to other events including a funeral and a community event. The demographic of those in attendance at the meeting was majority Latino. There were about fifty residents and community members in attendance, there were about 23 in attendance who were from organizations like the housing authority, the environmental protection agency, a consulting group, the developers, the mayor's office and CORO fellows. The residents were split up into tables by English speaking tables and Spanish speaking tables where there were earphones that transmitted a translated version of the meeting.

The agenda was also translated into both English and Spanish. There were community advisory committee members at each of the tables to guide the discussion. The topic of the meeting was based on choosing the building design and physical layout of the development project. The consulting group in attendance presented the results of surveys and focus groups they conducted with the residents about their desires for the development. The presentation was rushed through and when residents asked why the presentation was rushed through, they were assured that they would get a copy of the presentation at the next meeting.

The main focus of the meeting was on the building layout, however. The Jordan Downs residents that were members of the community advisory committee talked about the redevelopments that the housing authority took them to visit all around the country. These redevelopment projects varied in size, design and lay-out. The community advisory committee members talked about which developments that they liked the most and which ones they felt were undesirable. Residents portrayed a general desire for low-density developments. The developer that guided the discussion conveyed the need, however, for some high-density developments so that all 2100 of the units could fit on the development site. The older residents suggested lower density developments for seniors and higher density developments for the other developments. The developer said, however, that seniors did not want to be separated from the other residents though the seniors in attendance at the meeting said that they did want to be separated because young families make too much noise.

The mayor's council working group meeting had about 15-20 people in attendance. Most of those in attendance were African-American. People came from the consulting group hired by the housing authority, the mayor's office, the community redevelopment agency, UCLA, the Los Angeles department of cultural affairs, Charles Drew medical center, the housing authority, the planners group, and the Watts medical clinic.

The meeting focused on the human capital component of development, which meant that those in attendance discussed the involvement of the residents with the redevelopment project. The consulting group presented the results of their surveys and focus groups of the residents and there was an open discussion

that ensued about the things that the residents desired.

All in all, there was a discrepancy in topics discussed at both meetings. The Mayor's Council meeting focused on human capital, while the community workshop meeting focused on the building layout. The discussion times for each meeting were 52 minutes for the mayor's council and only 5 minutes for the community workshop. Though there was a significantly larger group in the workshop, they were only given 5 minutes at the end of the meeting to discuss any concerns that they about the consulting group's presentation of the survey. Also, the results about the human capital that were presented to the residents at the community workshop were rushed through. When residents asked for a copy of the survey and focus group results, they were told that they would receive them at the next meeting, though the housing authority had copies available at this meeting. The residents began to ask more questions amongst themselves about the results of the human capital presentation as a result.

Though many of the stakeholders present at the Mayors Council meeting expressed a desire to gain information about what the residents actually wanted and how they felt about the redevelopment, only 3 of the 25 were present at the community workshop when the residents were given an opportunity to express these desires.

## DISCUSSION

### REDEVELOPMENT:

The results from the statistical data collected on the chosen community indicators showed that the redevelopment projects that had greater community involvement fared better with the indicators than those that did not. Both Harbor Village and Dana Strand had better results with the indicators, though they were also smaller project developments as well. New Pico and Pueblo Del Rio saw increased benefits in crime the year after the developments were completed, but other indicators experienced minimal change. This supports my hypothesis that redevelopment projects that experience greater community involvement prior to and during development will have better results with community indicators. The research showed that

those that participated more in the redevelopment process, or forced participation, had less chance for displacement than residents who were not involved. This was evident through the Aliso Village redevelopment project.

### MODERNIZATION:

The results showed that there was a positive relationship between involvement and resident satisfaction. The results also showed that perceived involvement effected by outside community involvement as well as inside of the residential community. The research also showed that on-site services were most desired by residents and also have better outcomes with indicators. Residents do not have to travel into more dangerous neighborhoods and have better access to the sites, which increases the utilization of the resources available.

### CASE STUDY:

There was a discrepancy between topics discussed at both meetings. Participation was also limited due to some barriers. Most barriers to participation were most prevalent for Latinos because they were underrepresented in the decision making meetings like the Mayors Council and the Community advisory Committee though they have the highest representation in Jordan Downs.

Though the most effective indicators are created by the community, this study also created a set of suggested indicators for the Jordan Downs redevelopment project based on desires expressed in the meetings attended and surveys provided by the consultation group. These indicators include:

- Increase in Literacy Rates
- Increase in Translators at Community Meetings
- More residents transitioning out of Public Housing
- Increase in Employment rates
- Increase in income
- More extra curricular activities for youth
- More on-site resources
- Less density in housing development
- Decrease in crime and gang activity

## CONCLUSION

The housing authority has had a tumultuous history with the public housing residents in Los Angeles since its inception in the 1930s. This research has showed that the housing authority's most recent attempts to redevelop public housing sites into mixed income developments have had mixed results as well. Involvement has played a crucial role in the redevelopment or modernization projects whether involvement was minimal or extensive. The most effective involvement efforts were those that had a cooperative collaboration from all stakeholders involved in the process.

For future research, Professor Cooper and I have constructed surveys to be distributed at the public housing sites that have experienced redevelopment or modernization, as well as Jordan Downs. These surveys include questions about resident satisfaction with the involvement in the process, as well as satisfaction with the housing authority, and satisfaction with the project after modifications were made. These surveys will be mailed to 100 random tenants at each of the public housing sites studied to provide data about a possible relationship between perceived involvement and resident satisfaction. Questions about fears and suggestions for the redevelopment will be included on the Jordan Downs survey to see if suggestions made in the community meetings are different from those made in anonymous surveys.

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