Explorations
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With special thanks and appreciation
to the faculty mentors and volunteer
blind reviewers.
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WE ARE DELIGHTED TO PRESENT VOLUME V OF EXPLORATIONS. EXPLORATIONS IS A UNIQUE PUBLICATION; MANY UNIVERSITIES HAVE THEIR OWN UNDERGRADUATE RESEARCH PUBLICATIONS, BUT I BELIEVE THIS IS THE ONLY STATE-WIDE UNDERGRADUATE JOURNAL. TRULY THIS IS DUE TO THE STATE-WIDE COMMITMENT TO ENHANCING THE UNDERGRADUATE EXPERIENCE—EVIDENT FROM THE SEVERAL YEARS OF WELL-ATTENDED STATE OF NORTH CAROLINA UNDERGRADUATE RESEARCH AND CREATIVITY SYMPOSIA (SNCURCS).

VOLUME V CONTAINS NINE ORIGINAL ARTICLES FROM STUDENTS ATTENDING EIGHT COLLEGES AND UNIVERSITIES IN NORTH CAROLINA, INCLUDING ONE ARTICLE FROM A SENIOR AT THE NORTH CAROLINA SCHOOL OF SCIENCE AND MATHEMATICS. WHILE THE TOPICS OF THE ARTICLES THIS YEAR ARE VARIED, A THEME REFLECTING OUTREACH TO THE COMMUNITY RUNS THROUGH SEVERAL OF THE ARTICLES. FOUR OF THE SOCIAL SCIENCE ARTICLES PRESENT DATA ON OUTREACH EFFORTS AND CULTURAL PERSPECTIVES RELATED TO IMPROVING HEALTH CARE AND SOCIAL SUPPORT. THESE STUDIES RANGE FROM LANCASTER, ET AL.’S UNIQUE COMMUNITY-UNIVERSITY PARTNERSHIP TO GLIGA’S STUDY OF HEALTH BEHAVIOR PROMOTION IN ROMANIA TO BURKE’S ASSESSMENT OF ACCEPTANCE OF SOCIAL SUPPORT FOLLOWING DISASTER AMONG CITIZENS OF ECUADOR TO CORBY’S ANALYSIS OF BARRIERS TO EFFECTIVE WESTERN MEDICAL TREATMENT AMONG MONTAGNARD REFUGEES IN NORTH CAROLINA.

THE OTHER FIVE ARTICLES IN THIS VOLUME ARE ALSO QUITE INNOVATIVE. ALSO IN THE SOCIAL SCIENCES, JURIWALA APPLIES A GAME THEORY APPROACH TO THE STUDY OF DUG TRAFFICKING. THE TWO ARTICLES IN THE BIOLOGICAL SCIENCES SECTION PRESENT A REVIEW OF MATERNAL LUPUS ERYTHEMATOSUS BY FRYE AND A REPORT ON TECHNIQUES TO IDENTIFY GINSENOSEIDES IN GINSENG PLANTS BYAINSWORTH ET AL. IN THE HISTORY SECTION, WE HAVE TWO UNIQUE PERSPECTIVES ON SOCIETY AND HISTORY. BROOKS EXAMINES THE HISTORICAL EVIDENCE RELATED TO THE PERSISTENT ENSLAVEMENT OF THE JAMAICAN MAROONS, WHILE TOMLINSON OFFERS AN EXTENSIVE CRITICAL REVIEW OF POPULAR MUSIC DURING WARTIME.


THANKS TO SEVERAL PEOPLE AT UNCW FOR THEIR SUPPORT: DR. CATHY BARLOW, PROVOST; DR. JOHNSON AKINLEYE, ASSOCIATE VICE CHANCELLOR FOR ACADEMIC PROGRAMS; MS. EMILY SMITH AND HER WONDERFUL TEAM AT THE UNCW PUBLISHING LABORATORY; MS. REBECKA BRASSO, EXPLORATIONS WEB PAGE DESIGNER; AND MS. KATHERINE WEBB, COPY EDITOR; BOTH GRADUATE ASSISTANTS FOR CSURF; THE CENTER FOR THE SUPPORT OF UNDERGRADUATE RESEARCH AND FELLOWSHIPS; AND MR. BO DEAN, MS. CAROLE REYNOLDS, AND DR. BILL ATWILL FOR SUPPORT DAY-TO-DAY IN THE HONORS SCHOLARS PROGRAM OFFICE. WE ALSO APPRECIATE THE SUPPORT OF DR. COURTNEY THORNTON, UNC GENERAL ADMINISTRATION, WHO HAS PROMOTED UNDERGRADUATE RESEARCH AT THE STATE LEVEL AND LOBBED FOR BOTH SNCURCS AND EXPLORATIONS. AS ALWAYS THANKS ARE DUE TO DR. GEORGE BARTHALMUS AT NCSU, A DEVOTED AND UNFLAGGING ADVOCATE OF UNDERGRADUATE RESEARCH STATE-WIDE, WHO HAS KEPT THE MISSION OF EXPLORATIONS AND SNCURCS STRONG.

ENJOY VOLUME V!

KATHERINE E BRUCE, PhD
Biological, Earth, and Physical Sciences
Identification of Ginsenosides in American Ginseng Seedlings

Hannah Ainsworth
with Rachand Gywali, L. Tiara Murphy, and Smriti Sharma
Salem College
Faculty Mentor: Nita Eskew
Salem College

Abstract
Ginseng, a medicinal plant, is reported to provide a variety of health benefits. Ginsenosides are the biologically active compounds responsible for therapeutic attributes. Historically, ginseng roots have been considered the source of medicinal properties and are harvested for use. Because of their slow growth rate and increasing demand in global markets, American ginseng (Panax quinquefolius) roots are now protected by the Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora. The use of ginseng’s perennial leaves instead of its roots would preserve existent plant populations. However, there are few studies comparing ginsenoside concentrations throughout the plant. For this reason, our primary research goal is to investigate the presence of six dominant ginsenosides in the leaves and roots of American ginseng grown in North Carolina. Ginsenosides were extracted from seedling specimens and then separated with high-performance thin-layer chromatography (HPTLC). Utilizing densitometer software, comparisons of ginsenosides on digitized TLC plates identified the presence and relative amounts of ginsenosides. Initial results have indicated higher amounts of total ginsenosides in leaves compared to roots in seedlings.

Introduction
American ginseng (Panax quinquefolius) is a medicinal plant, and the biologically active compounds responsible for its therapeutic attributes are known as ginsenosides (Figure 1).1 Ginsenosides are stored in both the root and leaf portions of the plant.2 These ginsenosides are linked to numerous medicinal properties, including enhancement of learning and memory, reduction of anxiety and stress, and reduced risks of cancer and diabetes.3
With such diverse pharmacological properties associated with the plant, the demand for ginseng roots has increased. The average annual export of wild ginseng roots from 1999 to 2004 was approximately 68,688 dried pounds. To obtain such a high yield of ginseng roots, an average of 19 million ginseng plants were harvested (an average of 284 roots per pound) in 19 approved states. For the past 10 years, the average price of wild and wild-simulated (which mimic growing conditions of wild ginseng) American ginseng roots was $350/dry pound. However, in 2008 the annual harvest of wild American ginseng was 59,537 pounds. This decreased supply increased the price per pound. Overharvesting wild populations of ginseng plants has adverse long-term effects on ginseng as it has a “slow growth rate, a long pre-productive period (approx. three to eight years), low fecundity, and high seed and seedling mortality.” In addition to the high prices paid for wild and wild-simulated ginseng roots, the high rate of unemployment in North Carolina (11.1% as of March 2010) has increased poaching. Furthermore, the poor economy has driven less experienced harvesters to practice unsustainable harvesting, meaning that they often harvest less mature plants and fail to replant seeds from mature plants.

Measures could be taken to investigate whether a larger market can be developed to include American ginseng leaves. Wild-harvesters could be discouraged from over-harvesting wild mature and immature roots; instead, they could harvest the leaves so the roots could continue to grow. Using the annually grown leaves would preserve ginseng plant populations from harvest to harvest. If the leaves have sufficient concentrations of ginsenosides, they could be utilized in an array of value added products, such as supplements and energy drinks.

The presence of ginsenosides has been detected in the leaves of *P. quinquefolius*. One study of ginseng in British Columbia found ginsenosides in the leaves of four-year-old plants by high performance liquid chromatography. Another study investigated ginseng from wild populations in Ontario, Quebec, Maine, Vermont, and Wisconsin. In these plants, the leaves were found to contain an “appreciable amount of ginsenosides.” While these studies used older ginseng plants that were grown outside of the North Carolina region, based on their results, ginsenosides were expected to be detected in the seedling leaves we harvested. Thus, to investigate the relative amount of ginsenosides in the leaves and roots of American ginseng grown in North Carolina, this project examines extracts using HPTLC and densitometer analyses, which provide a method of simultaneous analysis of multiple American ginseng samples.

**Methods**

For leaf and root extractions, this project utilized American ginseng seedling populations grown in western North Carolina at North Carolina State University’s Mountain Horticultural Crops Research and Extension Center (MHCREC). At the MHCREC, seeds were planted in a cultivated plot or a wild-simulated plot on January 30, 2009, to explore any differences between growing conditions.
cultivated plot was shaded artificially and received regular watering and maintenance, as utilized on farms. In contrast, the wild-simulated plot received no interference that would alter wild growing conditions. Planted seedlings were randomly collected during one of four harvest dates: June 2, June 5, July 27, or August 24 of 2009.

American ginseng seedlings harvested from the wild-simulated and cultivated plots were individually analyzed. The extraction protocol was performed on roots and leaves separately. Forty milligrams were crushed and sonicated in absolute ethanol and then filtered. Using the CAMAG Linomat 5 instrument, concentrated bands of the extracted samples were precisely applied onto a glass TLC plate (Merck, Silica gel 60 F$_{254}$). For identification, a mixture of ginsenoside standards containing Rb1, Rb2, Rc, Rd, Re and Rg1 of concentration 0.2 mg/mL was also spotted on each plate as shown in Figure 2. Ginsenoside standards, purchased from ChromaDex (Irvine, CA), were dissolved in absolute ethanol.

The plates were placed in a chamber with an elution solution of chloroform, ethyl acetate, methanol, and water in a ratio of 7.5/20/11/4.5, respectively. For quantitative analysis via densitometer software, it was important for the HPTLC plates to exhibit maximum separation between components without losing the clarity of individual bands, and this was achieved with an elution distance of 87 mm. Once the solvent reached the predetermined elution distance, the plate was derivatized with a 10% sulfuric acid in methanol solution. Plates were then heated in a 100 °C oven for 10 minutes and subsequently scanned.

To identify ginsenoside compounds, the scanned plate-images were analyzed by UN-SCAN-IT densitometer software. This program measures the relative intensity of compounds on the TLC plate by measuring the number of pixels in each band. The UN-SCAN-IT software converts the TLC data into a chromatogram of each lane depicting the relative intensity versus the Retention Factor (RF) value, the distance travelled by the compound relative to the distance travelled by the solvent.

RESULTS AND DISCUSSION

Each seedling was documented according to plot location, harvest date, and mass. The largest, smallest, and average mass values for each harvest time and plot location are listed in Table 1. Heavy rains in spring 2009 encouraged fungal growth on the cultivated plot seedlings.

As a result, this seedling population was harvested in June before significant plant damage occurred; 33 seedlings were collected. The August-harvested, wild-simulated seedlings yielded the highest average mass, which is expected given they had the longest growing period. Seedlings that represented the largest, smallest, and average masses for a particular harvest date and plot location were photographed for documentation as shown in Figure 3.

PRESENCE OF GINSENOSIDES IN SEEDLINGS

Once extraction had been performed on the leaves and roots for individual 2009
Comparisons between ginsenosides in the roots and leaves are represented in Figure 6. In the four analyzed seedlings, ginsenosides Rb2, Rd, and Re were measured to have higher relative quantities in the leaves than the roots. These findings were similar to results from the study by Assinewe et al. who found high amounts of Rb2, Rd, and Re in their tested leaves. The greatest difference between root and leaf ginsenoside concentrations was shown in Rb2. While all seedling leaves exhibited high amounts of Rb2, the roots contained far less in concentration; and, in Seedlings A and D, Rb2 was not detected in the root extracts. These high concentrations of Rb2 in seedling leaves also coincided with findings by Assinewe et al. who found Rb2 in “substantial amounts” in their mature ginseng leaves. Three (A, C, and D) of the four seedlings yielded higher relative amounts of Rc in the root extract than in the leaves; and in Seedling A, Rc was below the limit of detection in the leaf extract.

**REPRODUCIBILITY OF DATA**

Duplicated TLC lanes are expected to yield the same values. To evaluate reproducibility, the densitometer data were examined for variations between duplicated lanes in the leaf, root, and standard extracts. When analyzed, the TLC plates for the four tested seedlings exhibited different ginsenoside quantities between duplicated lanes. Figure 4 and 5 where the root and leaf extracts from Seedling A are compared to the standard ginsenoside mixture by superimposing the chromatograms. A summary of the densitometer's detection of ginsenosides (measured in pixels x $10^{-3}$) for the four seedlings is shown in Table 2.
### Table 2

Data for each of the four tested American ginseng seedlings (Seedlings A, B, C, and D). The two columns for each leaf extract, standard, and root extract show the data for their respective duplicated lanes on the TLC plates.

Table 2 continued on page 8.
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Table 2. Continued from page 7.

<table>
<thead>
<tr>
<th>Sample Type</th>
<th>Leaf</th>
<th>Standard</th>
<th>Root</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lane 1</td>
<td>Lane 2</td>
<td>Lane 1</td>
</tr>
<tr>
<td>Plot Location</td>
<td>Wild-Simulated</td>
<td>-----</td>
<td>Wild-Simulated</td>
</tr>
<tr>
<td>Harvest Date</td>
<td>June 2009</td>
<td>-----</td>
<td>June 2009</td>
</tr>
<tr>
<td>Ginsenosides</td>
<td>Relative Quantities (Pixels x 10^{-3})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rb1</td>
<td>20.771</td>
<td>22.974</td>
<td>16.120</td>
</tr>
<tr>
<td>Rb2</td>
<td>54.225</td>
<td>70.708</td>
<td>22.781</td>
</tr>
<tr>
<td>Rc</td>
<td>2.793</td>
<td>3.061</td>
<td>23.813</td>
</tr>
<tr>
<td>Re</td>
<td>54.860</td>
<td>54.520</td>
<td>17.046</td>
</tr>
<tr>
<td>Rg1</td>
<td>5.747</td>
<td>4.955</td>
<td>24.677</td>
</tr>
</tbody>
</table>

Table 2. Continued from page 7.

Seedling B

<table>
<thead>
<tr>
<th>Sample Type</th>
<th>Leaf</th>
<th>Standard</th>
<th>Root</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lane 1</td>
<td>Lane 2</td>
<td>Lane 1</td>
</tr>
<tr>
<td>Plot Location</td>
<td>Cultivated</td>
<td>-----</td>
<td>Cultivated</td>
</tr>
<tr>
<td>Harvest Date</td>
<td>June 2009</td>
<td>-----</td>
<td>June 2009</td>
</tr>
<tr>
<td>Ginsenosides</td>
<td>Relative Quantities (Pixels x 10^{-3})</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rb1</td>
<td>12.914</td>
<td>8.794</td>
<td>27.872</td>
</tr>
<tr>
<td>Rb2</td>
<td>51.920</td>
<td>62.076</td>
<td>33.718</td>
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<tr>
<td>Rc</td>
<td>8.885</td>
<td>8.172</td>
<td>32.252</td>
</tr>
<tr>
<td>Rd</td>
<td>36.987</td>
<td>44.145</td>
<td>26.012</td>
</tr>
</tbody>
</table>

6 shows bar graphs illustrating data for duplicated lanes.

Table 3 summarizes the percentages of difference between duplicated lanes for tested seedlings. The average percentages of differences between duplicated lanes for Seedlings A, B, C, and D were 6.92%, 11.45%, 25.36%, and 10.34%, respectively. The data highlight concerns about the reproducibility of data as varied results between duplicated lanes indicate the presence of inconsistencies during HPTLC or densitometer analysis.

For the tested seedlings, ginsenosides were successfully extracted and identified in the leaves and roots by comparison to ginsenoside standards. However, variations in pixel intensity were observed between duplicated TLC lanes. Although this variation did not appear to significantly affect ginsenoside comparisons between roots and leaves, the reproducibility of the densitometer data must be further investigated. When using the densitometer software, some bands with closer Rf values were grouped together into one peak despite their visual separation on the TLC plates as shown in Figure 2. These peaks had to be hand-defined, which introduced a source of human error. Consequently, this may have contributed to the variations found between duplicated lanes. Examples
of grouped bands on the TLC plate for Seedling A are shown in Figure 7 (located on page 10).

Because many of the densitometer’s peaks needed to be individually defined, it introduced an element of uncertainty during analysis of TLC bands. An improved densitometer program that provides better automated band-distinguishing capabilities for TLC plates would help resolve data discrepancies between duplicated lanes in our samples. To date, two densitometer programs have been tested, and although we are currently using the best of the two, other programs should be investigated for future use.

**Table 3. Summary of the percentages of difference between densitometer-analyzed duplicated bands.**

<table>
<thead>
<tr>
<th>Sample Plate</th>
<th>Average Value</th>
<th>Maximum Difference Lane</th>
<th>Minimum Difference Lane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seedling A</td>
<td>6.92</td>
<td>Rb1-Leaves</td>
<td>1.23</td>
</tr>
<tr>
<td>Seedling B</td>
<td>11.45</td>
<td>Rc-Standard</td>
<td>2.82</td>
</tr>
<tr>
<td>Seedling C</td>
<td>25.36</td>
<td>Rc-Roots</td>
<td>0.19</td>
</tr>
<tr>
<td>Seedling D</td>
<td>10.34</td>
<td>Rg1-Leaves</td>
<td>1.59</td>
</tr>
</tbody>
</table>

**Figure 6. Densitometer data of duplicated lanes for each seedling.**

**Future Work**

Future goals include comparing the densitometer’s pixel analysis to liquid chromatography (LC) data as a means to determine the correlation of pixels to absolute concentration. By comparing the densitometer data to LC data, the limit of detection will be assessed. In addition, generating TLC plates with triplicate lanes would enable us to statistically analyze reproducibility. Once confident in the reproducibility of data, all seedling extracts will be quantitatively analyzed. From these data, we will investigate the impact of harvest date, growing conditions, and plant age on ginsenoside concentrations.
Conclusions

Using this ginsenoside extraction and HPTLC protocol, we confirmed that the methods are suitable for extracting and detecting ginsenosides in our sample of American ginseng seedlings. When comparing the roots to the leaves, we found that ginsenosides Rb2, Rd, and Re are found in higher concentrations in seedling leaves which coincided with previously published research. There are quantitative limitations with our chosen densitometer program. However, we will continue our investigation for a reproducible means of quantitatively assessing ginseng concentrations on TLC plates, as it provides an efficient way to compare multiple seedling extracts simultaneously. An established tool for quantification, such as liquid chromatography, would allow comparison of relative TLC measured ginsenoside quantities to ginsenoside concentrations in the roots and leaves, thus enabling the study of leaves as a potential renewable source of ginsenosides for ginseng value added products.

Figure 7. Chromatograms of Seedling A

Acknowledgments

We would like to thank Jeanine Davis, Ph.D., NC Specialty Crops Program Coordinator; and Amy Hamilton of the North Carolina State University Mountain Horticultural Crops Research and Extension Center, Mills River, North Carolina; Charles Pate, Ph.D. and George McKnight, Ph.D. of the Salem College Chemistry Department; Jennifer Cruse-Sanders, Ph.D., Director of Research and Conservation at the Atlanta Botanical Garden, Atlanta, Georgia; and all of the Salem alumnae who have dedicated their time and effort during the initial stages of American ginseng research at Salem College.
Works Cited


10 CAMAG, Wilmington, NC. Application notes F-32, HPTLC identification of American ginseng.
The Effects of Maternal Systemic Lupus Erythematosus on the Developing Fetus

Endya Frye
North Carolina Agricultural and Technical State University

Faculty Mentor: Patrick Martin
North Carolina Agricultural and Technical State University

ABSTRACT
Systemic lupus erythematosus (SLE) is a systemic inflammatory autoimmune disease which can affect multiple systems of the human body. SLE can have a wide range of negative effects on a person’s health that vary from patient to patient. Typically SLE affects the integumentary and musculoskeletal systems as well as the developing fetus. The underlying cause of SLE is not fully known; however, genetics, heredity, and environmental features are associated with the severity and outcome of the disease. Due to the wide range of deleterious effects associated with SLE, pregnant women diagnosed with SLE are especially sensitive to SLE-associated inflammatory responses. Currently, a concerted effort is underway to determine the mechanism(s) by which SLE affects fetal development. Maintenance of the autoantibody levels in the mother’s blood is vital and a key method in sustaining the health of the fetus by preventing the likelihood of maternal-fetal exchange of SLE-associated autoantibodies. However, these autoantibodies may cross the placenta and enter the fetus. When SLE autoantibodies enter the fetal circulation, the fetus can potentially form neonatal lupus erythematosus (NLE). NLE is a rare developmental disorder that results in cardiac, dermatologic, hepatic disorders and hematologic abnormalities in some infants. One of the more prominent abnormalities is the formation of congenital heart block (CHB). This review will focus on the mechanisms that permit maternal-fetal autoantibody exchange and regulate SLE-mediated congenital heart block as well as current therapies used to prevent autoantibody exchange.
Systemic Lupus Erythematosus and Neonatal Lupus Erythematosus

Lupus is a group of autoimmune diseases named for the occurrence of a distinctive butterfly rash, resembling the bite of a wolf, that appears across the bridge of the nose. This multifaceted disease can present in four forms which include: cutaneous lupus, systemic lupus erythematosus, drug-induced lupus, and neonatal lupus NLE. In this review, we will focus on systemic lupus erythematosus (SLE) and specifically how SLE affects fetal development in pregnant females. SLE is a systemic autoimmune disease with major inflammatory responses (Matsushita, Higashino et al. 2002). Studies have shown that SLE is ten times more prevalent in women than men and two to three times more prevalent in African-Americans and persons of Latin American descent than Caucasians (McCarty, Manzi et al. 1995; Tincani, Danieli et al. 2006; Smyth and Garovic 2009; Borchers, Naguwa et al. 2010).

To date, no cure has been found for this chronic disorder. SLE can affect any area of the human body, including dermatologic, neurologic, renal, cardiologic, hematologic, and other systems (Matsushita, Higashino et al. 2002; Izmirly, Llanos et al. 2010). Some common symptoms of SLE are fatigue, arthralgia, arthritis, fever, skin rashes, anemia, edema, pleurisy, facial rash, photosensitivity, alopecia, Raynaud’s phenomenon, seizures, and mouth or nose ulcers (Khamashta 2006). The requirements for diagnosis are assessed through patient history, hematologic tests—including complete blood counts and autoantibodies as well as physical examination. Individuals who present four of the 11 American College of Rheumatology Classification Criteria for SLE, simultaneously or within the same observed time period, can be considered positive for SLE (Table 1). However, individuals who have fewer than four may still be diagnosed with SLE. Treatment of SLE includes a combination of physical activity, rest, medications, and healthy eating habits. The regimen for therapy varies from patient to patient depending on the systems affected by the disease.

The higher prevalence of SLE in women has potential detrimental effects in pregnant females such as increased frequency of miscarriages, still births, preterm birth, neonatal lupus, and perinatal mortality (Buyon, Clancy et al. 2009). A pregnant female with SLE may pass autoantibodies to the fetus across the placenta which may cause developmental abnormalities. Furthermore, the presence of these antibodies can result in NLE and ultimately CHB, a major complication of NLE (Clancy and Buyon 2004).

NLE is a maternally acquired disease of the fetus that is associated with the crossplacental transfer of anti-Ro/SS-A and/or anti-La/SS-B autoantibodies, which are highly prevalent in individuals with SLE. The Ro/SS-A antigen is a small nucleo-cytoplasmic RNA protein complex (Ben-Chetrit, Gandy et al. 1989; Chan, Silverman et al. 1999). The function of the Ro/SS-A antigen is not completely known, although it is hypothesized to function in the ribosomal RNA discard pathway (O’Brien and Wolin 1994). The La/SS-B antigen consists

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<th>Table 1: 1997 American College of Rheumatology Classification Criteria for Systemic Lupus Erythematosus</th>
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<td>1. Malar Rash</td>
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<td>2. Discoid Rash</td>
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<td>3. Photosensitivity</td>
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<td>4. Oral ulcers</td>
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<td>5. Nonerosive arthritis</td>
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<td>6. Pleuritis or Pericarditis</td>
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<td>7. Renal Disorder</td>
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<td>8. Neurologic Disorder</td>
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<td>9. Hematologic Disorder</td>
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<td>10. Immunologic Disorder</td>
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<td>11. Positive Antinuclear Antibody</td>
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Table 1. Summary of classification criteria for Systemic Lupus Erythematosus
of a 48-kDa protein and serves as a termination factor for RNA polymerase III (Rinke and Steitz 1982; Stefano 1984; Gottlieb and Steitz 1989). The presence of these autoantibodies in the fetal circulation can lead to CHB.

Clinical manifestations of NLE include photosensitive rash and hematologic abnormalities (AlSaleh, Jassim et al. 2008; Walling and Sontheimer 2009). Some symptoms of NLE are temporary with the passing of maternal antibodies in the fetal circulation after birth; however, others are considered major. A major complication which occurs in 2% of fetuses of SLE-affected mothers is CHB (Jing-Bin, Ying-Long et al. 2009). CHB also referred to as atrioventricular block is an irreversible condition which causes scarring of the cardiac tissue and eventually affects the functionality of the heart (Nussinovitch and Shoenfeld 2007).

Normal Fetal Heart Development

Normal heart development of the fetus starts to occur at 15-16 days of gestation. The stages of heart development include five basic steps. These five basic steps give rise to the fundamental architecture and function of the heart. The initial step in development of the heart and associated cardiac structures is the migration of cardiac stem cells to the myocardial plate (site of cardiac development). After these stem cells arrive at the myocardial plate, the neonatal heart is formed by initiating cardiac looping, the process of developing the future cardiac chambers. Following formation of the cardiac chambers, atrioventricular valves (AV valves) are formed. These valves, known as atrioventricular valves, also prevent the backflow of blood into the atrial compartments of the heart. In CHB, cardiac tissue formation is disrupted with the introduction of scar tissue (Figure 1).

Cardiac development begins with migration of pre-cardiac stem cells following gastrulation (formation of the germ layers) to the site of cardiac formation. The initial heart cells arise from pre-cardiac stem cells that form along the midline of the developing embryo. These stem cells then migrate to the thoracic cavity and begin heart development. The second major phase in heart development is the actual shaping of the heart inside the thoracic cavity. After establishing the shape of each chamber of the heart, it must then be formed and defined. The heart must define the four chambers that comprise the heart. Defining and forming these chambers is known as cardiac looping. The heart contains four chambers that are separated by septa, connective tissue that forms the cross formation associated with the heart. The four chambers of the heart are the right ventricle and right atrium as well as the left ventricle and left atrium (Figure 1).

As the chambers continue to form, valves that permit blood to flow from the atrial chambers to ventricular chambers must form. These valves, known as atrioventricular valves, also prevent the backflow of blood into the atrial compartments of the heart. In CHB, cardiac tissue formation is disrupted with the introduction of scar tissue.

Figure 1. Diagram of the adult heart divided into four chambers. Gray arrows indicate the flow of deoxygenated blood and black arrows indicate the flow of oxygenated blood.
tissue on the atroventricular valve, which affects the successful circulatory flow of blood through the heart and the development of the fetal heart (Miranda-Carus, Askanase et al. 2000).

Another major problem observed in NLE associated CHB is disruption of the developing cardiac conduction system NLE (Michaelsson and Engle 1972; Watson, Lane et al. 1984; Buyon 1998; Buyon, Hiebert et al. 1998). The cardiac conduction system requires that cardiac myocytes produce and propagate the electrical impulses that are required to establish and maintain the heart’s rhythm (i.e., heartbeat). The cardiac myocytes responsible for the formation of the cardiac conduction system develop and are located in the right atrium adjacent to the ventricle (Christoffels and Moorman 2009). At this location in the right atrium electrical impulses, due to calcium influx into the cardiac myocytes, necessary to cause heartbeats are regenerated. Specifically, this area of the right atrium is referred to as the atrioventricular node (AV node). The production of an electrical impulse at the AV node promotes ventricular contraction and the pumping of blood from the ventricle. However, this system is prevented from completely forming in severe cases of NLE-associated CHB (Michaelsson and Engle 1972; Watson, Lane et al. 1984; Buyon 1998; Buyon, Hiebert et al. 1998).

The immune response of the fetus to the maternal autoantibodies increases inflammation of the developing cardiac tissues, block calcium influx in cardiac myocytes, and prevents the appropriate formation of the cardiac conduction system (Garcia and Campos-de-Carvalho 2000).

Congenital Heart Block
There are three categories of congenital heart block—first degree, second degree, and third degree heart blockage (Brucato, Cimaz et al. 2002). First-degree and second-degree heart blockage can progress to third degree heart blockage, irreversible CHB, without treatment. According to the National Heart, Lung, and Blood Institutes Disease and Conditions index, first degree heart block constitutes decreased movement of electrical signals travelling through the heart. Second degree heart block occurs when the movement of these signals is decreased on a larger level. In addition to slowed movement of electrical signals, second degree heart blockage, some electrical signals may not arrive at the ventricles. The blockage of signal results in the non-contraction of ventricles and their inability to pump blood throughout the body (Tincani, Rebaioli et al. 2005). Third degree heart blockage occurs when none of the electrical signals reach the ventricles. This degree of heart block is the most severe form of heart blockage and is associated with increased morbidity and lack of reversibility of the disorder in the fetus (Buyon, Clancy et al. 2009; Reynolds, Buyon et al. 2009).

Importantly, there are no standard treatment measures to prevent CHB during gestation. Treatment after birth for babies diagnosed with NLE-associated CHB consists of pacemaker implantation or steroid treatment of newborn infant (Mevorach, Elchalal et al. 2009).

Discussion
Systemic Lupus Erythematosus, Pregnancy and Medical Management
SLE can affect individuals of all ages; however, it disproportionally affects women of childbearing years (McCarty, Manzi et al. 1995). Generally people with SLE can experience a wide array of symptoms which can affect any system of the body, including the reproductive system housing a developing fetus. The fertility rate in patients with SLE is relatively normal compared to the general population; however, fetuses born to mothers with SLE may face major complications (Mok and Wong 2001). These complications range from spontaneous abortion to stillbirths (Mok and Wong 2001).
Although certain studies suggest that SLE-associated flares increase during pregnancy, other studies show no change in the number of disease flares during pregnancy (Mok and Wong 2001). These differences likely occur because of a discrepancy in the definition of lupus flares and how disease activity is assessed within each study (Mok and Wong 2001). Common characteristics exhibited during pregnancy may be misread as lupus flares. These lupus-like symptoms include palmar erythema (reddening of the palms), temporary facial blush, increase in protein in urine due to an increase in glomerular filtration rate, and postpartum alopecia (hair loss) (Buyon 2009). However, some of the conditions mentioned above, specifically postpartum hair loss, are common in all pregnancies; therefore, it is difficult to determine whether or not certain SLE-associated conditions are truly exacerbated by pregnancy. It has been suggested that different measures to evaluate SLE symptoms are needed to deci-pher between pregnancy and SLE-associated symptoms (Smyth and Garovic 2009). A specific timeframe of when SLE flares will occur in pregnancy has not been definitively described in the literature thus complicating diagnosis. When SLE flares do occur, they often present as skin and joint inflammations. Women with a pre-existing diagnosis of SLE who are planning to become pregnant are highly advised to have a six-month period without SLE disease flares before becoming pregnant (Khamashta 2006). Studies demonstrate that during this time-frame pregnant SLE females have an increased risk of premature labor, and those with active lupus nephritis increase the likelihood of fetal mortality (Clark, Spitzer et al. 2005; Khamashta 2006).

Once pregnant, women diagnosed with SLE are to be considered high-risk and should be frequently monitored to maintain the health of the mother and the fetus (Mok and Wong 2001). SLE pregnancies are considered high risk because there is an increased risk of spontaneous miscarriage, pre-eclampsia, intra-uterine growth restriction, fetal death, and pre-term delivery (Khamashta 2006). When these high-risk pregnancies are identified, a team of doctors from a variety of disciplines (such as obstetrics/gynecology, internal medicine, and rheumatology) is advised to monitor the progress of the pregnancy.

Because treating SLE during pregnancy may present dangers to the developing fetus, these treatments must be closely monitored. Any treatment during pregnancy should be evaluated for its teratologic effects on the fetus. Drugs such as prednisolone, azathioprine, cyclosporine A, and hydroxychloroquine help in preventing flares during pregnancy and can be maintained (Esplin and Branch 1997). However, medications such as methotrexate, mycophenolate mofetil, and cyclophosphamide have been found to be teratogens (Esplin and Branch 1997). It is advised to stop these medications three months prior to becoming pregnant (Khamashta 2006). Management of the disease is extremely important, while monitoring the type of drugs used for their possible toxic affects to the mother and/or the unborn fetus (Khamashta 2006). An additional concern that physicians have for pregnant mothers with SLE is whether lupus will be passed through maternal antibodies to the developing fetus. Recent studies demonstrate that a subset of females with SLE may pass on the disease causing maternal antibodies to the developing fetus (Lee 2005). These data suggest that approximately 3% of the pregnant mothers with SLE pass the disease on to their babies (Lee 2005).

Neonatal Lupus Erythematosus and Congenital Heart Block

Neonatal lupus erythematosus (NLE) is a fetal autoimmune disease suggested to be acquired by the passage of autoantibodies anti-Ro/SS-A and/or anti-La/SS-B from the mother to the fetus through the
Endya Frye

placenta (Oshiro, Derbes et al. 1997; Lee 2004). The exact mechanism as to how this autoantibody exchange occurs remains unknown and is the focus of current lupus research (Wahren-Herlenius and Sonesson 2006). The major condition associated with NLE is CHB; however, NLE has other associated fetal disorders. Skin lesions similar to those in SLE, hypopigmentation (abnormal reduction of skin color), hepatitis (inflamed liver), and thrombocytopenia (reduced platelet count) are additional conditions that have been associated with NLE. These non-cardiac disease manifestations are typically temporary and symptoms are non-existent once maternal autoantibodies have exited the fetal circulation (Lee and Jarrett 1990).

CHB is a rare disease in the absence of heart structure irregularities occurring in one out of 15,000 to 1 out of 20,000 in the general population (Wahren-Herlenius and Sonesson 2006). Thirty-one percent (31%) of the children with CHB die, and 71% of them die in the first month of life. In children who survive, 67% require lifelong pacemakers (Yang, Chen et al. 2005). Individuals with SLE have an increased prevalence of high titers of Ro/SS-A and La/SS-B autoantibodies. These antibodies have been found to be associated with the development of CHB (Buyon, Rupel et al. 2004). This leads to a concern for pregnant SLE females because of the potential of these antibodies to cross the maternal-fetal barrier. The transmission of autoantibodies occurs during the middle of the second trimester (13–27 weeks). When these proteins begin to circulate through the fetal blood they can influence inflammation of the atrioventricular node and myocardial tissues in the neonate’s heart (Jaeggi, Fouron et al. 2004). On a molecular scale, researchers are examining potential molecular mechanisms that may regulate the transmission of autoantibodies and participate in the formation of CHB.

CHB can be a lethal disorder, and therefore is important for early detection to reverse the effects of cardiac scarring caused by the initiation of apoptotic cardiac cells. In mothers with Ro/SS-A autoantibodies, 2–5% of neonates have been found to have complete CHB, which develops during the 18-24 week gestation period (Salomonsson, Sonesson et al. 2005). Salomonsson and colleagues proposed a model for the mechanism of the development of congenital heart block in fetuses of mothers with Ro/SS-A autoantibodies (2005). They have identified Ro/SS-A antigens that contain specific proteins which are pathogenic and promote CHB. Specifically, the Ro52 protein, a Ro/SS-A antigen has been discovered in mothers with fetuses diagnosed with complete CHB (Salomonsson, Sonesson et al. 2005). Salomonsson and colleagues propose the following model:

Maternal autoantibodies, Ro/SS-A cross the placental barrier and enter the fetal circulation and bind to Ro/SS-A antigens on the surface of the cardiomyocyte (2005). This binding is very specific in pathogenicity, in that CHB was found to be associated with Ro/SS-A antibodies with the p200 epitope (Salomonsson, Sonesson et al. 2005). This highly specific antibody-antigen interaction has been associated with cases of third degree heart block and resulting in NLE-associated CHB. Upon binding to the Ro/SS-A antigen on the cardiomyocytes, calcium dysregulation and intracellular accumulation is induced in the affected heart cells (Salomonsson, Sonesson et al. 2005). Calcium (Ca2+) is the leading regulator in the heart’s development of pacemaking and contractibility. An increased concentration of Ca2+ in heart cells disrupts the functionality of these two processes. Furthermore, the irregularity in calcium in the cells eventually leads to apoptosis of the cardiomyocytes (Salomonsson, Sonesson et al. 2005). This in turn can lead to a buildup of apoptotic cells in the cardiac muscle tissue leading to potential scarring and fibrosis. It is
this scarring and fibrosis that subsequently results in the formation of CHB (Figure 2). However, this model does assume that antigens necessary to elicit interaction with anti-RO/SS-A maternal antibodies are somehow released from their intracellular components and made available as targets for the maternal autoantibodies. To date no literature exists to address this physiological assumption.

Figure 2. Maternal Anti-SSA/Ro autoantibodies cross the placental barrier and bind the SSA/Ro antigens on the surface of cardiomyocytes. The binding of the antibodies signals apoptosis of the affected cardiomyocytes.

Alternative Model of the Development of NLE-Associated Congenital Heart Block

In the previous section, the widely accepted mechanism for the development of NLE-associated CHB describes cardiomyocyte apoptosis as a result of the anti-RO/SS-A maternal autoantibodies attacking the developing fetal heart and promoting calcium dysregulation leading to an accumulation of calcium and apoptosis. However, the above mechanism assumes antigens necessary for interaction with the maternal autoantibodies are made available on the cell surface of developing fetal cardiac cells. However, the alternative mechanism that opposes this well-accepted mechanism described previously, utilizes physiological apoptosis that occurs during normal fetal heart development to expose antigen to the maternal autoantibodies. More importantly, this alternative mechanism of NLE-associated CHB addresses the glaring assumption made in the previously described model, that anti-RO/SS-A antigens are released from intracellular components and made available to maternal autoantibodies.

Typically during normal fetal heart development, apoptosis is a normal physiological event which functions in part as a “sweeping away” of unused cardiac cells (Pexieder 1975). This form of apoptosis occurs in the developing fetal heart in areas such as the endocardial cushion, developing conduction system, and AV node. Physiological apoptosis during endocardial cushion formation permits the development of the septum between the atrium and ventricles. This alternative mechanism of NLE-associated CHB is thought to be regulated by a signal that utilizes apoptosis associated with the normal development of the heart and specifically cardiomyocytes. During fetal heart development, extra cardiomyocytes are made and are not used. In order to remove these additional cardiomyocytes, apoptosis occurs. It is this apoptosis that is believed to promote cell degradation and release of anti-Ro/SS-A antigens. After the release these antigens from intracellular compartments, these antigens are now free to interact with neighboring cardiac cells utilizing a paracrine cell signaling mechanism. Once released and attached to neighboring cells, these antigens are presented to anti-Ro/SS-A maternal autoantibodies that are circulating in the fetal blood system and this interaction promotes fetal cardiac apoptosis (Figure 3).

This increase of apoptotic events leads to fibrosis, pathologic accumulation of connective tissue in the heart organ that can eventually lead to NLE-associated CHB.

This model is supported by the work of Tran and colleagues, where they found apoptosis in the fetal conduction system of the heart and tested for the presence of Ro/La (La, also referred to as SS-B, an alternate version of the SS-A antigen) antigens on the surface of the cardiomyocytes, once cells
underwent normal apoptosis during development (2002). High levels of the anti-gens were detected and the apoptotic cells presented intracellular La antibodies on the cell surface. Additionally, anti-Ro/La maternal autoantibodies were found to be aggregated with human IgG in apoptotic cells in the areas such as the atrium, endocardial cushions and the AV node (Tran, Macardle et al. 2002; Tran, Ohlsson et al. 2002). More importantly this study utilizes an In vivo model of anti-Ro/La antibody binding to the surface of apoptotic cells (Tran, Ohlsson et al. 2002). Other groups have proposed a similar model of NLE-associated CHB (Miranda, Tseng et al. 1998; Mazel, El-Sherif et al. 1999; Rosen and Casciola-Rosen 1999; Miranda-Carus, Askanase et al. 2000).

Treatment of NLE-associated Congenital Heart Block and Development of Diagnostic Markers
Due to the complete irreversible nature of CHB, identifying at-risk mothers and administering preventative treatment is imperative in improving the survival of the neonate and possibly preventing the progression of first-degree heart block to third-degree heart block (referred to as CHB). There are several methods of prophylactic treatment for CHB. These treatments can include fluorinated glucocorticoids, immunosuppressants, intravenous immunoglobulin, and plasmapheresis (Yang, Chen et al. 2005). Ro/SS-A specific proteins are considered to be a potential marker of CHB in the fetus who progresses to complete CHB. Identifying a marker for NLE-associated CHB is important since

Figure 3. Alternative mechanism for the development of NLE-associated CHB. A. Cardiomyocytes with intracellular anti-Ro/SS-A anti-Ro/SS-B antigens surrounded by anti-Ro and anti-La antibodies. B. Physiological apoptosis occurs; intracellular antigens are translocated to the cell surface. C. Neighboring cells become apoptotic due to signals sent by initial apoptotic cell. Apoptosis is accelerated due to the antibody-antigen interaction.
not all mothers with Ro/SS-A and La/SS-B antibodies pass these antibodies to the fetus causing cardiac defects (Jaeggi, Fouron et al. 2004; Mevorach, Elchalal et al. 2009).

A fetus with NLE-associated CHB, can present with bradycardia, abnormally slow heartbeat, typically less than 50 beats per minute (Matsushita, Higashino et al. 2002). A normal fetal heart rate is between 110-180 beats per minute. As a method of treatment to improve the fetus’ heart rate, researchers have studied administering dexamethasone and β-sympathomimetic in combination or individually to the mother (Jaeggi, Fouron et al. 2004). Jaeggi and colleagues concluded that the administration of dexamethasone did not revert effects of CHB; however, it improved the outcome of the fetus by circumventing other associated diseases from manifesting (2004). Additionally, Jaeggi and colleagues presented evidence that demonstrates combining dexamethasone with β-sympathomimetic treatment to treat CHB-associated bradycardia significantly improves the outcome of the fetus (2004). Additional studies support the finding that administration of β-sympathomimetic increases the fetal heart rate (Matsushita, Higashino et al. 2002). In other case reports salbutamol, terbutaline (β-sympathomimetic), and ritodrine, respectively, were successful in managing CHB (Groves, Allan et al. 1995; Koike, Minakami et al. 1997; Chan, Silverman et al. 1999). Further studies have found beneficial effects of the utilization of corticosteroids in reducing the immune-initiated damage to the developing fetal heart (Ostensen 2004; Hussain and Parke 2006; Tincani, Danieli et al. 2006; Jazwinska-Tarnawska and Niewinski 2008). Although these treatments have favorable results to the fetal outcome, long-term side effects of the medications can increase morbidity (Tincani, Danieli et al. 2006). For example, administration of high-dose corticosteroids during pregnancy can lead to premature rupture of the membranes, intrauterine growth retardation, gestational diabetes, hypertension, osteoporosis, and avascular bone necrosis (Mok and Wong 2001).

After evaluating two possible models of CHB, I suggest a synthesis of the two models that focuses on apoptosis as a target for possible therapy. In each model, either by physiological occurrence or calcium dysregulation, the end result is apoptosis of the cardiomyocytes which exposes the intracellular antigens that could be identified with antibodies in maternal circulation. A possible pharmacological model for treatment would involve developing a drug that inhibits antibody binding to specific Ca++ channel which continues to be operationally functional. This chemical could possibly bind to a specific region on the antibodies which would prevent it from binding to their appropriate antigens despite interacting with these antigens. Because maternal Anti-Ro/SSA antibodies are innate to the maternal circulatory system and are key factors in both models, pinpointing this immunological structure would be pertinent to discovery of a treatment. A hypothetical drug would need to be administered to the gravid female during the critical phases of fetal cardiac development. Extensive pharmacological research testing would be needed to investigate the possibility of teratological effects on the fetus. In addition, molecular and biochemical techniques such as electron microscopy and protein analysis should be utilized to identify the specific site the antibody that can be affected by the drug and to characterize the complete structural components of the antibody, respectively.

**Conclusion**

Systemic lupus erythematosus is an autoimmune disorder in which symptoms can be exacerbated in affected pregnant females.
The increase in symptoms in the female can negatively affect the health of the fetus, and it is imperative to closely monitor these at-risk pregnancies. This risk is due to the ability of maternal autoantibodies to cross the placenta and initiate pathogenesis of the fetus. One of the most severe SLE-associated conditions is the formation of congenital heart block and can develop as a result of the passage of maternal autoantibodies. Research has been initiated to examine the mechanisms of SLE-associated congenital heart block, and generate potential therapies to prevent the affects of maternal autoantibodies. Today, two differing models of NLE-associated exist, however, with the current information available it is difficult to determine which model more precisely describes the mechanism regulating the formation of NLE-associated CHB. Since both models describe the formation of NLE-associated CHB result in cardiac apoptosis, it is plausible that both models present a part of the entire mechanism(s) and thus do not preclude either model. Specifically, it is possible that the “alternative mechanisms” is a precursor to the widely accepted model of maternal autoantibodies attacking developing fetal cardiac tissue and vice versa.

Understanding the molecular pathways of systemic lupus erythematosus, neonatal lupus erythematosus, and congenital heart block are all necessary in finding an effective treatment and possibly a cure. Research in these areas would be increasingly beneficial to the scientific community and helpful in improving the quality of life of individuals affected by SLE. Additionally, as CHB associated with maternal lupus status is highly correlated with the ethnic background of the mother, these studies also offer the opportunity to examine a developmental model of health disparities.
**Works Cited**


Humanities
From Freedom to Bondage:
The Jamaican Maroons, 1655–1770

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ABSTRACT
The Jamaican Maroons were not a small rebel community; instead, they were a complex polity that operated as such from 1655-1770. They created a favorable trade balance with Jamaica and the British. They created a network of villages that supported the growth of their collective identity through borrowed culture from Africa and Europe and through created culture unique to Maroons. They were self-sufficient and practiced sustainable agricultural practices. The British recognized the Maroons as a threat to their possession of Jamaica and embarked on multiple campaigns against the Maroons, utilizing both external military force, in the form of Jamaican mercenaries, and internal force in the form of British and Jamaican military regiments. Through a systematic breakdown of the power structure of the Maroons, the British were able to subject them through treaty. By addressing the nature of Maroon society and growth of the Maroon state, their agency can be recognized as a dominating factor in Jamaican politics and development of the country.

In 1509 the Spanish settled Jamaica and brought with them the institution of slavery. By 1655, when the British invaded the island, there were 558 slaves.1 During the battle most slaves were separated from their masters and fled to the mountains. Two major factions of Maroons established themselves on opposite ends of the island, the Windward and Leeward Maroons. These two groups formed the first independent polities from European colonial rule. The two groups formed independent from each other and with very different political structures but similar economic and social structures. Nevertheless both groups

1 Bryan Edwards. “Observations on the Disposition, Character, Manner, and Habits of Life of the Maroon Negroes of the Island of Jamaica; and a Detail of the Origin, Progress, and Termination of the Late War Between Those People and the White Inhabitants.” In Maroon Societies: Rebel Slave Communities in the Americas, edited by Richard Price. (Baltimore: The Johns Hopkins University, 1973), Pg. 231
suffered from increased bondage by the British under the guise of treaties promising autonomy.\(^2\) The British never recognized the Maroons as independent and did not view the treaty as a document that would bring balance between the two nations. The children of former slaves created a unique collective identity and created a nation. From 1655 to 1770 the Maroons were integrated into the British bondage system through external military force, internal sabotage, and lack of political cohesion.

In 1660 the British hired Capitan Juan de Bolas to lead an army against fellow Maroons. The British gave him an individual land plot in exchange for his services; four years later de Bolas had reduced the number of Maroons from 558 to one hundred and eventually perished during a campaign against a remote village in the Blue Mountains.\(^3\) The number of Maroons was a small fraction of the total population of the island and was not consolidated or united, with each village having 30 members or more. Maroons operated independently from British interference for the next 84 years. Their engagement was initially limited with others on the island. Contact was primarily through raiding and trading with slaves unwilling to leave their plantation.

Raiding took place mainly at night and without preemptive motives. Raiding was an act of desperation as trading was more the norm. Trading happened on a daily basis. Maroons would go into towns and trade in the markets with free blacks and also develop relationships with slaves in order to access goods only found on the plantation. Goods needed from the plantation and market place included farming tools, textiles, and iron and copper products. Goods gained from raiding included money, weapons, women, and slaves; however, they practiced a policy of isolationism.

The isolation policy adopted by the Jamaican Maroons allowed them to grow in political and social complexity. This allowed for generations to be born not on plantations but in Maroon villages. They utilized land suitable for agriculture which allowed for self-sufficient agriculture production. With population growth and the expansion of hunting and agricultural ground the Maroons who had not been born on the plantation established a sense of identity that was unique and free from bondage and identification with Britain.

The Maroons made extensive contact almost on a daily basis with slaves on the plantation—trading food products they had grown for tools, weapons, textiles, and pots and pans that they were unable to manufacture themselves. He argues that it was necessary in order to recruit new members because the mortality rate of life in the mountains was high.\(^4\) Even though mortality rates were high Maroons did not need to be recruited. Slaves participated in petite marronage on a daily basis. It was not unusual for slaves to go absent for a day or two and return. Slaves were given reign by the plantation overseer to participate in an urban environment that allowed them to travel long distances away from the plantation. Slaves sometimes migrated from plantation to plantation when they felt that the master’s punishments were too grueling or unjust. Seasoned slaves and slaves born on the plantation participated in this kind of marronage, primarily because they had a heritage on the plantation that included a family unit. The increase in Maroon numbers was caused by grand marronage; mainly engaged in by slaves who had recently arrived in Jamaica and had not finished the

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\(^2\) The word treaty was defined as a formal agreement between two or more states in favor of peace and trade.


seasoning process, a five year process of working on the plantation.

Grand marronage was carried out by large groups of slaves and their goals were to join a Maroon group or form their own group, and most importantly never return to the bondage system which they had left. Grand marronage was conducted through rebellion or organized fleeing. In 1673 a Maroon–instigated rebellion on the Lobby Plantation set the precedent in Jamaica. The rebellion ultimately failed but it inspired other slaves to use the same organizational processes, utilizing knowledge of the landscape and military skills to help them escape, for the next 50 years. Again in 1673, St. Anne Plantation revolted under its own population's organization and three hundred slaves escaped into the Cockpits occupied by the Leeward Maroons. In 1685 the Widow Grey Plantation experienced a revolt that allowed 150 slaves to escape. In 1690 on the Sutton Plantation four hundred slaves revolted and was heralded as the manifestation of Maroon organization efforts. Only 40 managed to escape, but the message had been understood by the British.\(^5\) Upward of 1,500 slaves revolted across the island, but there is no evidence that the majority of revolts were initiated by Maroons, unlike Brazil where rebellions were decidedly organized by Maroons. From 1655 to 1690 the Maroons had grown in numbers and even though they had limited contact with slaves their presence was already that of legend.\(^6\)

The British reacted by financing campaigns against the Maroons beginning in 1700. The expenditures reached 250,000 pounds and the British death toll rose to three thousand men.\(^7\) In 1734 the Governor of Jamaica stated:

We are not in a condition to defend ourselves... and their success has had such influence on our other slaves that they are continuously deserting to them in great numbers... without your Majesties gracious aid and assistance must render us a prey to them.\(^8\)

The Governors' concerns were echoes of the British crown which had written a letter claiming the conflicts with Maroons were going to bankrupt the country. The lack of labor on the island was threatening sugar production as grand marronage was on the rise, primarily due to lack of authority on the plantation. Most owners lived in Britain rather than Jamaica, and their overseers participated in military campaigns against the Maroons only if the master had traveled to the island. The urgency of correspondence between Britain and Jamaica prompted the Governor to take a census of the Maroon population.

In September 1734, an estimate on Maroon population was released by the British: “The Windward [eastern] Rebels... amount to 490 persons... Those to the Leeward [western]... about the same in number...”\(^9\) The estimates were based on Maroon mortality in battle. Maroon casualties reached at the maximum two hundred men.

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\(^6\) After 1690 Maroon numbers stabilized as mortality rates provided equilibrium against new runaways, however, Maroon reproduction rates were high and helped population growth through 1734.

\(^7\) The causalities were much higher than Maroon mortality in battle. Maroon casualties reached at the maximum two hundred men.

\(^8\) Address of Governor, Council and Assembly of Jamaica to the King, 21 February, 1734. This speech was published in Silvia W. De Groot, Catherine A. Christen, and Franklin W. Knight. “Maroon Communities in the Circum Caribbean.” In *General History of the Caribbean: Volume II The Slave Societies of the Caribbean*, edited by Franklin W. Knight, 169-193. (London: UNESCO Publisher, 1997), Pg. 56-91

on plantation owners who had submitted forms claiming the number of slaves that had abandoned their plantation. The figure was also based on the number of Maroons they encountered on their military campaigns. Based on the numbers of escapees in previous years through rebellions, this number was inadequate. The only record from Maroons is that of Leeward Headman Cudjoe who recorded “231 men…women and children are considerable and in proportion to men.”

10 Cudjoe reported false numbers in an attempt to soften tension with the British. The number of men was greater than that of women and children because the proportion of men brought to the Americas is much greater than that of women; the number of women who participated in marronage was small, as they had established kinship or family ties on the plantation. Leeward and Windward Maroon combined population reached well over one thousand by 1735 and the communities had developed an independent economy and material culture.

The Maroons grew cocoa, sugar cane, plantains, melons, yams, corn, banana, wild yams and roots, and cabbage. The villages traded with each other for foodstuffs cultivated in various parts of the mountains. Trade networks between villages made it possible for communities to build entire safe houses specifically for storage and house merchants traveling around to all the different villages. 11 The size and location of settlements outlined during excavations of Accompong Town suggested they were too small to be occupied by a large number of people and that at the most around 30 people could occupy the settlements. The outposts were not used for defense. Defenses were built into the villages and the Maroon populations trained in combat. This number is too low to accommodate the number of men used for military protection and is perfectly suited to fit the number of people allocated to conduct trade. Accompong of the Leeward Maroon community was the largest of the communities and built the largest outposts. The buildings had accommodation of 30 people which proves that they were used for storage and trade. They were hidden so that new runaways would not find and loot the buildings also, so that Europeans would not find and destroy the surplus. If they were used for any other purpose than storage and trade then such measures would not have been made.

The Windward Maroons built their outpost on the rivers because fields suitable for agriculture were not in close proximity and they relied more on fishing. They also traded food products with slaves on the plantation and with free blacks in the urban market. If they were unable to produce enough to be self-sufficient or did not have enough surplus to engage in trade they raided. Maroons hunted extensively and raised hogs and birds for consumption. Salt was difficult to find for the Windward Maroons and relied on boiling salt water, which meant they were in closer against the Maroons and then transformed into storage units. Kopytoff argued settlements were built in case of emergency relocation but they were much larger in scale and built not far from the original settlement, preferably near a known productive agricultural field. She also says that the large scale settlement functioned in similar fashion to the small outposts when they were not used.

proximity to the plantation complexes than the Leeward Maroons. Plantations were located near the ocean so saltwater could be easily gathered for local salt production; also, access to trading ports was greater. Their location gave them greater access to trade with non-Maroons. The Leeward Maroons relied heavily on wood ash for their salt needs. Salt was needed to preserve food products and was used medicinally for cleaning wounds. Wood ash was the only substance available that was comparable to sea salt or desert salt.

The agriculturists of the Maroon communities formed a non-militant faction of society. They were not armed on a continuous basis. The Maroons were able to build an artisan class which engaged in building canoes, spears and various kinds of arrows each designed for a specific purpose. They also made many musical instruments including the abeng, a horn-like instrument, sometimes as rudimentary as a conch. They also made numerous variations of the drum. With specialization and large population, the Maroon settlements were complex and self-sustaining. The Leeward Maroon Community of Old Nanny Town consisted of 120 separate huts with the village zoned for living and working quarters. Each village had a “Dancing Palace” where Headman conducted rituals and ceremonies. The Headman functioned not only as social leader but political leader, too.

Political structures and Headman roles varied between the Windward and Leeward Maroons. The Leeward Maroons were centralized and leadership was based on kinship. Succession of Windward Maroons was matrilineal and always went to a younger generation instead of a brother, sister, or older relative. Leeward Maroons were patriarchal instead of matrarchal. By 1730 Cudjoe was the Leeward Headman and claimed legitimacy based on his lineage; his father was the Maroon who instigated the Sutton Plantation rebellion. Cudjoe claimed to be Nanny’s “brother” and claimed legitimacy through her lineage and his father’s lineage. Cudjoe was able to consolidate the villages under his authority by taking power away from the individual obeah women, further perpetuating patriarchy in Leeward Maroon society. He did allow obeahs to control domestic matters but economic and military policies were decided by Cudjoe. The Windward Maroons were more like a federation than a monarchy and it was more egalitarian than totalitarian. There was communal leadership, and hierarchy was based on age with elders at the top. Law and order was conducted by society as a whole. Obeahs were more influential and were advisors to the elders. Obeahs were considered to be in the second highest positioning society. They were described as “supernatural technicians exercising their powers on behalf of the group, and they might begin to take on political powers and apply ritual sanctions on behalf of the group.”

This was especially true of Nanny, the founder of the Windward Maroons.

She was one of the only obeahs to exercise the full potential of her position. Most obeahs never engaged in fighting and were at odds with Headman over political control. Nanny, on the contrary, carried a large knife belt with 12 knives at any given time. Her reputation was solidified as a fierce warrior when she returned from battle against the Europeans with bracelets.

14 Kopytoff, pg. 83
15 This was evident when Windward Headman Quoha said: “When I consulted our Obeah woman, she opposed the measure, and said him being beccara [whites] for take the town, so cut him head off.” This quote is found in Kopytoff, pg. 85. The larger text can be found in the Jamaican archives. The message had been recorded by an unknown soldier held captive by the Windward Maroons. The “measure” that was “opposed” by the Obeah was to keep the captive soldier as a slave. Also, the term “beccara” can be found spelled “bakra.”

13 Agorsah, Pg. 20-25
made of British teeth wrapped around her wrists and ankles. She had proven that the Maroon nation had legitimatized itself as a self-regulating political entity. She was said to have taken on the “... role of Queen Mother of Ashanti.” For most obeahs it was difficult to maintain power, one wrong prediction would dismantle their reputation within the community and they would be reduced to agriculturalists. The obeah is a part of Maroon society that is directly linked to its African heritage. Most runaways that joined through 1739 were African-born and obeahs are only one of many cultural aspects incorporated.

For Windward Maroons every aspect of culture was inherently African; the nature of authority, the belief in the supernatural, kinship relations and obligations, division of labor among the sexes, Headman roles, ritual leaders, and polygamy. Each village had its own medicine man and mid-wife. One of the strongest African influences was that of marriage and residence relations. Males could not settle in a new village individually while women could, and residency status usually depended on economic situations and hierarchy of lineage unlike Leeward Maroons. Leeward Maroons amalgamated cultural influences, successfully combining African and European religion, agricultural practices, and a rigid class system. This was more prevalent by the Maroons who had been born on the plantation in the Americas and those who had been institutionalized for more than five years. As a result of closer proximity to Europeans over the years Maroons increasingly took titles such as Colonel, Captain, and Governor.

Proximity to plantation settlements was essential to Maroon communities and the importance increased as the British waged campaigns against them, burning their food crops and storage units. Proximity to Amerindians increased in significance over time, many of the agricultural techniques were developed by Amerindians and taught to Maroons; however, relations diminished as time progressed due to encroachment on Indian hunting territory. Amerindians were also being contracted by the British to besiege the Maroons. Military alliance and competency was essential in keeping independence. Constant warring put a strain on all inhabitants’ military capabilities.

Major General Sedgwick foresaw the escalated incidents in 1656: “[Spanish slaves] must be destroyed or brought in... or else they will prove a great discouragement to the settling country.” These sentiments were reiterated in a more acute form in 1734 when the Governor of Jamaica said:

We are not in a condition to defend ourselves, the terror of them spreads itself everywhere and the ravages and barbarities they commit, have determined several planters to abandon their settlements, the evil is daily increasing and their success has had such influence on our slaves that they are continually deserting to them in great numbers and the insolent behavior of others gives but too much cause to fear a general defection.


17 Ibid, Pg. 109

18 Orlando Patterson “Slavery and Slave Revolts: A Socio-historical Analysis of the First Maroon War, 1665-1740.” In Maroon Societies: Rebel Slave Communities in the Americas, edited by Richard Price, 246-292. (Baltimore: The Johns Hopkins University, 1973). He argued they were very much syncretic: “Marriage systems forged in response and resistance to the dehumanization of slavery drew on both underlying African culture values and a transformation of European marriage to create a Caribbean Creole system of conjugality and procreation.”


20 Edwards, pg. 232

21 Address of Governor, Council and Assembly of
These concerns were coupled with increasingly expensive campaigns. Major-General Brooks remarks:

...to make a good mule road to the Negro town if practicable to be done and if not to find another road that may be made so, as the success of the present expedition will chiefly depend upon a constant supply of provisions and ammunition.\textsuperscript{22}

Distribution problems and casualties were not only experienced by Europeans but Maroons as well; however, the mortality for Maroons was not from combat but rather starvation and disease.

Prior to 1734 Maroons were not disrupting the plantation complex on a large scale and the limited contact was neither hostile nor repercussion-producing. After 1734 Maroon activity in close proximity to the plantations was viewed as a high threat, and militias were sent to destroy Maroon settlements and enslave if not kill them. The Maroons increased their isolation policies in order to keep the threat of British military action low. In order to drive the Maroons out of the mountains, the British burned agricultural fields, barred trade in urban areas between blacks, and restricted movement of slaves on the plantation and throughout Jamaica. The actions and reactions of both the Maroons and the British detrimentally exacerbated the incidents:

The Maroons were not less anxious for an accommodation they were hemmed in and closely beset on all sides; their provisions destroyed; and themselves reduced to miserable a condition by famine and incessant attacks, that Cudjoe declared, if peace had not been offered to them, they had no choice left but either to be starved, lay violent hands on one another, or surrender to the English at discretion.\textsuperscript{23}

Equally, the British were feeling the “horror of continual alarms, the hardships of military duty, and the intolerable burden of maintaining an army on foot.”\textsuperscript{24} The British were unaware that one or two more campaigns would have permanently crippled the Maroons. Before either side exterminated itself, the British offered a peace treaty in 1739. This treaty was the first step in assimilating the Maroons into Jamaican society; although, the assimilation was guised as recognition as an autonomous nation for Maroons.

The first draft of the treaty recognized only one town of the Leeward Maroons and none of Windward Maroons. Trelawney Town, Accompong, Crawford Town, and Nanny Town adhered to the treaty after Cudjoe reported it to each village; the British believed his lineage claim to both Windward and Leeward would give him the ability to represent all Maroons. The inability to recognize Cudjoes’ treachery incorporated Maroons that otherwise were self-governing and economically sufficient. Many provisions and stipulations were offered to the Maroons; including returning new runaways and those in the community who had been members for two years or less. Since the first draft only recognized one town, Trelawney Town, the land allotments were outlined exclusively for that town. The “ambiguity . . . of Maroon-Government relations allowed much flexibility in the application and interpretation of the treaties and eventually gave rise to serious differences between the two parties,”\textsuperscript{25} the difference being in favor of the Maroons who were largely still acting with limited restriction. The Maroon economy was still allowed self-sufficiency through production of cash crops, except sugar cane. They could not, however, hunt within three miles of any

\textsuperscript{22} Carey, pg. 279

\textsuperscript{23} Kopytoff, pg. 106

\textsuperscript{24} Ibid, pg. 107

\textsuperscript{25} Ibid, Pg. 118
British settlement. They were also required to build roads to their communities accessible by the British. This was a major process that would inextricably link the downfall of Maroon autonomy.

The British believed that all Maroons were highly centralized and gave full social authority to Cudjoe: “That Captain Cudjoe… and the Captains succeeding him shall have full power.” The model was suited for the Leeward political structure but undermined the Windward political structure by forcing the egalitarian system into a patriarchal hierarchy. It also diminished the significance of obeah in politics. The British replaced obeahs with white superintendents stationed in or near the villages. Cudjoe’s village was required to have two and they were to be paid two hundred pounds annual salary. Their main goal was to “…receive and communicate such orders as shall be sent by his Excellency the governor to the said Negroes.” The mandate transferred the political power of Headman to the Governor of Jamaica. The governor ordered all Maroons to declare war against the Spanish. The Maroons were stripped of rank in the militias and all officers were British. If succession lines ran out in any hierarchical structure the appointee would be placed there by the British not the Maroon consensus.

In 1741 the treaty was revised in order to support European feudal notions of subjectship. Nanny Town received 500 acres in the parish of Portland. Maroons had an annual tax of one pound on the land and owed 1/20th on profits made by community. The town was required to have five white superintendents. Only a few towns had been given land outlines, and most Maroons hunted and farmed far beyond their allotted territory. The expansion led to encroachment on British plantations and frontier settlements. This culminated in the purchase of the Peete Plantation by Britain for Maroons. In exchange for the 610 acre allotment they had to police surrounding plantations. Accompong was given 1,500 acres of land it were to be divided by all Leeward Maroon settlements. Encroachment also led to the purchase of one thousand acres of St. Elizabeth Plantation. By this time the Maroons communities had been encompassed by whites. This was strategically done by Britain to keep land usage by Maroons as limited as possible and to restrict trade with one another and keep trade dominated European sanctions.

Under huge stress on the land, widespread starvation occurred and the Maroons rebelled. Trelawney Town and Crawford Town dissolved only to reestablish themselves as Scotts Hall and Charles Town. The agricultural variety plummeted and production was regulated; Scotts Hill was required to grow a certain amount of arrowroot and Charles Town was required to grow coffee and harvest lumber. Cudjoe’s town was the only Maroon town after the treaty allowed to raise cattle. His town was also required to grow tobacco. Accompong was required to grow coffee and pimento. This caused large economic imbalances within the Maroon community causing Maroons to rely on grants from the British.

It was necessary to keep the economy floating since Britain’s revision of the treaty in 1744 which stated slavery in Maroon communities was illegal. The breakdown of the slave labor system in the Maroon communities was covered up as the Act for the Better Order and Government of the Maroon Communities. This measure tore apart the social system and economic systems began slowing. The constant provisions and enforced restriction on treaties that were redesigned to enfranchise Maroons.
caused internal dissent. In 1749 Crawford Town rebelled and successfully murdered their Headman Crawford and British superintendents. Dissatisfaction with the Headman diminished their authority in the Maroon community.

The treaties restricted the Headman’s ability to organize a militia and to exercise the death penalty, which were the two main sources of fear induced power over the community. Their power was also limited by restricting their access to the Jamaican government. The intrusion of superintendents on the villages further alienated the Headman from the group as they took over the role of mediator between the British government and the Maroons. The Headman’s ability and the group’s ability to appoint or elect their own leader was stripped from them:

A structure was erected—a group of Government-appointed Maroon officers, supervised by White superintendents, complete with commissions, and badges to legitimize it, but it never carried enough authority to satisfy other Maroon needs or British requirements.28

The British treaty put the Maroons in a cycle of perpetual regulation and oppression.

The British government increasingly added more superintendents that would specifically control militias. Over time the responsibilities of all superintendents increased as the Headman’s responsibilities waned. In 1770 a superintendent-general was appointed to the Leeward Maroons and one was appointed to the Windward Maroons. It reduced the Headman’s role to figurehead and the British government had control over all aspects of Maroon life. This solidified the whites as the wholly recognized supreme authority. The British government had been able to reduce the once autonomous Maroons to petty subjects.

Between 1655 and 1739 the Maroons of Jamaica functioned as an independent polity and had total control over their own economic, political, and social systems. Competition over resources and trade caused conflict between the British and the Maroons; internal sabotage exacerbated hostilerelations and caused disunity among the Maroon groups and their leaders. In 1739 a treaty was signed promising recognition of the Maroon state in return for menial regulations. The revisions eroded Maroon agency from 1739 to 1770 and reached a apex when the superintendents took over governing practices from the obeahs and headmen, ultimately leading to total economic, social, and political control by Britain and ended Maroon autonomy. The utilization of documents written by the British, archaeological excavations of settlements, and the most recent ethno-histories were essential in analyzing Maroon hegemony. The Maroons established a complex society with distinct culture and identity; it was through external and internal coercion that Maroon autonomy was stifled.

28 Ibid, Pg. 208
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America’s Changing Mirror: How Popular Music Reflects Public Opinion During Wartime

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Entertainment is always a national asset. Invaluable in times of peace, it is indispensable in wartime.

All those who are working in the entertainment industry are building and maintaining national morale both on the battlefront and on the home front.~

~Franklin D. Roosevelt, June 12, 1943

Whether or not we admit it, societies change in wartime. It is safe to say that after every war in America’s history, society undergoes large changes or embraces new mores, depending on the extent to which war has affected the nation. Some of the “smaller wars” in our history, such as the Mexican-American War or the Spanish-American War, have left little traces of change that scarcely venture beyond some territorial adjustments and honorable mentions in our textbooks. Other wars have had profound effects in their aftermaths or began as a result of a catastrophic event: World War I, World War II, Vietnam, and the current wars in the Middle East. These major conflicts create changes in society that are experienced in the long term, whether expressed in new legislation, changed social customs, or new ways of thinking about government.

While some of these large social shifts may be easy to spot, such as the GI Bill or the baby boom phenomenon in the 1940s and 1950s, it is also interesting to consider the changed ways of thinking in modern societies as a result of war and the degree to which information is filtered. Because the thoughts of a nation’s citizens are seldom expressed explicitly, exploring pop

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culture during wartime may be a good way to gauge America's feelings about war. For the sake of clarification, pop culture is defined as "commercial culture based on popular taste." There are many aspects of pop culture that address the topic of war, but to best understand how everyday citizens felt about wars of the twentieth century, music is one of the best media to consider. Music is readily available and abundant in both amount and variety. In addition, given that participation in music is available to everyone, it provides a means to look for themes of continuity or change over time.

Music's role during times of war has changed throughout the twentieth and twenty-first centuries. The present research will consist of the four wars previously mentioned: World War I, World War II, Vietnam, and the wars in the Middle East (including the Gulf War of the early nineties, the war in Afghanistan, and the war in Iraq). After studying the popular songs of these wars, it is evident that how music is used has changed over time. Once used as a tool for military recruitment or a means to boost public support of world conflict, music's role changed drastically during Vietnam to become the people's outlet for anti-war sentiment and criticism of the government, a role which, for the most part, persisted to the present. These changes reflect a larger, changing public opinion that became altered with the advent of mass media in the war zone. As the media became more unfiltered, the music became more uncensored, willing to express more radical views from supporting desertion to overthrowing the government. In a way, war, or at least the media's depiction of it, made culture more democratic.

To show this change over time, it is necessary to explore the popular music of each of these wars. The first step in the process will be to examine how the songs of World War I were developed and identify social opinions about war that may be reflected through the music. World War II will be examined in a similar fashion, but given the greater number of US troops in the conflict and, by extension, a greater involvement of US citizens, it will be necessary to consider how music adapted to reflect the changing atmosphere.

Coverage of Vietnam will reveal the shift in public opinion from pro-war to anti-war, exposing growing divisions within American society. These are, of course, generalizations, but this research will consider songs that address both sides of the conflict. How the anti-war protestors expressed their views in song (i.e., what language they employed) will also be studied.

The final portion of the paper will explore music associated with the wars in the Middle East. Given that these wars are ongoing, secondary research on the subject is very limited, but the songs available are abundant. By exploring songs that have been released in recent years and recognizing similar patterns from previous wars, this paper will ultimately consider the current direction of public opinion.

The songs themselves will commonly be referred to as “war songs.” For the purposes of this paper, to be considered a “war song” the song in question must be released during a war and the lyrics must address a topic related to the conflict on the warfront or “back home.” These topics vary greatly from war to war, but many prevailing themes have been opinions concerning the draft, separation of loved ones, fulfilling one’s duty, motivating the troops, and criticism of the conflict itself or the world leader responsible. Those songs that may have been written during a war but address alternate themes, such as the drug subculture or civil rights in the 1960s, will not be considered in this research.

To understand why this research is important, it is necessary to recognize the link between music and society itself. The
impact of music on society has been greatly debated as far back as Plato. In The Republic, he argued that music can influence not only individuals, but also for whole societies. For this reason he urged that some musical expressions be encouraged, but others be banned because, as he stated, “when modes of music change...the State always changes with them.”

War songs in the World Wars operated with a similar point of view. It was commonly understood that music can build morale or mobilize the masses. Music could be used as a vector for change to ease confusion during conflict. Furthermore, as writer Les Cleveland asserts, music can be “infused with a sense of individual worth and national urgency.”

World War I: Reluctantly Going “Over There”

During the early years of World War I, before the radio was available in every household, the best way to gauge a song’s popularity was by counting sheet music purchases, which Billboard charts reflect. Many of the songs prior to the United States’ involvement in World War I reflected strong support for neutrality. Such melodies included Blanche Merrill’s “We Take Our Hats Off to You, Mr. Wilson” sung by Nora Bayes and Fanny Brice in 1914. In the song, Wilson is hailed as “the world’s great mediator” because his “pen is greater than the sword.”

1914 was the first year of the Great War and under President Wilson the United States remained neutral despite the conflict overseas. Americans were not ready to fight a war, and many citizens did not see a good reason to get involved in what they believed was another country’s fight; according to the song, they supported Wilson’s role as a peacekeeping mediator.

Public opinion experienced a shift following the sinking of the Lusitania in May 1915. When the story reached American newspapers, the public was outraged at Germany’s unrestricted submarine warfare. As a result, titles such as “When the Lusitania Went Down,” written by Charles McCarron and Nathaniel Vincent, were released. Nevertheless, even after the sinking of the ship many Americans were still reluctant to join the fight.

When the United States began to consider mobilizing troops, several songs were released that showed support and protest for the war. The common misconception is the assumption that World War I songs were all in support of the war, but this is not the case. There was a presence of openly pacifist sentiment reflected in song, mostly through the eyes of parenthood. According to the Billboard charts, Al Bryan’s “I Didn’t Raise My Boy to Be a Soldier” was a very popular song at its release in 1915. With lines like “Who dares to place a musket on his shoulder / To shoot some other mother’s darling boy,” the message of the song implies that war would be nonexistent if more mothers spoke out in opposition.

While this song was very popular in 1915, it faded by April 1917 when the U.S. entered the war. Even Al Bryan later re-
wrote his song, giving it the title “It’s Time for Every Boy to Be a Soldier.” The songs considered “pro-war” during World War I used commonly recognized American symbols to arouse patriotism. Songs with titles like “We Shall Never Surrender Old Glory” and “Uncle Sam Will Help You Win the War” used this imagery as a means to encourage participation in the military and industrial ventures for the war effort. The American flag became an icon in songwriting and the focus of many war anthems. In fact, the national anthem “Star-Spangled Banner” was made popular in 1914, even though it was penned by Francis Scott Key a century earlier. After it reemerged, it remained an important rallying song and was used constantly at public events.

By far the most popular song of World War I was George M. Cohan’s “Over There.” Released about two months after the United States entered the war, it became the number one song on the Billboard charts in 1917. Sung by Nora Bayes, the song urges families and sweethearts to be happy their loved ones are heading off to battle to “show the Hun [they’re] a son of a gun.” The upbeat tempo and sound of the drums in the song are reminiscent of troops marching. Soldiers are urged to “hoist the flag and let her fly/Yankee Doodle do or die” and go into battle with the intention of bringing pride to their country. The song was an instant success, and remained so until the end of the war. For his part in contributing the lyrics, Cohan was actually awarded the Congressional Medal of Honor in 1936.

Following the war, there was a growing sense of inevitable change as a result of the world conflict. After having gone overseas and being exposed to other cultures, many soldiers returned home and desired a life outside of the small-town atmosphere they were raised in. Such is the subject of the popular 1919 hit, “How ‘Ya Gonna Keep ‘Em Down on the Farm (After They’ve Seen Paree?),” which became one of the top singles on the Billboard charts that year. The song is a conversation between a farmer named Reuben and his “wifey dear” who discuss the likelihood of their sons staying on the farm. The mother represents the voice of the past, with the desire to have her sons return to a life of normalcy after the war: “…farmers always stick to the hay.” Reuben, on the other hand, represents the voice of reason that reflected a growing realization that the war had changed everything:

They’ll never want to see a rake or a plow
And who the deuce can parley vous a cow?

Although parts of the song are humorous for the listener, there is a clear message that exposure to other cultures during war have led to social change, and many who returned home desired to move into the cities.

As the lyrics indicate, there were different views related to the war during World War I. Prior to the sinking of the Lusitania, the songs released reflected the public support for neutrality. It was only after the newspapers broke the story that the songs supported the war effort, and largely so; the most popular song “Over There” favored involvement in the Great War. Still, there were voices of opposition, but these popular songs resonated mostly with worried parents. When the war was finally over, Americans understood that their

12 Alfred Bryan, “It’s Time for Every Boy to Be a Soldier,” 1917.


14 Watkins, Proof Through the Night, 289, 297.


17 Joe Young and Sam M. Lewis, “How ‘Ya Gonna Keep ‘Em Down on the Farm (After They’ve Seen Paree?),” 1918.
country was forever changed, as reflected by “How ‘Ya Gonna Keep ‘Em Down on the Farm.”

**World War II: Preferring Not to “Sit Under the Apple Tree” with the NWMC**

With roughly a million American troops killed and wounded, the reach of World War II was exponentially greater than the previous one. The music industry consequently reflected an array of varied feelings about the conflict. The changes in society following the Great War were illustrated through several war songs and, as one historian states, mirrored a “corresponding shift away from homogeneity of America during World War I.”

Technological changes during the interwar years set the stage for the musical scene of World War II. The radio became the premier source of media and information during the 1920s and 1930s with the typical American citizen listening to it around four and a half hours a day. Not only did Americans listen to radio more frequently, but there were more and more radios available in the home; the percentage of homes with at least one radio rose from 67% in 1935 to 89% in 1945. While the main reason for owning a radio can be debated, it is not far-fetched to assume that more radios would equate to more opportunities to listen to music, hence the war songs having a stronger influence on society, however subtle.

The federal government understood the mobilizing potential that media could have on Americans. In June of 1942, the Office of War Information (OWI) was formed with the intent to maintain morale and regulate information coming in about the war. In their book *Music of the World War II Era*, authors William and Nancy Young described the institution as the following:

> The OWI hired artists to create propaganda posters on subjects as varied as rationing and saboteurs, put together several hundred newsreels about both the war and the home front to show in theaters…and utilized radio by producing numerous broadcast series that heightened public awareness about current events.22

Furthermore, the head of the OWI, Elmer Davis, created the NWMC, or the National Wartime Music Committee. As the title implies, the committee’s purpose was to evaluate the appropriateness of war songs for the public. The committee identified songs that encouraged the citizens or motivated the troops, acting as national music arbiters and extending their governmental influence into the music business. Their quest for the perfect war melody, however, proved to be a big disappointment, as only a few songs attracted any attention. After the failures of the NWMC to boost morale through music, the committee voted itself out of existence in April 1943.

Of all of the songs the NWMC released, only two were popular in the American mainstream. “Comin’ in on a Wing and a Prayer” and “Praise the Lord and Pass the Ammunition” both became big hits, with the latter going to number one on *Billboard* in early 1943. “Praise the Lord” told a story of a pilot who encouraged a group of gunners to keep fighting the good fight:

> Praise the Lord and pass the ammunition
> And we’ll all stay free.25

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19 Jones, *The Songs that Fought the War*, 16.

20 Ibid., 22.


23 Ibid.

24 Ibid., 9.

The catchiness of the song is undeniable, and the NWMC managed to cleverly pass on a message: the United States must fight this war in order to preserve democracy.

Other efforts were made to fuel the war effort through songs outside of the NWMC. Tin Pan Alley, a neighborhood in New York that was home to the music publishing business, hired lyricists and composers to create war songs, many of which were big successes. It is not exactly clear why Tin Pan Alley was more successful than the NWMC, but it can be expected that while the federal government’s main concern was shaping public opinion and regulating information about the war, Tin Pan Alley’s primary motivation was making money. Thus, Tin Pan Alley followed public tastes to profitable ends. Whether or not the song was explicitly about war was of secondary importance. Over the course of the war it became more obvious that the majority of Americans did not want to hear songs about patriotism; they preferred ballads of romance or songs that were good numbers at the dance halls, like “I’ll Be Seeing You” or “Rum and Coca-Cola.”

At the onset of World War II, the songs debuted seemed to have inherited the isolationist mindset from World War I. While “Over There” had been an extremely popular song in the previous conflict, many isolationist anthems in the 1940s like “Go Back Over There,” released in 1940, used Cohan’s classic to argue the nativist point of view. Many messages in these songs encouraged dealing with “America first” before European affairs or were considered anti-immigrant. Some songs of preparedness did exist in the early years prior to the U.S. involvement, but not many. One of the more popular songs on the subject of preparedness was actually from George M. Cohan: “We Must Be Ready,” released in 1939. It was nowhere near as popular as “Over There,” though both songs share similar themes.

Pearl Harbor changed America’s mind about the war. Following the attack, there were virtually no songs of isolationism, but a vast sea of them about going off to war and its effects on soldiers and their families. Tunes like Hughie Charles’ “We’ll Meet Again” may not have been popular in its 1939 release, but its re-release following Pearl Harbor became a hit and landed on the Billboard charts in spring of 1942.

Many of the songs released during World War II were overtly pro-war in their messages. Cliff Friend and Charlie Tobias “We Did It Before and We Can Do It Again” was one of the first militant songs of the war that reached a national audience with its soldiering reminiscent of the last conflict. Other songs took a more nationalist approach with titles like “We’re Gonna Have to Slap The Dirty Little Jap” and “I’ve Got a Scrap with a Jap” that reveal a popular shared opinion of the Japanese following the Pearl Harbor attacks, albeit a racist one. Songwriters from Tin Pan Alley attempted to create music that gained support for the troops by encouraging all sorts of participation from letter-writing to saying prayers, from giving financial donations to planting Victory gardens. While their motivation was profit, it is clear that they were influenced by the powerful National Wartime Music Committee.

The lyrics of many of World War II’s most popular tunes were simple with a soft melody; the sentimental nature of the messages of reuniting lovers led to many successes. These numbers became trendy during the war as troops began to deploy.
such song, “Lili Marlene,” was originally a poem written by a German soldier in World War I. It was set to music on the Axis side and broadcast over German lines in 1941. The song became so popular among their troops that an English version was released in the United States in 1943, the most famous rendition of which was sung by the anti-Nazi songstress Marlene Dietrich, who was a German native. The song’s story of Lili who waits for her loved one by the lantern’s light outside the barracks became a celebrated tale on both Axis and Allied lines.  

Songs about hope were also prevalent during the war following Pearl Harbor. “(There’ll Be Blue Birds Over) The White Cliffs of Dover,” released in 1941, spoke about everything returning to normal “tomorrow when the world is free.” The references to Dover and the use of English sweetheart Vera Lynn in its original version tend to mislead audiences into believing the song was imported from England, but it was actually written by Walter Kent and Nat Burton, both native New Yorkers. It struck a nerve with audiences and became immensely favored throughout the war. The lyrics are simple but come attached with an emotional message, leading to the tune rising to the number one spot on Billboard in December 1941.

Other popular songs of the war included hits like “Sentimental Journey,” made famous by Doris Day, which describes the yearning to go home to loved ones and landed the number two spot on Billboard in May 1945. Over the course of the war it became clear that listeners demanded music that reminded them of their families back home or loved ones overseas, commonly referred to as “slush” songs. These melodies about affectionate relationships or the fear of separation, like “Don’t Sit Under the Apple Tree (With Anyone Else But Me),” recycle wartime romance scenarios. The majority of these “slush” songs became very popular, as the focus was on the “girl back home” instead of the war.

Another category of music that was popular was the upbeat dance songs featuring servicemen. Referred to as “khaki-wacky” songs, these hits described middle and working-class girls becoming infatuated with the soldier persona. The phrase “every woman loves a man in uniform” comes to mind with many of these songs. These melodies were rhythmic and equipped with positive messages designed to distract the listeners, such as “The Boogie Woogie Bugle Boy (of Company B)” written in 1941 by Don Raye and sung by the Andrews Sisters. Other fun songs included “(There’ll Be a) Hot Time in the Town of Berlin (When the Yanks Go Marching In)” and “Rum and Coca–Cola.” “Hot Time,” while upbeat and catchy, reminded the listener of the mission at hand: quell German dominance in the region. “Rum and Coca–Cola” incidentally would be considered inappropriate in the 1940s if one read the original lyrics. With lines like “Both mother and daughter/Workin’ for the Yankee dollar” and “They wear grass skirts, but that’s okay/Yankee likes to ‘hit the hay’” the subject of the song is clearly the good time to be had thanks to native girls in Trinidad. When the Andrews Sisters sang the song with Bing Crosby, the lyrics were revised slightly, and the song became the most popular hit of 1945.

33 Jones, The Songs that Fought the War, 77.
35 Young, Music of the World War II Era, 3.
37 Jones, The Songs that Fought the War, 221.
38 Jones, The Songs that Fought the War, 215.
39 Ibid., 216.
40 Young, Music of the World War II Era, 15.
41 Ibid., 48.
Many of the songs that have been discussed to this point might be considered part of pop, but in 1942 we begin to see country music emerge as a national genre. “There’s a Star-Spangled Banner Flying Somewhere,” written by Paul Roberts Metivier, was the war song that brought country to a larger audience. The artist credited with singing the song, Elton Britt, became the first country music artist to be awarded a gold record from the Recording Industry Association of America. After its debut on national recognition, country music has remained an integral part of wartime music.

Few songs that dealt with the war directly were considered successful. Most of the songs that were popular discussed war indirectly, as many of their characters were soldiers or “the woman left behind.” As Young and Young remarked, “The bestselling, most-listened-to popular songs… existed outside of time and place. This situation frustrated many in government looking for a stirring, chart-topping war song, but most Americans, men and women, in civvies or uniform, preferred to stay with the tried-and-true familiarity of the love song.” This truth reflects the notion that the public may have supported the war, but they were ready for it to be over so life could return to normal.

Vietnam War: “I-Feel-Like-I’m-Fixin’to Protest

The Vietnam War is the turning point in the study of war music. While many of the songs from wars in our past tended to lean in favor, Vietnam presents a startling shift in music. For the first time during a major conflict, the number of protest songs begins to outweigh the number of pro-war songs. This can be attributed to a more unfiltered media presence able to spread more information to the public.

The change in relationship between war and music and patriotism can be linked with the changing role of the media in the 1960s. The emergence of television in particular provided more opportunities to question events as they streamed into America’s living rooms. Social unrest in the 1960s, particularly related to Civil Rights efforts and demonstrations, was broadcast frequently. In the past information spread through newspapers and radio reports, but Americans had never actually seen the images beyond photographs and newsreels at the movies. Seeing the images tends to force participants to draw their own conclusions, and Americans were questioning authority long before Vietnam became their concern.

It should be understood that many citizens were unaware of Vietnam until the spring of 1965 with Operation Rolling Thunder. By then, it was too late for Americans to experience the “neutral period” that had existed in the World Wars because they were already suspicious of the federal government’s decision-making capabilities. When the images of war streamed in, many questioned authority further, especially a government that constantly tried to convince citizens that fighting communism was a legitimate reason to go to war in Vietnam. It is easy to see why a large number of anti-war songs existed; many citizens were either upset or unable to understand the images they were seeing.

Prior to that time many musicians were silent about the war. It was not until Americans themselves began to change their opinion about their presence in Vietnam that many musicians in the record industry began to market protest.

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43 Young, Music of the World War II Era, 197.

44 Ibid., 53.


46 Kenneth J. Bindas and Craig Houston, “Takin’ Care of Business: Rock Music, Vietnam and the Protest
music began to mirror American opinions more and more, the popularity of many of the anti-war songs soared. In fact, many of the tunes that are still remembered from this time were released after 1965.

Lee Andresen, an authority on music during Vietnam, argues that music “shaped and articulated public opinion in unprecedented fashion.”47 Music played a significant role with lasting impressions, enough to the point that many Hollywood movies about the war (e.g., Apocalypse Now, Full Metal Jacket, Good Morning Vietnam) often include music from the era to show its authenticity.

With the Vietnam War escalating after 1964, “folk music” reemerged, carrying the beacon of protest for the duration of the conflict. James E. Perone, author of several books on music in the 1960s, defines the renewed folk music’s leaders and characteristics:

The new generation of folk revival musicians, including Joan Baez and Bob Dylan, emerged in the early 1960s. These musicians, which by 1964 would include Phil Ochs and Tom Paxton, sang older left-wing protest music and composed songs that were in the style of folk music, but that addressed the social issues of the 1960s, including racial integration, the threat of nuclear war, labor strike, and the Vietnam conflict.48

Under the leadership of folk music, many became quickly involved in the anti-war movement. Participants included mostly young people, many of whom had already been influenced by the folk music revival on their college campuses.49 One of the early protest songs of the war was P.F. Sloan and Barry McGuire’s “Eve of Destruction,” released in the summer of 1965. At the time of its release it was criticized by several artists for being a poor expression of protest, and it was banned by several radio stations in the United States. Still, it managed to land the number one spot on the Billboard Top 100 pop charts.50

The protest songs begin to escalate with Tom Paxton’s “Lyndon Johnson Told the Nation,” released in 1965. In the song, Paxton exhibits great criticism of the president’s policy in the chorus:

Lyndon Johnson told the nation, “Have no fear of escalation. I am trying everyone to please. Though it isn’t really war, We’re sending fifty thousand more, To help save Vietnam from Vietnamese.”51

The lyrics demonstrate the frustration felt by Americans, many of whom were unable to find a good reason to “save” Vietnam from their own people and were upset that so many lives were lost when war had not been formally declared.

One of the most easily recognized anti-war songs of the Vietnam War was Creedence Clearwater Revival’s “Fortunate Son” released in 1969. The song’s opening riff is famous, along with the impassioned vocals criticizing the draft. The “fortunate ones,” according to the lyrics, are those that are from affluent families and have the means to avoid being drafted to serve overseas. The song shows traces of populist tendencies with the haves vs. have-nots struggle being implied throughout. The second verse is a good example of this:

Some folks are born silver spoon in hand, Lord, don’t they help themselves, oh. But when the taxman comes to the door,


47 Lee Andresen, Battle Notes...Music of the Vietnam War (Superior, W.I.: Savage Press, 2003), 16.

48 Ibid., 21.


50 Perone, Music of the Counterculture Era, 15.

Lord, the house looks like a rummage sale, yes. It ain’t me, it ain’t me, I ain’t no millionaire’s son, no. It ain’t me, it ain’t me; I ain’t no fortunate one, no.52

The implication is that the “fortunate ones” have found ways to subvert the system and remain privileged; that is, they use their wealth to protect themselves from being drafted in ways the poor are unable to do. The notion of Vietnam being a war in which the poor men die was a commonly held one, so the fact that the “we-they” mentality emerges between the rich and poor in these songs should not be surprising. Other songs criticizing the draft can be found from several music groups. Steppenwolf, remembered for “Born to Be Wild,” also wrote “Draft Resister,” considered a tribute to men who left their families to avoid being drafted.53

With America becoming more and more disenchanted as the war progressed, other bands came to the forefront with messages of revolution and protest. Jefferson Airplane’s “Volunteers” calls for listeners to join the revolution in the streets, and the Rolling Stones recognized the sounds of marching heard all around in “Street Fighting Man.” Other songs urged for an end to the fighting; John Lennon’s Plastic Ono Band gave the peace movement its anthem with “Give Peace a Chance” during the Paris Peace talks in 1970.54

The culmination of the peace movement was Woodstock in the summer of 1969. Thousands gathered to hear the music and many memorable songs surfaced, including the infamous “I-Feel-Like-I’m-Fixin’-to-Die-Rag” by Country Joe and the Fish. This upbeat song opened Woodstock with Country Joe shouting “F*ck” before the audiences in a rebellious exercise of free speech, an obvious deviation from the “Fish Cheer” on the album.55 His song’s use of profanity actually cost him a spot on the Ed Sullivan show,56 but the song remains a memorable anthem that spoke out against the war. Several verses find jollywaystoprotestwhatconsidered themeaninglessventureinthejungle:

And it’s one, two, three, What are we fighting for? Don’t ask me, I don’t give a d*mn, Next stop is Vietnam; And it’s five, six, seven, Open up the pearly gates, Well there ain’t no time to wonder why, Whoopee! We’re all gonna die.57

Beyond the sarcastic lyrics and fast-paced tempo of the song lies significance. The number expresses discontent over the reasons for going overseas, and makes clear that many who go will perish, evidence of which was streamed into American homes on a daily basis. But all the songs during Vietnam were not necessarily part of the anti-war movement. For those Americans who saw the war as part of the larger “domino theory,” or believed that Vietnam was a major battlefield in the war against Communism, songs that were pro-war or acknowledged the importance of U.S. intervention were well-received.58

The most well-known anthem of patriotism during Vietnam was “Ballad of the Green Berets” by Staff Sergeant Barry Sadler, released in 1966. Sadler himself was a Vietnam veteran in the Special Forces, although many of his fans were probably unaware that he also worked as

52 Creedence Clearwater Revival, “Fortunate Son,” Willy and the Poor Boys, Fantasy, 1969, CD.
54 Andresen, Music of the Vietnam War, 53.
55 Perone, Songs of the Vietnam Conflict, 40.
56 Andresen, Music of the Vietnam War, 63.
57 Country Joe and the Fish, “I-Feel-Like-I’m-Fixin’-to-Die Rag,” I-Feel-Like-I’m-Fixin’-to-Die, Vanguard, 1967, CD.
58 Perone, Songs of the Vietnam Conflict, 72.
The song’s pro-government leanings were not heavy-handed; rather, the song focused on the Green Berets as a stellar fighting unit. The fighting in Vietnam was not glorified to a large extent. These little tweaks helped “Ballad of the Green Berets” become number one on the Billboard top 100 chart in 1966, making it arguably the most popular war song in the sixties. Had the song been more evident of Vietnam support, it definitely would not have sold so well.

Moreover, with the debut of country music in World War II, we find that many country music artists were also in support of the U.S. presence in Vietnam and expressed those views musically. Johnny Wright’s “Hello Vietnam” was one of country’s first songs of support during the war. Released in August 1965, it came onto the scene closely after the first major buildup of troops had been deployed on the ground. Lines from the song reflect the belief in the domino theory:

America has trouble to be stopped
We must stop communism in that land
Or freedom will start slipping through our hands.

This recognizes the idea that America—and democracy—will be at risk should Vietnam fall under Communist control.

When considering which areas of the United States were more likely to be “pro-war,” it should be made clear that if any part of the country remained steadfastly supportive of the United States’ involvement in the war, it was the South. Even after 1965 when a large portion of the country grew angrier about the conflict, the listeners considered part of the “country music audience” were receiving more and more pro-war tunes out of Nashville. It is not entirely clear why this is the case, but there is likely a connection between the prevalence of country music and the increasing numbers of soldiers drafted from the South.

One of country’s most renowned artists during the 1960s was Merle Haggard. Remembered for contributing several country hits, he also wrote war songs. His song “The Fightin’ Side of Me,” was released in 1969 and is considered an anti-protester anthem, and the lyrics show an upset side of some Americans:

Let this song I’m singin’ be a warnin’
If you’re runnin’ down my country, man
You’re walkin’ on the fightin’ side of me.

As the words express, there was a bit of a social backlash in the face of the protesters that we commonly associate with the peace movement, and a great number of them were represented through country music.

After looking over several songs of the Vietnam War, one can notice some long-term social themes that have carried over from previous wars. One dominating theme is the fear of losing a son. Like the World War I classic “I Didn’t Raise My Boy to Be a Soldier,” this war also addressed the apprehension of having loved ones overseas. Several songs in the 1960s communicate the heartache of losing a son, such as Dorothy Gorman’s “Happy Birthday Son,” Jan Howard’s “My Son,” Bonnie Guitar’s “The Tallest Tree,” and, of course, Loretta Lynn’s “Dear Uncle Sam.”

While we have been looking over war songs on the homefront, musical change overseas in the jungles of Vietnam. During the war there was some censorship of music from the Armed Forces Radio (AFR), but it did not prevent protest music from

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59 Andresen, Music of the Vietnam War, 65.
60 Ibid., 132.
61 Perone, Songs of the Vietnam Conflict, 75-76.
63 Andresen, Music of the Vietnam War, 105.
65 Andresen, Music of the Vietnam War, 125-126.
making it overseas. Many of the hits from back home were played in the AFR, but not many that were anti-war in nature or any music that was considered to have a “French flavor.” Any music that was undeniably against the war could be heard from the tape players of the soldiers, who frequented shops that sold the music.66

Pirateradio stations existed overseas, and many of the popular ones actually operated out of major U.S. military bases.67 These stations sought to counter the influence of the Armed Forces Radio in the minds of soldiers. One station, Underground Saigon, made frequent use of profanity and was quick to tell its listeners where to find the best marijuana and massage parlors in Vietnam.68 The prevalence of a demoralized armed force could then be linked to the military’s inability to control the media influences on the warfront, especially those linked with the protesting voices back home.

Some songs produced back in the United States were used for other purposes in the jungle. One use of war songs was to disorient the enemy at nighttime. Soldiers returned home with tales of using Creedence Clearwater Revival’s “Run Through the Jungle” on night guard duty to warn Viet Cong fighters that all troops nearby were awake and alert. If captured, American prisoners of war were played music as a means of being psychologically broken. Music used for these purposes ranged from Johnny Cash to Christmas carols, all for the purpose of making soldiers more emotionally vulnerable.69

The images of war on television gave battle a new face that many were not ready to see or understand, and it likely contributed to why public opinion shifted during Vietnam. As more citizens grew upset, the music reflected a greater lack of support for the war. As many recall, the Vietnam soldiers were not well received when they returned home. Given the popularity and messages behind many of the hits of the time, it should be no surprise that public opinion shifted in that direction, especially if one belongs to the school of thought where music is believed to be a major reflection of public opinion. If the majority of popular war songs were against the war, then it can be inferred that a large number of Americans, especially the young baby boomers, held this view.

Wars in the Middle East: America Still Divided, “Courtesy of the Red, White, and Blue” and “American Idiot”

The music describing the Wars in the Middle East is the latest chapter in the present discussion of war songs. This is essentially uncharted territory for several reasons, the first of which is the question: When did these wars really begin and when will they end? For the sake of exploring the music of the present, it is necessary to go back to music from the Gulf War in the early 1990s and continue to the songs of the War on Terror in Afghanistan and the War in Iraq, both of which are still ongoing.

The fact that these wars are still ongoing means that any conclusions are highly debatable. Without seeing the bigger picture the outcomes and results have not yet been realized in their entirety, and consequently there has been very little discussion about the role of music in wartime post-Vietnam. Although the outcome of these later wars is uncertain, the music remains, and there are lots of songs that discuss the wars in the Middle East. There are enough present to recognize common themes and draw conclusions. Given what is already known about the relationship between music and previous wars, it can be inferred that music will continue to be a reflection of public opinion during wartime.

66 Ibid., 177.
68 Andresen, Music of the Vietnam War, 180.
69 Ibid., 184-185.
The implication is that the price of oil is blood, yet Americans are lulled by the media into believing that the U.S. are committing good acts:

Mister anchor assure me  
That Baghdad is burning  
Your voice is so soothing  
That cunning mantra of killing  
I need you my witness  
To dress this up so bloodless  
To numb me and purge me now\(^73\)

The lyrics describe the news networks as soothsayers that can influence public opinion with their eloquent news reports. The destruction of Baghdad mentioned is made a “bloodless” event, one that will have little effect on society because they are “numb” to the stories. This definitely supports the notion that the media can have a profound impact on the opinions of Americans because they can manipulate the images on television. “Testify” asks that the media continue on their job well done.

Following the attacks on September 11, 2001, music returned to familiar ground. During times of war the character of the “heroic, male, blue-collar American worker, the man of few words but strong deeds” returned to the forefront.\(^74\) The television bombarded us for weeks with images of smoke and fire and New Yorkers running away while the police and firefighters rushed into the chaos to rescue lives. It brought new reality to major events, as many of the images were not recorded by news stations, but captured by regular people who uploaded their videos online. September 11 was one of the first major events in American history where media

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\(^70\) Rage Against the Machine, “Guerilla Radio,” The Battle of Los Angeles, Epic, 1999, CD.


\(^72\) Rage Against the Machine, “Testify,” The Battle of Los Angeles, Epic, 1999, CD.

\(^73\) Ibid.

images were completely unfiltered and were contributed by regular citizens.

Not unlike the reaction America had after Pearl Harbor, the attack on American soil prompted patriotic feelings. It did not matter what one’s opinion of the United States had been before; now that so many Americans had suffered and survived the same catastrophe, many tended to pull together and acknowledge that they are all Americans and that they are all “in this together.” That mentality was carried through to music, and given what is already known about patriotism and music, it should be no surprise that country led the charge.

One of the earliest and certainly the most successful song that directly addressed 9/11 was Alan Jackson’s “Where Were You (When the World Stopped Turning).” The somber melody of the song and the “simple man” perspective allowed the message to reach a number of people. It also identified the various reactions that Americans had to the event, including “dusting off that Bible at home,” spending more time with loved ones, watching I Love Lucy, and purchasing firearms. At the time of its release, it became the fastest single to reach the top of the Billboard country charts since 1997.

Other memorable country songs in the wake of 9/11 came from Toby Keith, who presented an angrier response to the attacks. Some of the controversy caused by his lyrics actually led to his exclusion from a 9/11 memorial broadcast that was set to air on national television, but he gained lots of fame and sold many albums during the war. His most recognized musical tribute is “Courtesy of the Red, White, and Blue (The Angry American),” which describes a very impassioned response to the attacks as stated in the song title. The portion of the song that prompted the largest reaction was the fifth stanza:

Justice will be served and the battle will rage
This big dog will fight when you rattle his cage
And you’ll be sorry you messed with
The U.S. of A.
’Cause we’ll put a boot in your a**
It’s the American way

Obviously, when a songwriter says that “putting boot to a**” is the American thing to do, he is clearly not looking for a diplomatic solution. The lyrics even sparked opposition from other country musicians, notably Natalie Maines from the Dixie Chicks, who stated that the song made country music appear “ignorant.” Shortly after the controversy surrounding the song, Keith put out another potentially offensive number.

Sung from the point of view of a “middle-aged, Middle-Eastern, camel-herdin’ man,” Keith attempts to describe the impact that the Taliban have had on communities in Afghanistan with “The Taliban Song.” The song may be humorous for many listeners, but the song also acknowledges lots of commonly held beliefs of the time, the primary one being that Saddam Hussein was linked with the Taliban and partially responsible for the events of 9/11:

Mr. Bush got on the phone with Iraq and Iran and said, ‘Now you sons-of-b*tches you better not be doin’ any business with the Taliban.

75 Ibid.
76 Alan Jackson, “Where Were You (When the World Stopped Turning),” Drive, Arista Nashville, 2002, CD.
The extent to which Hussein was or was not involved with the Taliban was hotly debated at the time of the song, and these lyrics recognize that the link between the two was thought to have existed, although later events indicated its falsehood.

While “The Taliban Song” was not played on the radio, likely because of the potentially offensive lyrics, it was sung in public venues and before fans at every concert. In fact, the only version of the song that is available anywhere is the concert version. While the song as a whole could be seen as an expression of patriotic fervor, natives of the Middle East may find some lines offensive, like the referral of the homestead as a “two-bedroom cave” or a burqa as a “scarf.” Probably the most insulting part of the song is when the United States entered Afghanistan:

They dropped little bombs all over their holy land
And man you should have seen ’em run like rabbits, they ran (the Taliban) 82

It is doubtful that members of the Muslim community would celebrate the bombing of their homes, regardless of whether or not they were associated with terrorist groups.

Other musical trends outside of country with regards to the Wars in the Middle East should also be recognized. Rap and other genres from the urban areas have become the frequent communicators of anti-government messages in recent years.

President George W. Bush is often a target of ridicule for his foreign policy decisions during his presidency. In one song “Son of a Bush” by Public Enemy, the election of George W. Bush is critiqued:

I been through the first term of the rotten
The father, the son, and the holy Bush
It we all in

Don’t look at me
I ain’t callin’ for no assassination
I’m just sayin’ “Who voted for this a**hole of the nation?” 83

The members of Public Enemy must have assumed that Gore would be elected in 2000, and expressed their unhappiness at the results given their memories of the elder Bush’s administration. This could be seen as a reflection of the public outrage of the election results, whereby Gore won the popular vote but lost the election.

As the Wars in the Middle East progressed, the images of war streamed through American televisions as they did during Vietnam. This reality of war was also amplified thanks to new technology that allowed for war participants to record the war unfiltered and upload their findings on the Internet without any censorship from the authorities. The debate on whether or not this kind of amateur journalism should be allowed is for another time, but the important thing to understand is that the media presence, however unofficial, has a profound influence on what we see at home.

If the presence of video cameras and television in Vietnam was any indication of the future, then the presence of unfiltered Internet footage can be even more influential on the public opinion of the war. As the public’s opinion changes, the music produced will continue to realign itself to reflect it.

Other rappers were more explicit with their outrage at President Bush than Public Enemy, in part because they too had seen the war footage unfiltered. Prior to the 2004 presidential election, Eminem recorded a protest song and music video called “Mosh” that was made available online. Although it was not an official single, it does carry on the revolution spirit of Jefferson Airplane and the Rolling Stones from the Vietnam

82 Ibid.

era. Eminem portrays himself as a leader of a movement in the United States that would prevent Bush from continuing his presidency and continuing the War in Iraq. In the third verse, he considers anarchy as an effective solution for the Bush administration:

Let the President answer a higher anarchy  
Strap him with an AK-47, let him go fight his own war  
Let him impress Daddy that way  
No more blood for oil  
We got our own battles to fight on our own soil

The lyrics speak for themselves. He later raps that what America needs to do is “to disarm, THIS weapon of mass destruction that we call our President,” a jab at the allegation that Saddam Hussein was keeping “weapons of mass destruction” from UN inspectors.

Eminem’s lyrics reflected a commonly held opinion that can be seen as a repeat of Vietnam: the reasons why the United States are involved in war are not shared by the American people. It also recognizes the idea that our presence in the Middle East may be linked with our dependence on oil, a theme pointed out by Rage Against the Machine in the late 1990s. As these opinions can be considered highly subjective, it is nonetheless important to understand that the public opinion on any event can change based on what it sees on television or online. This is especially true when the information Americans receive is more unfiltered. By the time “Mosh” was released, Americans were able to download daily any missile strikes footage or videos of improvised exploding devices (IEDs) in action from the comfort of their home office. This degree of digital freedom is significant for its ability to present images that force Americans to draw their own conclusions about the scene, whether or not they understand what they see.

The last musical genre that must be addressed is rock, simply because it has effectively carried the anti-war tradition of Vietnam with the least amount of change over time and produced the majority of popular protest songs for the wars in the Middle East. One of the most comprehensive protest songs of the Middle East must be “Hands Held High” by Linkin Park. It addresses several aspects of the war, from the opinions of the people watching television in the United States, to the actions of the soldiers, to the perspectives of the children in Iraq.

This song is also reminiscent of “Fortunate Son” in its message of the “rich man’s war,” which presents frustration at the continuing social stratification:

‘Cause I’m sick of bein’ treated like I have before…  
Like this war’s really just a different brand of war  
Like it doesn’t cater to rich and abandon poor  
Like they understand you in the back of the jet  
When you put gas in your tank  
These f*ckers are laughin’ their way to the bank and cashin’ the check

Like the “rummage sale” in “Fortunate Son,” the rich in this song have also managed to find ways to stay wealthy at the poor’s expense. Linkin Park also implies that the wealth was derived from oil companies, which for many were thought to be linked with the wealth of the Bush family.

Perhaps the most vocal rock band in terms of their protest of the U.S. presence in the Middle East is Green Day. Since the invasion of Iraq in 2003, they have been writing protest songs, two of which became hits and led to their receiving the Grammy for

Best Rock Album for both 2004 and 2009. The first, “American Idiot,” off their album bearing the same name finds an upbeat way to say that America is brainwashed by paranoia and hysteria. Lines from the song are very catchy, yet still criticize the Bush administration for stirring fear in the minds of Americans:

I’m not part of a redneck agenda
Now everybody do the propaganda
And sing along in the age of paranoia.

The “redneck” agenda is an allusion to Bush’s plan for the country, as many considered him nothing more than a redneck from Texas. The encouragement to “do the propaganda” implies that the “propaganda” is a group dance to which everyone would know the steps.

Presently heard on the radio is their most recent protest song of consequence, “21 Guns.” It is not overtly anti-war and while the jury is still out on the true meaning of the song, many listeners have interpreted the number as an anti-war anthem because of the frequent references to the twenty-one gun salute performed at the funerals of fallen soldiers. The salute is repeated for every chorus:

One, twenty-one guns
Lay down your arms, give up the fight
One, twenty-one guns
Throw up your arms into the sky
You and I

This song does not spell out its anti-war stance, but given Green Day’s reputation as protestors of the wars in the Middle East and the previous success of “American Idiot,” it is safe to assume that they at least implied protest by having these words in the chorus.

Conclusion

By examining the war songs of the twentieth and twenty-first centuries, there are several conclusions that we can draw based on the research available. The most important conclusion is that music during times of war is a reflection of the opinions of Americans at that moment, or at least the songwriters that claim to represent them, but they are subject to change based on the information available through media outlets and the degree to which they are unfiltered. The public opinion of World War I prior to the sinking of the Lusitania was that of neutrality, and the music reflects that. Only when Americans read about the tragedy in the newspaper did their opinions begin to change. Some still clung to neutrality, but many were affected by the news of death, and so altered their perception about America’s role in the conflict.

World War II followed a similar pattern with the neutrality songs at the forefront. The attack on Pearl Harbor changed everything. Soon after, the songwriters were churning out songs that called for war and support of the troops at home. The radio replaced the newspaper as the primary source of war news, and provided a greater outlet for the music industry. As World War II carried on, it became more and more obvious that music was not only a reflection of opinion, but perhaps an influence as well. For this reason the government and record companies went to great lengths to create the perfect war song, but the truth is that most people in the forties wanted a love song that reminded them of better times, as these were the best-sellers of their time.

The major shift from predominately pro-war attitudes to those that were anti-war came with Vietnam. A stark difference between that war and the World Wars was the

86 “Grammy Award Winners,” Grammy.com, http://www2.grammy.com/GRAMMY_Awards/Winners/Results.aspx?title=&winner=u2&year=0&genreID=0&hp=1
lack of an American attack that the public would take seriously, like the Lusitania or Pearl Harbor. If that event had occurred, more pro-war songs would likely have been made. The lack of that event meant that the only pro-war songs would have come from the school of thought that considered Vietnam a pivotal link in the “domino theory.” The large following of the anti-war sentiment came from Americans exposed to the war through their television, the new technological medium for media and information. The events they witnessed from their screens affected many of their beliefs and fears, and their music reflects an outlook of anger and frustration over war in a country that many Americans felt needed to be left alone.

The wars in the Middle East, as of 2010, seem to be following the tradition of Vietnam, although they began like the World Wars because of the events of September 11. Most of the pro-war songs that were popular were country songs like they had been for Vietnam, but occurred very soon after the attacks on the United States. After the U.S. became involved with the war and the images began pouring into American homes again, the music shifted to mirror the feelings of Vietnam. Many of these anti-war messages were further fueled by the presence of the internet and more sophisticated digital equipment that allowed for users to record footage and share it with the world without being censored by the government.

Perhaps the lesson here is that many Americans cannot comprehensively understand the images of war; obviously no one would want to see their loved ones in battle on television, but how can the United States, or any modern nation, ever have lasting support for the war effort with such graphic images streaming daily? It would be nearly impossible, based on the war songs that are continuing to emerge from musical artists. The current public opinion for many that are living through this war seems to be the desire to end the war soon and to bring the troops home.
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PRIMARY SOURCES

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(Songs found in each collection are listed alphabetically by songwriter or performer’s last name.)

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Merrill, Blanche. “We Take Our Hats Off to You, Mr. Wilson.” 1914.

Rose, Ed. “Oh Johnny, Oh Johnny, Oh!” 1917.
Young, Joe and Sam M. Lewis. “How ‘Ya Gonna Keep ‘Em Down on the Farm (After They’ve Seen Paree)?” 1918.

PUBLISHED PRIMARY SOURCES


OTHER PRIMARY SOURCES—SONGS


SECONDARY SOURCES

BOOKS


**Journals**


Online Sources


Social Sciences
The primary focus of this study relates to the various types of informal support received by people who have been relocated due to a disaster, in this case in a town near Mt. Tungurahua, Ecuador, as a result of its eruptions in 2006. More specifically, since it is well-known that family plays the strongest role in providing informal types of support, I chose to focus on the settings in which non-familial informal support was provided in this time of need, while controlling for other factors such as gender and relationship type. The types of support studied were grouped into four categories: tangible, informational, emotional, and job-opportunity. In conducting interviews designed to highlight these instances of non-familial support, it was then possible to note patterns the respondents shared. The results indicate that acquaintances considered to be ‘friends’ or ‘neighbors’ are the most likely non-relatives to offer support, and that emotional support was the most common form of informal support received by respondents, followed by informational. Results also suggest that males, contrary to other similar studies, were more responsible for both receiving and reciprocating these various types of support.

This study concerns the various types of non-institutional and non-familial support received by victims of a natural disaster—these people have been relocated to a small town, Penipe, near Mt. Tungurahua as a result of its eruptions in 2006. In many disaster settings, the government and other specialized organizations are available for various forms of assistance. This type of help—institutional or formal—is responsible for supplying considerable tangible, or material, aid to many victims of disaster, but does not provide all the forms of support that people need. More specifically, research suggests that family often plays a strong role in providing the other forms of support not provided by institutions. However, beyond the

Forms of Social Support by Non-Relatives in Emergency Situations: Ecuador

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support of family, less is known systematically about the importance of non-family in supporting in disaster settings. Thus, it is the goal of this study to focus on non-kin social support in a time of need. Perhaps by reviewing circumstances in which informal support is most commonly utilized, institutional methods could be improved to better handle cases similar to those of Penipe. Factors such as relationship type and gender were also considered to assess the possible influences they bear on support results in an emergency situation. Utilizing both closed and open-ended questions in my interviews with 26 people, I was able to analyze circumstances under which non-familial, informal support is provided to disaster victims.

Incidence and Importance of Informal Support
Ample research has been conducted in the fields of both formal and informal types of social support. Many of these studies are aimed at evaluating under which circumstances one can expect to receive or give support. In a broad study conducted on stress and support in various situations, Unger and Powell (1980:567) concluded that “When families needed advice in emergencies, they typically went to relatives, the local druggist, bartender, or priest. Formal agencies were not utilized by families in trouble.” Unger and Powell cite some instances in which formal agencies were relied upon for support following an emergency, but the overall trend tended to be that “informal sources were utilized just as often, or more frequently, than agencies” (1980:568). A number of informal venues were listed as sources of informal support in Unger and Powell’s report, including personal ties to relatives, friends, pastors, teachers, and physicians; although some of these might be considered formal support if serving in their official capacity on behalf of an institution. Formal support organizations have had a large impact on the resettlement in my study site of Penipe. These forms of support are relatively easily measured. Less easy to measure is support provided by friends and neighbors. I investigated these more personal, or informal, instances of support in order to understand non-kin sources of informal assistance in recovery following disaster.

What are the instances, then, in which people tend to receive non-family informal support? Degree of urbanization is one factor. Scott and Roberto (1987) conducted research on support involving older adults and concluded that persons living in rural areas are more likely to both give and receive informal support compared to those living in urban areas (448). This suggests that populations living outside the city depend more upon personal relationships than institutions for help. As Penipe is a very small community, I considered it a rural area and so I expected to find ample situations in which support was exchanged on a more personal/informal basis. Because transportation in the area is limited to those who can handle it physically and afford it, distance (and thus neighbors) became a relevant aspect to consider for these sparsely scattered populations in central Andean Ecuador.

It makes sense that those situated farther away would be less dependable than the people living in closer proximity in the event of an emergency, unless longer-term assistance is offered. However, studies involving support and distance are limited. One study conducted in a rural area of Thailand showed that construction of schools and temples linked villages and citizens in ways that would have otherwise not existed because of the relatively long distances (Faust et. al. 2000). Events involving the exchange of machinery and/or labor, such as tractor sharing, happened over shorter distances, thus strengthening more proximate social networks. In a study
conducted on distance and types of support pre-Internet era, “tangible” and “emotional” support were most often received from those residing within close proximity to the respondent—in this particular case, within a 10-mile radius (Mok and Wellman 2007). I expect to find similar results due to the lack of telecommunication devices, such as computers and Internet, throughout the community.

A study conducted on African-American social networks for cases of need throughout the United States focused on a number of different variables that determined the types of informal support givers (Taylor et al. 1998). Specifically, as family members are more commonly situated in more remote areas from one another, non-kin instances of support (20.6%) increase in a time of need (Taylor et al. 1998). Although family and kin may still be the more preferred choice overall, friends and neighbors are the more likely candidates in situations where relatives live further than is comfortable to travel on a regular basis. In these instances, neighbors and friends become the best alternatives for help in an emergency situation. Common characteristics, as well, do play a role not only in strengthening social ties but in increasing likelihood of receiving support.

Demographics are another important factor in disaster and informal support studies. By analyzing characteristics of African Americans, such as marital status, gender, age, and location, (Taylor et al. 1988) studied the contributions of both relatives and non-relatives in a time of need. Those authors discovered that “Both family and non-kin were found to be important sources of emergency assistance” and concluded that adults ages 25–45 report the highest instances in which friends would be of service in a time of need. In the same study, they reported that black seniors without children rely on non-relatives not only for maintaining social networks, but to replace the role a child would presumably fill. In these instances, non-kin become the most likely candidates for support following a disastrous event.

Gender also seems to be a factor that limits or creates opportunities for informal support following an unexpected destructive event. A study conducted by Drabek (1986) in Topeka, Kansas, analyzed the influences of relatives and non-kin on support patterns after the touch-down of a large Tornado. It appears that in response to the disaster, men were more inclined than women to help individuals outside their families (Drabek 1986), but were generally less likely to receive support from others. According to the same study, women are much more likely than men to utilize a range of relationships to ensure support in a time of need. Beggs et al. (1996:207) also report this trend, noting that following Hurricane Andrew, “individuals who are embedded in networks with high proportions of men should have better access to informal recovery support.” In their findings, Beggs and colleagues conclude that although men were more likely to offer aid to acquaintances, they were less likely to receive support than women were.

Finally, concerning the type of support that people receive in post-disaster settings, Kaniasty & Norris (2000) found that Caucasian, African American and Hispanic Americans in the US were equally comfortable asking for emotional and informational support, but somewhat less so for tangible support. In terms of receiving support, emotional support was most common, followed by informational support, and then tangible support. No comparable study has been done on support in the form of work opportunity in a disaster setting.

**Hypotheses**

In order to account for these findings on informal support, I formulated hypotheses
Explanations | Social Sciences

to test in Penipe, Tungurahua Province, Ecuador. To begin, I expected to have many well-documented instances of varied support to work with utilizing socio-demographic data from an on-going project in the same area. By using these data I could better narrow my sample-size and create a group of qualified respondents with whom to conduct this project. Thus, I expect that, from within this sample, people who experienced non-familial informal support since the 2006 eruptions of Mt. Tungurahua would (a) have experienced emotional support as the most common type of support, (b) be helped mostly by males, and (c) be females with dependent children.

Methods

Measures

To capture variation in received informal support, I considered numerous types of support a person can receive, and then categorized these into four broad groups: tangible, emotional, informational, and work support. The first three are commonly identified in research on social support (e.g., Kaniasty and Norris 2000), and the last was a specific kind of support commonly mentioned while I was in the field so I felt it would be important to include. Tangible or instrumental support is commonly considered the giving/receiving of any physical item or assistance that can be used to better one’s situation, and includes unpaid labor, food and shelter in addition to other materials. Emotional support refers to cases in which the respondent confides within another person for the purpose of self-relief or problem solving. Informational support is defined as an instance in which the respondent has an opportunity to become more knowledgeable of an event or of recovery resources by means of verbal and/or written communication. Work support includes the exchange of physical labor for monetary compensation (i.e., giving of finding someone a job whether short-term or long-term). I developed a questionnaire (see Appendix A) and asked people whether they received each of these kinds of support, from whom, and how often. I also included a hypothetical situation at the end of the interview to give the respondent a chance to give an example of a non-relative that they could rely on for day to day support (formales—borrowing work tools; and for females—seeking child care).

Nature of the Sample

The sampling frame consisted of an already existing random sample of 150 households taken from the several hundred pre-existing and resettled households in Penipe. Requirements for participation were as follows:

1. Must be 18 years of age or older
2. Must have already completed the survey interview from the on-going NSF project in Penipe (Collaborative Research: Social Networks in Chronic Disasters – Exposure, Evacuation, and Resettlement; PIs-Eric Jones, Linda Whiteford, Arthur Murphy, Graham Tobin), and must have reported receiving at least one type of informal support from non-kin
3. Must agree to be tape recorded for the interview, because my Spanish is an intermediate level and also because data may be lost in interviews due to speed of speech.

Once I had conducted pilot tests, it was clear that lack of trust in non-family was a major hurdle in receiving non-familial support, which suggested it might be difficult to obtain sufficient cases for this study. Many of the respondents admitted they don’t receive nor welcome help from anyone to whom they are not related. I decided to eliminate from the sample people who had received no informal help from non-kin. This information was available from the on-going project already underway in the same area. Thus, I reviewed the survey...
Interviews from the larger research project and selected only people who had received some form of support from non-relatives in their post-eruption recovery process. My next complication dealt with trust yet again. Oftentimes, informants were not comfortable relying on their current neighbors for support in a time of need. In most cases, the resettled part of Penipe from which I drew my sample had complete strangers moving in next door to each other. Because trust is such an important aspect of these people’s lives, I decided to allow neighbors reported living in other areas (i.e., previous neighbors before resettlement) to be listed the same as those living within Penipe. This approach worked well and the rest of my interviews produced sufficient variation in types of informal support from non-kin.

Because I had available only one month in the field, my goal was to interview 25 people out of the 150 people previously interviewed by the larger project. I randomly selected 30 individuals who had already completed their survey is with the larger project and who had also reported at least one instance of support from someone other than a relative from the overall sample of 150. Overall, I was successful in completing 26 interviews; for 25 of them, I noted one or more cases in which informal support from non-relatives following the eruptions of Mt. Tungurahua was received. One interviewee denied having receiving any type of non-familial support, despite answers given for the previous survey, thus this survey was omitted. Twelve of the 26 respondents were males and 14 were females. Ages varied from 19 to 84 years old. All of the respondents lived in Penipe, and all but one of them lived in a resettled section of the town occupied by families whose housing near the volcano put them at risk and/or families that have suffered various property losses due to eruptions and ash fall from Mt. Tungurahua in 1999 or 2006.

Conduct of Interviews
Once in the field, I spent my first two weeks exploring Penipe, with special attention paid to the resettled area of the community, or New Penipe. Due to the lack of trust and relationships between neighbors in New Penipe, it was important to develop a questionnaire that addressed this unique situation. To make up for the probable lack of responses citing current neighbors as sources of support, I allowed for previous neighbors (neighbors from before the disaster and resettlement) to be classified the same as ‘neighbor’. Following the initial two week period, I finalized the interview questions (see Appendix A) by doing a few practice sessions of questioning three other project field workers. Although each question asked for specific information, there was flexibility to record unstructured

<table>
<thead>
<tr>
<th>Tangible (n=12)</th>
<th>Informational (n=33)</th>
<th>Emotional (n=49)</th>
<th>Work (n=27)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighbors</td>
<td>42</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td>Friends</td>
<td>26</td>
<td>45</td>
<td>57</td>
</tr>
<tr>
<td>Work-mates</td>
<td>16</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Mix</td>
<td>16</td>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1. Percentage of different types of support offered by different relationship types.
responses that would add ethnographic understanding of the results. For each type of support I included in my questions a brief description for the interviewees including some generic examples in order to lessen the chance that a participant would confuse one type of support with another (e.g., emotional for informational).

**RESULTS**

**Relationship Type**

New Penipe is comprised of people originating from a number of smaller villages within the Tungurahua region; and, because of this, direct neighbors in New Penipe do not necessarily have strong bonds and, in some cases, actually lack mutual trust. Out of the 42 instances of support from neighbors, only 22 were from neighbors currently living in Penipe. Of those 22, six had resided in the same community from which the respondent relocated. Therefore, a possible 26 of the total 42 cases of support from neighbors were more likely due to trust and the relationship itself, rather than locality.

Table 1 shows that informational and emotional support were the most common forms of support for the relationship category “Mix.” This mix category was composed of people who had been described as both work-mate and friend, or, more commonly, both friend and neighbor. Because every mix categorization included a friend, this exemplified the notion that relationships throughout New Penipe are dependent upon trust. In other words, as shown in Table 1, friends alone are very important sources of emotional support; however, when that strong bond with a friend is further strengthened by close proximity (neighbor) or constant interaction (workmate), friends become even more dependable—not only for emotional but also informational support.

Table 2 presents the results of the chi square analysis of the data considering relationship type and support type. For each

<table>
<thead>
<tr>
<th>Type of Support vs. Relationship type</th>
<th>Friend vs. Other Relations</th>
<th>Neighbor vs. Other Relations</th>
<th>Work-mate vs. Other Relations</th>
<th>Mix vs. Other Relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangible vs. Other Support</td>
<td>3.010</td>
<td>2.878</td>
<td>0.004</td>
<td>0.338.561</td>
</tr>
<tr>
<td>Informational vs. Other Support</td>
<td>0.198</td>
<td>1.343</td>
<td>0.154</td>
<td>7.122*</td>
</tr>
<tr>
<td>Emotional vs. Other Support</td>
<td>5.120</td>
<td>0.225</td>
<td>2.936</td>
<td>4.513</td>
</tr>
<tr>
<td>Job Opportunity vs. Other Support</td>
<td>0.895</td>
<td>0.289</td>
<td>6.186*</td>
<td>0.589</td>
</tr>
</tbody>
</table>

Table 2. Chi-Square values for relationship type and support type.

<table>
<thead>
<tr>
<th>Type of Support</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangible</td>
<td>27</td>
</tr>
<tr>
<td>Informational</td>
<td>62</td>
</tr>
<tr>
<td>Emotional</td>
<td>81</td>
</tr>
<tr>
<td>Work</td>
<td>54</td>
</tr>
</tbody>
</table>

Table 3. Percentage who reported having received different types of support.

Figure 1. Proportions of people receiving high, medium, and low frequencies of support.
analysis, one relationship was compared to the total of the rest of the relationships, and one type of support was differentiated from the all the rest of the types of support together. The differences are significant for friends vs. others (other categories all lumped together) as well as mix vs. others as being a greater source of emotional support. The mix category also provided more information vs. other kinds of support than did other relations, and workmates provided more job opportunities (as opposed to other kinds of support) than did the other relationship categories. Other categories of potential importance, but not significant at the .05 level, were tangible support from neighbors or friends and emotional support from workmates. Interestingly, the neighbor category by itself, when compared to the other relationships together (neighbors vs. others), did not provide more of any type of informal support (p=.090), as shown in Table 2.

Types of Support
The four types of support (job opportunity, emotional, informational, and tangible) yielded both expected and unexpected results in relation to support and relationship type. Out of the 26 interviewees, emotional support was most often reported (Table 3), as predicted by my hypothesis. Informational was the second most common form of support received, followed closely by work-related support. Tangible support was received by less than half as many interviewees as were the other three support types.

Frequency of Support Received
Responses were first categorized into: “high,” “medium,” or “low” levels of support based on the reported frequencies of each type of support. If respondents answered yes to having received support, they were then asked how frequently they had received that support. Specifically, high frequency was defined as receiving support ranging anywhere between daily and weekly. Anything reported as every weekend or monthly (and everything between that time-range) was scored as medium. The response “when needed” was included in the medium category. Low frequency was defined as support occurring less than once per month. These responses were graphed to better understand the relationship between type of relationship and the frequency of support. In comparing/contrasting the frequencies of instances in which support had been offered to respondent (Figure 1), emotional support was rated highest.

<table>
<thead>
<tr>
<th>Level of Support</th>
<th>Tangible (n=12)</th>
<th>Informational (n=29)</th>
<th>Emotional (n=51)</th>
<th>Work (n=27)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>25%</td>
<td>41%</td>
<td>59%</td>
<td>22%</td>
</tr>
<tr>
<td>Medium</td>
<td>58%</td>
<td>52%</td>
<td>35%</td>
<td>48%</td>
</tr>
<tr>
<td>Low</td>
<td>17%</td>
<td>7%</td>
<td>6%</td>
<td>30%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4. Proportions of people receiving high, medium, and low frequencies according to type of support.

<table>
<thead>
<tr>
<th>Type of Support</th>
<th>High</th>
<th>Low</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangible (n=12)</td>
<td>33%</td>
<td>67%</td>
<td>100%</td>
</tr>
<tr>
<td>Informational (n=29)</td>
<td>45%</td>
<td>55%</td>
<td>100%</td>
</tr>
<tr>
<td>Emotional (n=51)</td>
<td>75%</td>
<td>25%</td>
<td>100%</td>
</tr>
<tr>
<td>Work (n=27)</td>
<td>48%</td>
<td>52%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 5. Rates of support grouped into high and low frequencies.
Emotional support was the most common type of support received by those resettled in Penipe since the volcanic eruptions. The other three types of support were most commonly offered in medium frequencies (i.e., between every weekend to every month). Percentages can be viewed below in Table 4. I further investigated the gap between frequencies of support by grouping all instances into “High” and “Low” categories. High was defined as any instance falling into a daily to monthly occurrence, and all else was considered low. As Table 5 shows, high frequencies of emotional support are much more common than are low frequencies of emotional support; high frequencies of tangible support are much less common than are low frequencies of tangible support; and reporting of both informational and work support cannot be predicted by recency of last support received.

**Gender**

Contrary to my hypothesis, women were actually less likely to receive support in this study. Women made up the larger part of the sample (54%), though they reported fewer instances of having given or received support, thus reporting lower per capita support (Table 6). In descriptive analysis of the data, men reported higher frequencies of actually having received support from people named as part of their support network. To determine the reasoning for this unexpected finding, I removed the “work” column from Table 1. Perhaps males experience many more job opportunities than women? Even with this revised analysis, men received more overall support than women received. In fact, for every type of support, men experienced more aid. However, as predicted, males were also noted as offering support more frequently than females.

**Discussion and Conclusion**

Access to informal social support varies from case to case depending on a number of different factors. Every person in this sample had been affected in one way or another by the disaster, though some were theoretically better equipped to manage an unexpected event. This was due to their social networks consisting of not only family but also non-kin. Persons, especially men, with a variety of friends, neighbors, and work-mates appeared most able to deal with the aftermath of this emergency situation.

By researching the aspects of social support typical of peasant farmers, it may be possible to craft a more effective plan to assist communities similar to Penipe following a natural disaster. More importantly, by understanding the relationship types of those in need, we can better predict the types of support that will already be available from citizen to citizen. The lack of trust between citizens of New Penipe can be expected, for instance, as it is predicted in Asthana’s (1996) research. By creating a disaster management program that is prepared to handle obstacles such as these, formal support can be utilizing more effectively.

According to my hypothesis, I expected to

<table>
<thead>
<tr>
<th>Interviewee Gender</th>
<th>Percentage of times that support was received from non-family males</th>
<th>Percentage of times that support was received from non-family females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men (n=12)</td>
<td>81% (n=61)</td>
<td>19% (n=14)</td>
<td>100%</td>
</tr>
<tr>
<td>Women (n=29)</td>
<td>40% (n=18)</td>
<td>60% (n=27)</td>
<td>100%</td>
</tr>
<tr>
<td>Total (n=41)</td>
<td>79</td>
<td>25</td>
<td>124</td>
</tr>
</tbody>
</table>

*Table 6. Support received by men and women.*
The inhabitants of Penipe are of meager financial means and do not have private transportation. Instead, the only transportation available for a relatively low expense is the buses. They make interval runs to many of the local villages on a daily basis, though constant stops along the way even make short distance travel quite an effort.

Although the relocation process solved the lack of housing issue, it failed to ease stresses in other areas. The lives of the relocated people were much improved due to the efforts of housing projects and various formal organizations, but it seems other aspects of the relocation have been less positive. Specifically, lack of trust was a major consequence of the relocation process. Neighbors of New Penipe were often from different communities throughout the Chimborazo province. Property loss was yet another negative effect that stemmed from not only the eruptions themselves, but from relocation as well. Transportation was necessary to get to one's property, which presented a new expense should farmers decide to continue working what land was still productive. General dissatisfaction was also a common comment of respondents. Most interviewees stressed their desire to return back to their native communities.

Possible interventions are based on my analysis:

A strong emphasis on increasing access of a broad range of help to females would also benefit the whole community.

Regularly scheduled neighborhood meetings/celebrations could be a start to compensate for the lack of communication and/or trust between relocated households in new communities.

Some respondents have free time on their hands—now having no land to work or having no means of securing transportation to get to their land. Village projects could provide monetary income to those willing to
work, as well as help to strengthen relationships, and even improve quality of life in newly relocated locations. These building projects would also likely help with the issue of dissatisfaction among resettled families and instill a sense of pride and belonging to the community they now live. Many communities in the Tungurahua area already meet to perform labor projects in their communities. I believe the best example of this is the traditional mingas—community projects organized by male leaders in some villages—which are so prevalent throughout the Andean region (Korovkin, 1992; Thurner, 1993; Whitten, 1969). Programs such as these can be used as models for resettlement and disaster management.

Results from this project might be useful for generating models for post-disaster relocation sites, but generalization from the data is not warranted due to the small sample size. It is also important to note that this study was conducted using a sample that had been offered, accepted, and received the above-mentioned types of aid, so overall rates of support are exaggerated—I attempted only to interview people I knew had reported in another study having received social support. Further research would be necessary to compare these results with those of the entire town of Penipe (or elsewhere), as well as add support by family members into the study to understand the relative importance of non-kin aid for each of the four types of support.
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WORKS CITED


APPENDIX A: INTERVIEW

Questionnaire Used in Penipe

INTRODUCTION TO INTERVIEWEE:
Greetings, I’m a student and I’m working with AJ, Fabiola, and Eric on their study involving the social effects of the volcano. I’m studying for a smaller project for my university. I know that sometimes the family is best for helping with whatever necessity, but sometimes it’s not possible to ask family members, and I’m interested in knowing more about the moments in which other people are asked for assistance and why. Would you be able to answer a few questions for me? The interview is short, about 10 or 15 minutes long, it’s not as long as the last interview you answered.

Is it okay if I tape record this conversation?

Name: ________________________________

ASK:

A1: I see that you’ve received support (like tangible/information/emotional/work) from people whom are not relatives of yours, correct?
   □ Yes □ No

Tangible: Loaned items, money, food, gifts, etc…
Information: That can help to better or ease your situation (like information about organizations that can help).
Emotional: Like sharing emotions, worries, sadesses, experiences, etc…
Work: Have offered chores of some sort to you in exchange for monetary compensation.

A2: Tangible: Has there been a time that you’ve received tangible support from someone that is not a relative of yours?
   □ Yes □ No

A3: What was/were their name(s)? (Up to 3 names)

A4: Who is _______ to you? And where do they live? __________________________

A5: What tangible support did ____________ give to you? And when was the last time?
________________________________________

A6: With what frequency did ____________ give this support? And how much did they give?

A7: Have you also given tangible support to ____________? And what was it?_________
________________________________________

A8: Information: Has there been a time that you’ve received informational support from someone that is not a relative of yours?
A9: What was/were their name(s)? (Up to 3 names)

A10: Who is __________ to you? And where do they live? ________________

A11: What information did __________ give to you? And when was the last time?

A12: With what frequency did __________ give this support?

A13: Have you also given informational support to __________? And what type of information was it? ________________

A14: Emotion: Has there been a time that you’ve received emotional support from someone that is not a relative of yours?

A15: What was/were their name(s)? (Up to 3 names)

A16: Who is __________ to you? And where do they live? ________________

A17: What emotional support did they share? __________ And when was the last time?

A18: With what frequency did __________ give this support?

A19: Have you also given emotional support to __________? And what was it? ____

A20: Work: Has there been a time that you’ve received a job opportunity from someone that is not a relative of yours?

A21: What was/were their name(s)? (Up to 3 names)

A22: Who is __________ to you? And where do they live? ________________

A23: What type of work did they offer you? __________ And with what frequency did they offer you work?

A24: Have you also offered a job to __________? What type of work was it?
Now I’m going to read a hypothetical situation.

FOR MALES:
A25: Say your family members cannot help you, from whom would you ask to borrow a pickax and/or hoe and why?

FOR FEMALES:
A25: Say your family members cannot help you, to whom would you go to to watch your children and why?

A26: Who is ________________ to you? And where do they live? __________

A27: Have you already received some things like this from ______? Like what? ______________

A28: When was the last time? ________________________________

OBSERVATIONS:
Defining Barriers to Acceptance of Westernized Medicine Among Montagnard Refugees

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ABSTRACT
As culture is a primary component in shaping an individual’s perception of illness, this research attempts to discover the cultural barriers to displaced populations’ acceptance of “Western” medicine and observance of prescribed medical regimens. In this ethnographic study, evidence-based cross-cultural health knowledge of the Montagnard community in Greensboro, North Carolina, was collected via snowball sampling. Subjective narratives, investigator observations and review of previous research were used to evaluate the overall patterns observed in both first- and second-hand accounts of health-related activities and health care utilization by the Montagnard community. Patterns found included misunderstandings between patient and provider due to differences in defining illness and the use of passive obedience to avoid revealing ignorance. Such findings appeared to encourage patient noncompliance and explained ignorance of clinical appointment and health care systems.

What are the cultural barriers to displaced populations’ acceptance of “Western” medicine and compliance to its tenets? How can medical practitioners overcome potential barriers to improve the health of displaced populations? Culture is primary in shaping an individual’s perception of illness and compliance with prescribed medical regimens. The importance of health care providers understanding Southeast Asian refugee populations’ cultural tenets and ideologies, especially in establishing patient-doctor relationships and ensuring successful provision of care, has been documented in both scientific studies and practitioner observations (Ito, 1999; Stephenson, 1995; Uba, 1992). These refugee populations, typically the poorest and lowest educated members of modern society, are more likely to suffer from
significantly higher levels of death and disease than other population segments when acceptance and accessibility to Westernized medicine is lacking (Kreps & Sparks, 2008). Identification of health-related cultural elements is critical for providers and health educators wanting to establish appropriate health care programs and materials for culturally diverse populations. Respect for cultural factors, such as familial roles, spirituality and communication patterns, are essential to the acceptance of recommended care regimens and preventative programs (Kreuter et al., 2002).

Refugee populations are at a greater health risk than other segments of the population (Kreps & Sparks, 2008) because they are the most likely to experience dissonance with Western medical culture. In order for the target population to accept the medical notions of their new nation, a bridge must be created between cultural axioms and the foreign, yet effective interventions that Western medicine provides. In this paper, I present findings from an ethnographic study of Southeast Asian refugees, a Montagnard population in particular, residing in Greensboro, North Carolina, to fully demonstrate the need for cultural awareness in a clinical and public health setting. Some of the key cultural barriers for this population that will be examined in the article are Montagnards’ varying definition of illness that may limit health-seeking behavior, the use of passive obedience to avoid shame or revealing ignorance, reliance on traditional medicine and false perceptions of Western medicine. Before the stories of these cultural groups can be told, it is necessary to introduce the populations examined in this study and briefly discuss the reasons behind their exodus to the United States.

Over the past 35 years, 1.3 million refugees have arrived from Southeast Asia. Cambodia, Laos and Vietnam are the three major countries represented by the immigration of Hmong, Cambodian, Laotian, Vietnamese and Montagnard communities following the end of the Vietnam War (Southeast2009). Montagnards are not Vietnamese, a distinction that has steered the course of these peoples’ history and future in Vietnam, as their religious and ethnic differences have been the catalyst for much of their persecution. Raleigh Bailey, director of the Center for New North Carolinians and a senior research scientist at University of North Carolina at Greensboro was heavily involved in the first Montagnard immigration waves in the 1980s. His experiences and study of the uniquely tragic history of these people from the time of their involvement in the Vietnam War was a significant source of the following historical information. According to R. Bailey, although some live in urban areas, the majority of Montagnards are rural, farm people from Vietnam, very ethnically different from Vietnamese. The U.S. Special Forces recruited them as frontline allies to fight in the highlands of Vietnam during the Vietnam War, another reason the Vietnamese government continues to harass the Montagnards (R. Bailey, personal communication, April 30, 2009).

The life of Montagnards in Vietnam and their relationship with the ruling Vietnamese government eerily parallels the calamitous history of the Native Americans in the United States, according to R. Bailey. Land treaties between Montagnard leaders and the ruling Vietnamese government were struck and subsequently broken. Montagnard Christian churches, especially the evangelical churches in Vietnam that had become the organizing place for Montagnards in terms of social change, were made targets of governmental oppression; many were burned. Stories of physical violence, mysterious imprisonment of family members and forbiddance of church attendance were common amongst interviewees—many fled to the jungle between...
Vietnam and Cambodia to escape persecution (R. Bailey, personal communication, April 30, 2009).

“They’re always like ‘You came from Vietnam’ and we’re like ‘No, we’re running away from Vietnam,’” one interviewee said. The distrust Montagnards have of the Vietnamese is truly pervasive throughout the majority of the community, stemming from the violence inflicted on these Christian people attempting to worship in a communist country. Human rights violations continue today and Montagnard churches both in the United States and Vietnam continue to petition Congress and the United Nations for help.

The very first large group of Montagnard refugees came in 1986 and subsequent immigrant waves and natural born generations have led to the 7,000 or so that reside in North Carolina. Montagnard refugees, made to flee because of their beliefs, hold tightly to such values in America, and these traditions and principles directly influence health care decisions, compliance and pursuance.

Southeast Asian refugees in the United States, despite many cultural, linguistic and national differences, share common pre-emigration experiences of war and flight from oppressive governments and common governmental benefits once in America (Ito, 1999). As such, information about Montagnard normative cultural values and their direct and indirect influence on health care will be supplemented by findings of other Southeast Asian refugee experiences and cultural patterns observed by various health care providers, all of which have been documented in anthropological studies. The influence of culture on health-related activities, provider responsibility and the need for health professional-targeted interventions will also be examined extensively, in addition to an exploration of suggested approaches to improving cultural competency of patient care providers.

**Literature Review**

Modeling health messages in a culturally appropriate framework is primary for health communication to be effective between health provider and patient or health agency and target community. The importance of culturally appropriate care has been explored by public health and communication scholars via 1) examining the significance of cultural awareness in health communication, 2) the special need for culturally appropriate health care for refugee populations, and 3) the role of health providers in establishing culturally appropriate communication. Such issues have proven to be forefront in the struggle to overcome cultural barriers to appropriate health care (Barr & Wanat, 2005; Paez et al., 2008; Kreps & Sparks, 2008).

Significance of Cultural Awareness in Health Communication

Examining cultural issues that impact and influence the way in which members of vulnerable populations respond to health communication and care is crucial for successful disease prevention and health management (Kreps & Sparks, 2008). The necessary customization of health communication programs and health services to better meet the needs of minority consumers is accomplished by recognizing and practicing culturally relevant modes of appropriating knowledge (Kreuter & McClure, 2004). Healthy People 2010 is a set of health promotion and disease prevention initiatives meant to help health organizations develop programs to improve the overall health of the nation during the first decade of the new century (U.S. Department of Health and Human Services & Office of Disease Prevention and Health Promotion, 2010). It was established by several federal agencies, health departments, businesses and community partners working to increase life expectancy and quality, as well as
eliminate health disparities. The program's objectives, which include increased access to quality health services and establishment of more educational and community-based programs, acknowledge the significance of maintaining a focus on culture when developing intervention strategies (Kreuter et al., 2002). It charged health practitioners to explore not only the unique concerns of different cultural groups, but investigate how such needs can be met when conventional services have failed (Kreuter et al., 2002). Health care providers play a critical role in the interaction with patients from diverse populations and their improved cultural competency would yield improved communication with patients and potentially reduce disparities in health and health care utilization (Horner et al., 2004).

Necessity of Culturally Appropriate Health Care for Refugee Populations

Consequently, non-native and refugee populations are especially vulnerable to significant discrepancies in health care access and are in great need of culturally relevant, accurate and timely health information (Kreps & Sparks, 2008). Reaching immigrant populations is a tremendously complex but acute need in the United States, as these groups are the most vulnerable health care consumers (Kreps & Sparks, 2008). Traditional culture and accompanying values are highly esteemed by populations who, because of violent and horrific circumstance, are forced to live without the basic comforts of a familiar language, nationality and political structure (Frye & D'Avanzo, 1994). Often these belief structures have been threatened in their native country and refugees have suffered violence from the governing bodies who forced their exodus (Frye & D'Avanzo, 1994). Refugees are leaving one volatile and violent environment for a potentially safer but more unpredictable and foreign one. They are subject to the additional emotional and physical demands of flight and uncertainties encountered in an alien country. These numerous potential sources of stress refugees face make them prime candidates for health problems, but because of the cultural and linguistic barriers before them, the least likely population to take advantage of necessary and available health care systems.

Health Providers’ Role in Establishing Culturally Appropriate Communication

It is because of these emotional, educational and economic obstacles faced by refugees that public health activists and educators should not attempt to add the additional burdens of changing refugee etiologies of illness and require conformation to Western health care models. Cultural barriers experienced by refugees in relation to their health care are expansive and result in increased stress on an already overstressed community. Ultimately, health programs and interventions targeted at refugee populations require greater expense for and demands upon local health care systems (Kemp, 1985). Interventions and programs aimed at health care professionals are considered most likely to effect change since it is providers that exert more primary control over the health provision and care process (Horner et al., 2004). Approaching patients within a relevant cultural framework will actually aid the process of diagnosis and treatment, since symptomology and treatment regimens can be better understood by patients, who must describe and comply with such measures, and practitioners, who must interpret such symptoms and provide treatment (Hamilton, 1996; Kreps & Sparks, 2008). It has been argued that more effort should be put into provider-focused interventions than focusing on change in patients for these reasons (Horner et al., 2004). Providers who obtain detailed information about patients’ cultural perspectives will have a greater insight into patients’
health beliefs than if they only identify a patient by ethnicity (Andrulis & Brach, 2007). Because failure to consider patient cultural issues can result in incorrect medical histories, non-compliance, and low likelihood of effective treatment (Flores, 2000), culturally appropriate health communication targeted at healthcare providers or agencies is thus necessary to limit health disparities in non-native and refugee populations.

**METHODS**

This ethnographic study focused on the subsection of Montagnard refugees in the Greensboro area, as well as community members who have worked extensively with the population and took place from September 2008 to February 2010. Snowball sampling was used to locate and interview subjects since organizations familiar with the community mainly work exclusively with the local Montagnard religious leaders and are not in contact with other individuals except on a case-by-case basis. The sensitive nature of my questioning, as it regarded health-related information, made introductions through acquaintances beneficial in securing source confidence. Because there is very little current literature about the Montagnards in general, much less about those living in North Carolina, I began the process of contacting members of the Montagnard community by contacting refugee resettlement agencies and requesting referrals for community leaders. By attending regular Sunday worship services at the United Montagnard Church, I established a familiarity with the community and recruited interviewees, most of whom suggested other family members or friends as potential interviewees.

Eleven female and three male Montagnards were interviewed, all between the ages of 20 and 60. Interviewees had been born in Vietnam but now lived in the United States for at least three years and were proficient English speakers. Interviews, which ranged from 45 to 90 minutes in length, were conducted individually, although family members were sometimes present, and participant narratives were recorded and transcribed. Interviewees were asked questions that covered a variety of topics, including inquiries about their health histories, personal experiences with health care in the United States and Vietnam, challenges they faced during the resettlement process, religious beliefs, Montagnard traditions and health experiences related to them by friends and family members. Visual material (photographs and video of some informant interviews) and audio material from taped conversations were collected. These subjective narratives, in combination with investigator observations and review of previous research, were used to analyze the overall patterns observed in both first- and second-hand accounts of health-related activities and health-care utilization by the Montagnard community. Interviewees are not identified in the paper, unless their position is relevant to the quoted information. Analyzing techniques I used involved 1) the identification of indigenous themes that appeared to characterize the health care experience of interviewees and 2) the comparison of these themes to other interviewee accounts and current scholarly research. Use of these types of scrutiny-based techniques have been deemed more appropriate for longer, richer narratives and the contrast-compare methods allow a broader exploration of a previously unexplored health culture (Ryan & Bernard, 2003). Such comparisons were made after the interviews by identifying key concepts discussed by informants and then matching these patterns to other interviewee statements and relevant literature. Seven primary motifs were identified and further literature was sought to expand specific themes not fully described in the initial literature review.
Patterns found among Montagnard refugees included misunderstandings between patient and provider due to differences in defining illness, passive obedience, reliance on traditional medicine and false perceptions of Western medicine. In addition, the introduction of American fast food is leading to the formation of new dietary habits by refugees, forecasting the possibility of new health concerns brought on by an unbalanced diet. These patterns were devised a posteriori by separating observations, interviews and applicable literature analyses into comparable thematic categories.

Defining Sickness
Modern health care is highly regarded by many Southeast Asian groups. Problems related to these groups’ utilization of health care are due more often to misunderstandings rather than a lack of acceptance (Kemp, 1985). Because health culture shapes the way in which sickness is defined and the interpretation of its severity, it also influences the actions necessary to treat it and the way in which it is described to others. Ideas concerning the source of sickness and disease, something many mistakenly believe are universally understood and accepted, are susceptible to varying explanations. For instance, the idea of preventative care is not a familiar mode of thinking for many Montagnards. “[The Montagnards] work until they get hurt or are too sick to go into work,” said one interviewee. “If someone gets them to a medical provider, then they get care, and if they don’t they don’t.”

An individual’s understanding of illness etiologies is created well before a clinical encounter (Ito, 1999). Such interpretations of symptoms and causation of sickness are conceived through interactions with people within important social networks and can influence behavior both before and after doctors’ visits (Ito, 1999). Moreover, procedures such as circumcision or tonsillectomies, which are considered routine in the United States, are frightening to many Southeast Asian refugees. Some groups believe such invasive procedures have long lasting and multiple effects that outweigh the benefits of surgical relief or cures (Muecke, 1983). Religious beliefs can also play a role in the refusal of many routine procedures by Montagnard patients. “Circumcision [the doctors] explain is cleanliness, for a better health,” one interviewee said. “But in our culture and belief you shouldn’t take off anything that’s given, you go against God’s will, and those are the things that are so sensitive because once it’s done you can’t sew it back.”

Southeast Asians who decide to seek health care are often apprehensive about the treatments and diagnostic tools used in Western medicine because of their lack of familiarity with and misinterpretation of the functions of such procedures, no matter how non-invasive or simple they may seem to Westerners (Uba, 1992). One Montagnard woman gave birth to a son with a malfunctioning liver and, although the doctors’ suggested a transplant, she refused to give permission for such an operation. “They keep him two months and they said they want change for him, change his liver,” she said. “I say he still little, I’m scary for him. At the meeting they say ‘Why you say no?’ I say no, I can’t do it, they want me to sign the paper, and I say no I just speak to God I pray to God.” This Montagnard mother’s lack of knowledge about the technology, process and safety measures taken before, during and after organ transplants in the United States led her to refuse a potentially health-improving, even life-saving, surgery for her son.

Seeking Health Care
Health-seeking behavior is constrained in many refugee Southeast Asian populations due to beliefs in the naturalness of suffering and reticence about seeking treatment for
asymptomatic diseases. Southeast Asians beliefs concerning the inevitability of suffering and acceptance of the time of death as predetermined inhibit some from seeking medical services (Uba, 1992). Members of a Vietnamese population of rural origin studied in Victoria, British Columbia appeared to base many decisions around the traditional concept of causation, and the notion of individual destiny (Stephenson, 1995). Stigmas associated with disease and illness can lead many to not seek care for serious conditions out of fear of family or community judgment. “They can’t afford to be here and to be an outcast from their society, their community because they have no one, nothing, this is it and they can’t go back to their homeland,” said one interviewee from the county health board. “So what do they do? They just accept it and die.” This belief is still very strong in older generations of Montagnard refugees. “It’s so hard to get them to go see a doctor because they always believe if you have cancer it’s a curse because your mom did bad things or your dad owe me 50 cents,” said one Montagnard refugee, who also works as a hospital translator. “Just to face the community alone is not easy. People start looking at you like ‘Your mom is a bad mom.’ For a certain symptom of a disease that you have [the thought] is you deserve it.” Similarly, Cambodians are slow to seek help because some accept symptoms as fate, which is related to certain religious beliefs and varying definitions of what it means to be healthy (Kemp, 1985).

Southeast Asian populations also can have different standards than Americans about how significant a health threat has to be to seek professional care. For example, the majority of Cambodian refugees are unaware of basic hygiene, principles of disease transmissions and many have lived under conditions in which high levels of disease are tolerated (Kemp, 1985). Many Montagnards lived in the jungle to escape governmental persecution and spent years treating injuries and sicknesses with herbal remedies since qualified healthcare was not an option. Even though professional health services are now available to Montagnards in the United States, many do not take advantage of them because they are not used to the idea of seeking out such services.

Collectivism and Importance of Family

Although collectivism and kinship are not inherently health related, these factors have a significant influence on health behaviors and outcomes (Kreuter & McClure, 2004; Ito, 1999). Because family and peers are often the source of accepted and trusted information, inclusion of family, especially decision-makers within the family whom may not be actual blood relatives, is an important factor in facilitating compliance (Ito, 1999). Montagnard refugees rely on elders, husbands and most importantly, their community’s religious leader to assist in or make the actual decision about care and the acceptance of treatment plans. “The oldest, normally one person makes a decision for you. If that person were not around in an urgent situation that you need to make a decision in five minutes then religious leader is the second person that make a decision on your spouse behalf. It normally whether you should have any more baby or not, whether you should go on birth control or not,” said an interviewee. “A lot of health care providers ask, ‘What is your relationship with the patient?’ and the preacher will say ‘I’m her pastor’ and they still won’t get it because they have no idea. We honor God and we honor the person who delivers the message who is the preacher or the pastor.”

The grouping of Montagnard communities and the many extended and immediate family members that crowd households illustrate the importance of “togetherness” many feel. “[Montagnards] don’t seek out the private space that [Americans] do,” one interviewee said. “You want to be with
your family, you don’t want to be separated, in a way.” If Montagnards are willing to sacrifice personal boundaries and comfort to be with family members, they will certainly reject health professionals and institutions that don’t understand or allow family members to be included in the medical decision-making process.

The impact of specific family members (usually a husband or other male figure) and their importance as decision-makers is essential in gaining client cooperation and aiding in effective treatment and diagnosis (Ito, 1999). “The culture is always the husband makes decisions. The problem like... to give birth, control they have to ask husband to decide,” said one interviewee. Many Southeast Asians find being alone frightening. One woman did not want to leave Vietnam but came to America to be with her father who was living all by himself. “When I came here the first time I think I don’t want to come here,” she said. “My dad call my family in Vietnam on the phone and I feel so sad for my Dad, he can’t speak English and work hard and I just feel sorry for him. I miss him too [so because of] that I just come over too.” Involving a patient’s family as much as possible during a doctor’s visit, even possibly simultaneously scheduling an entire family to be seen can put patients at ease (Muecke, 1983). “Over there in Vietnamese or Montagnard culture, family is to be honored, you got to respect that,” one interviewee said. “Rather listen to parents than listen to yourself.” Inviting family members and friends to participate in the clinical encounter and even assist with asking questions and recalling instructions is essential since many Southeast Asian cultures require family member approval or participation in the decision-making process (Andrulis & Brach, 2007).

Passive Obedience

Even though a Southeast Asian refugee patient may not understand or agree with a given diagnosis or the reason for a prescription regimen, many will not express their disquiet. Many Southeast Asian cultural traditions emphasize that authority figures or experts should not be questioned or opposed directly but only discreetly disobeyed later on (Muecke, 1983). This passive obedience also leads to non-compliance for Montagnard patients. “The trick is they are so polite they wouldn’t respond, they wouldn’t say no, they hardly say no because health care provider is like the goddess or something to them but they won’t do it when they go home,” said one hospital translator. This type of passive obedience is culturally adaptive and Southeast Asian refugee patients use this strategy to cope with uncertainty and authority as well as avoidance of shame (Muecke, 1983). The cultural values that emphasize this unmilitated politeness and obedience to authority figures is frustrating and confusing for medical personnel who do not understand why patients fail to return for medical services after a seemingly smooth encounter (Uba, 1992). “That is the culture itself,” said a hospital translator. “Whether they like you or not they won’t let you know, the only way you know is if you never see them come back for their follow up, that’s when you know something was wrong.” Cultural norms regarding respect of clinicians’ authority may prevent patients from being active in their care (Andrulis & Brach, 2007). Winning a patient’s confidence is difficult for doctors who must contend with the many cultural variations in attitudes toward medical professionals.

Unfamiliarity and Misunderstandings of Western Health Care Systems

United States citizens familiar with the Western medical system often consider intake procedures routine but these same situations are often confusing to Southeast Asian refugees new to the process. Members of minority groups may try to
hide or mask their limited health literacy or unfamiliarity with Western systems of care by not asking questions or simply feigning comprehension (Andrulis & Brach, 2007). The American appointment system is often misunderstood both in terms of needing an appointment and the fact that once an appointment is made, patients still must often wait past the scheduled time (Muecke, 1983). According to one Montagnard interviewee, the concept of needing to make an appointment time, arriving at the doctor’s office or clinic at that specified time and then have to wait several minutes past that time is unusual and frustrating. “It’s different from Vietnam and here. When I was in Vietnam when I got to doctor, when we go there, it’s like they working when we get hurt but over here we have to wait. No, in Vietnam when you get hurt just go, you don’t need to make an appointment or anything.”

The appointment system continues to be a source of confusion and sometimes a reason behind a lack of health care seeking behavior, according to community leaders. “They keep say ‘Why doctor make appointment for me and I have to come on time but, I wait over thirty minutes or one hour how is that?’” Frustration felt by Montagnard patients already dealing with stresses of relocation can lead to bitterness toward Western health services, a dim prospect for the resolution of future medical conditions.

The purpose behind physical examinations and the listing of health histories is not understood by many refugees. Indochinese groups tend to focus on treatment of symptoms rather than discovering the underlying causes (Kemp, 1985). In addition, obtaining medical histories from many Southeast Asian patients tends to be unproductive because they are rarely told the names of previous illnesses or medicines given to them. “Many time when they do a family health history, we don’t know,” an interviewee said. “We know our folks died, but we don’t know what they die from. We just say one day we come home and after meal she die. It’s hard for [doctor] to acknowledge that.” Thus knowledge of past diagnostic procedures and the results of such tests are rarely known (Muecke, 1983).

Any foreign-born person’s first contact with Western health services requires them to fill out questionnaires. These situations reveal unfamiliarity with Western medicine’s typical instructions such as checkboxes and rating scores of symptoms, and require the patient to reveal private and possibly embarrassing health-related information (Zanchetta & Poureslami, 2006). “They ask you how many partners you have,” one female interviewee said. “We don’t ask that back home or are you active and things like that, we don’t ask those things. When they asked me for the first time I was like ‘What do you mean? I’m single.’ You didn’t understand the question to be honest.” Such misunderstandings of important medical questions have the potential to lead to inaccurate health histories, which may cause clinicians to order unnecessary, expensive and time-consuming diagnostic procedures or misdiagnose a patient.

The roles of hospital or clinical personnel differ from country to country, and the breadth of responsibility exercised by a nurse versus a doctor or a receptionist may be unfamiliar to a patient. A Montagnard woman who was a nurse in her native country continually seemed confused by how little nurses seemed to influence care regimens. “Everybody know the nurse in Vietnam not same as here,” she said. “Here somebody sew they only sew, somebody take out baby they only take out baby and over there I do everything. I take out baby, I can see ear, can see jaw, can see everything. I give the medicine. I don’t need the doctor.” The idea of specialization or different fields of medicine is also a hard idea to grasp for some Montagnards used to a more generalized system of care. “In Vietnam they have a general doctor,” one interviewee said. “One doctor he can make decision to...
do things. Here you go to primary doctor, and he cannot do the family practice he sent you to specialist and that is different the way of treatment. Montagnards wanting to see a physician must find some form of transportation and potentially secure a translator, in addition to the regular scheduling steps taken by most Americans needing to use health services. After putting so much effort into seeing one doctor, it can be incredibly disheartening for a patient to realize the process must be repeated. The prospect of repeating such a daunting task may lead to an abandonment of efforts all together.

Reliance on Traditional Medicine
The perception that Western medicine is inappropriate for non-Westerners can contribute to Southeast Asian patients’ refusal to seek Western healthcare or, once being prescribed a medication, not taking it (Uba, 1992). “I guess like my family have used the root of the tree but I don’t know what that called,” one interviewee said. “My brother sent it over here but we don’t keep it no more we use it all. ” When asked about antibiotics many interviewees seemed confused and asked what antibiotics were. Many did admit using Tylenol and Aleve but couldn’t think of any American medicine besides those name brands.

Southeast Asians put more emphasis on self-care and self-medication and both are often practiced longer than with Western patients before professional care is sought (Muecke, 1983). “In Vietnam only if the life’s threat, then you go to hospital,” one interviewee said. “If you flu you try to use herb medicine. We treat flu from earth, from mother earth medicine. They give birth also we have herb medicine. And vitamin we take from the jungle. I been 17 year in jungle I learn myself, I do all that I learn and use in the jungle 17 years. If you have wounded you put honey inside and clean all pus and clean pus go fast to heal. That is what we used to do.” Montagnards do believe there are limitations to even what herbal remedies can cure so Western medicines are still sought out. “Herb medicine to treat one only [symptom],” one interviewee said. “The body only one diagnosis and symptom can be gone only one and if you have two or three you can’t have herb medicine.” When medication is dispensed, dosing instructions are often misunderstood or not received at all. “We have makesuretheyunderstandmedicines, how to take it,” said one Montagnard community leader. “They said okay one day I take three times a day. Three time how much? How many hour?” When a prescription or medication is received, a lack of knowledge about medicines in pill form still can lead to confusion. “The concept of needles they’ve heard of because they have experience because of the flu shot annually but they’re not really a big fan of pills because usually when you got the doctoryou usually get out with a shot. [In Vietnam] whether you have stomach ache they give you shot. Over here they expecting [a shot] but all you have is prescription you can’t even buy there,” said one hospital translator. “That’s when it gets lost, the pills never get taken. The prescription is ended up in their wallet for many years.” In this case, even though the patient does receive care from a physician, the necessary steps to begin effective treatment (i.e., filling the prescription) are never taken.

Changes in Diet and Lifestyle
The “bigness” of American lifestyle, including the availability of high calorie, large proportioned food not available in Vietnam has contributed to the formation of new health concerns for Southeast Asian populations. According to one interviewee, the Montagnards have adopted all of the bad American dietary habits. “Over here it’s like it’s kind of easy,” according to one interviewee. “It’s like hamburgers, in Vietnam it’s tree leaves and what we found in jungle just eat something we
found in jungle. In America it’s like kind of get bigger, in Vietnam it’s not get big.” The vast selection of food and its availability in America appears to be in stark contrast with what many Montagnards experienced in their native country. “In Vietnam no food, no anything,” one interviewee said. “In America you have salt, you have food, you have anything.” Another interviewee emphasized the people’s dependence on the natural environment for sustenance in Vietnam. “I told Montagnard one word in the beginning Montagnard have never die by food. Many people surprise when I say that. But when we are in Vietnam we are starving, we don’t have food enough, and we eat nature; we not eat meat too much because we don’t have.” This new selection of food and its unhealthiness is compounded by the sedentary lifestyle propagated by Western luxuries such as public transportation and factory jobs that don’t involve manual labor. “I never exercise,” one interviewee said. “Because they used to work a lot so they don’t need exercise and they all skinny. When they get here they are kind of big. Even me when I was in Vietnam I was so skinny.” High blood pressure and other diseases associated with weight gain are very plausible future medical concerns for these populations not used to having to compensate for lack of everyday exercise and the accessibility of cheap, unhealthy fare. “In America many people get wrong food, high blood pressure, cholesterol, diabetes and often if you not careful with nutrition you get because of that,” said the leader of a local Montagnard congregation. “I have over history 30 Montagnard die in America. Same cause from stroke because of high blood pressure, and they never heard that in Vietnam.”

CONCLUSION

In this study, cultural barriers to the Montagnard refugee populations’ acceptance of “Western” medicine and compliance to its tenets have been examined. The findings point to the need for greater acceptance and understanding of Montagnards’ definition of illness, use of passive obedience, reliance on traditional medicine and false perceptions of Western medicine by health care professionals to improve the quality and accessibility of information and treatments. A clinician seeking to learn about the Montagnard needs to know about how these cultural factors can negatively influence a clinical encounter. For instance, patient ignorance, due to distrust of Western medicine and misunderstandings about its functions, is not always apparent since Montagnard cultural values emphasize feigning understanding rather than questioning authority figures or admitting a lack of knowledge. Culturally aware clinicians can navigate such cultural nuances through engagement and implementation of tailored communication techniques.

Future studies looking at the ways in which second and third generation Montagnards are experiencing dissonance with Western medicine are needed as the population continues to grow. Studying Montagnard communities outside of one specific geographic area and in other regions of North Carolina such as Raleigh and Charlotte could provide information about how location impacts health barriers, in terms of access and cultural incongruities. A more quantitative study using measurable data like that achieved by surveys could also be employed in future research. Such findings could potentially determine the significance of one barrier compared to another and establish a more detailed plan by which providers and educators could develop cultural competency.

Because it is the engaged, non-judgmental clinicians who can learn about a patients’ belief system and practices, they are also the ones who can replace harmful or ineffective remedies with harmless ones
that are consistent with individual beliefs (Flores, 2000). This can be accomplished in several ways, on both a micro and macro scale. At a provider-patient level, physicians and nurses can modify their messages so they are more digestible to refugee patients unfamiliar with health care commonalities. Allowing patients to use their own words to describe their culture and language and adopting less formal assessment strategies will also limit misunderstandings between patient and provider (Andrulis & Brach, 2007). Clear communication can be facilitated by providers that deliver simple messages to patients and are taking an active interest in a patient’s understanding of their instruction. Providers that do not bombard patients with several messages at once, speak in uncomplicated and jargon-free language often have more success with patient compliance and improved trust (Andrulis & Brach, 2007). The teach-back or teach-to-goal method is also another successful strategy of having patients explain what they have been told. Patients should be asked to repeat information to make sure comprehension has occurred. Clinicians can learn more about their patients’ health culture and beliefs by asking questions that explore patients own unique concept of health, such as: What do you think has caused the illness? What do you think the illness does? (Andrulis & Brach, 2007) Providers who accommodate folk illness beliefs and practices and who are able to integrate them into suggestions for appropriate care will be better able to explain the rationale behind a particular condition and treatment plan (Flores, 2000). Cross-cultural exploration by providers will better allow them to appropriately diagnose and treat culturally diverse, minority patients. An understanding and culturally appropriate approach must be taken by providers to support their patients’ self-management efforts (Andrulis & Brach, 2007). Accomplishing this is possible if clinicians are willing to adapt their own approaches to accommodate multiple needs of culturally diverse minority community members (Andrulis & Brach, 2007).

It is important to remember that health communicators, providers and allied professionals are all at an early age of understanding the scope of health literacy and culture as it relates to minority populations, especially those isolated from majority populations by cultural boundaries (Andrulis & Brach, 2007). The scope of methods employed to evoke positive health change can be as large as instituting new training programs or as small as assuring understanding in a single patient encounter. On a grander scale, establishing cultural competency training in collaboration with local resettlement agencies or building relationships with community leaders who can communicate the needs and cultural nuances of their group to medical professionals and health educators can help address certain health barriers. Studies have suggested training in cultural competence when dealing with such multicultural and diverse patient perspectives, but this training is a complex mix of specific types of knowledge and self-awareness (Horner et al., 2004). Furthermore, creativity and flexibility is needed to apply these cultural competencies to the treatment and clinical decision-making and it is unlikely to be achieved by a one-time-only study course (Horner et al., 2004).

A merger of programs that seek to improve health professionals’ communication skills across culture and language and training to improve provider ability to serve low-health literacy populations is necessary (Andrulis & Brach, 2007). Training programs should take advantage of known effective learning methods such as role-playing, specific case presentations and the inclusion of outside consultants such as indigenous healers and community leaders (Horner et al., 2004). Opportunities to
include cultural training in health provider education may include courses offered in medical schools, lecture series during residency and continuing medical education courses (Flores, 2000). Patient and clinical care, however, are not just between physician and patient—the receptionists taking appointments and hospital administrators who make their facilities more or less accessible to minority populations are also involved in the health care process (Horner et al., 2004). If such advances are made and those working in a patient-care, health provider setting are able to move beyond their own personal perceptions of lack of care coordination, racial and ethnic prejudices and assumed patient ignorance, the cultural competency process can begin and the length and quality of refugee lives can be improved and brought up to par with majority members of the population (Paez et al., 2008).

No matter the extent of these accommodation efforts, an increase of cultural awareness and knowledge by providers and educators can bring refugees one step closer to real understanding and effective care that continues outside the hospital or clinic. This progress is sorely needed by refugee communities, especially the Montagnards, whose want for comprehensive health care is great because of intense pre- and post-immigration experiences but ability to access and understand such beneficial health services is limited by cultural barriers.
Works Cited


Explorations | Social Sciences


Ocular Health Knowledge Modifications

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ABSTRACT
The purpose of the project was to investigate ocular health knowledge modifications in subjects of the former communist country Romania. Accessible, high-quality eye health care in Romania remains a primary challenge to be overcome. Because for many Romanians eye care is difficult to obtain, the intention of this research was to raise awareness about preventive eye care versus costly treatment. NEI (National Eye Institute) recognizes that an increasing occurrence of eye afflictions is becoming a major public health problem worldwide. NEI also underlines the importance of public education through health-promotion workshops, and it encourages community leaders and local efforts to foster vision health education and research. Voluntarily-participating subjects were asked to complete a pre-seminar interview assessing basic knowledge of proper eye care. General qualitative questions included: what are effective ways to protect one’s eyesight, why do we need to take care of our vision, and how can eye exercises be effectively used to maintain healthy vision. Additionally, information was collected about subjects’ socio-economic backgrounds via individual surveys. Post-seminar interviews, using a format identical to that of the pre-seminar interviews, were conducted within a two-week timeframe. Changes in participants’ knowledge were gauged via comparison of the two sets of interviews. The population distribution was assessed in terms of gender, age, medical (mainly ocular) family history, ocular health, economic status, and education level. Final evaluations of educational outcomes showed retention and application of information.
Eye care health disparities have long been the subject of debate and deliberation, both locally and nationally, in organizations such as National Eye Health Education Program (NEHEP). The need for a greater number of ocular health care providers is undeniable. The issue has gained interest and has started to be addressed in third world countries such as India. In fact, the National Eye Institute (NEI) endowed seven research grants in 2005 to expand vision research in India. However, more work in ocular research is still needed in many other developing countries.

Upon approval of the University and Medical Center Institutional Review Board (UMCIRB), I gathered pilot data over the last two years in a project titled “Eye-care health disparities: International and Rural United States Comparison.” This 2007 self-designed research was conducted in Bihor County, Romania and Pitt County, NC, under the supervision of two family practitioners, Dr. Aurelia Marti and Dr. Tom Irons. Educational seminars and vision acuity examinations provided opportunities to explore and compare the basis of health disparities among subjects at both research sites. Preliminary data indicated that a high percentage of the populations studied (55.19% in Oradea, Romania and 68.90% in Belvoir Elementary School, Pitt County, NC) had vision-related problems. These problems included poor to very poor vision acuity, frequently combined with the usage of inappropriate glasses. The findings recently published in Explorations (Gliga) underlined the urgency of providing proper eye care and health education.

In the research of ocular health knowledge modifications reported in this paper, I address the need for health education and test its impact on targeted populations.

Addressing Health Disparities
Approximately 250 million people worldwide cannot see, or they have trouble with their eyesight. Yet it is estimated that 75% of blindness cases could be treated and that 90% of cases of blindness could be prevented (National Eye Health Education Program). A lack of access to eye care and a lack of funding are the main obstacles. “Optometry Giving Sight” is an international initiative which, in cooperation with CIBA Vision, raises funds to help cover the cost of ophthalmologic care for inhabitants of impoverished countries. Forty countries receive funding through the project, including Sri Lanka, Kenya, Tanzania, Uganda, South Africa, and Zambia (National Eye Health Education Program). Unfortunately, Romania has not yet received such support despite its status as a third world country with a modest economic profile and limited access to ocular care. And although the National Eye Institute (NEI) has collaborated with populations-based visual impairment surveys in Nepal, China, Chile, India, South Africa, Malaysia, and Brazil, Romania has not yet been included.

An unstable economy and a poorly funded health care system make medical care in Romania very nearly a luxury item. Nationally, an average of only six hospital beds are available for every thousand patients. Currently, in this country of more than two million people, only about a thousand ophthalmologists and residents are in practice. There are no optometrists; routine vision examinations are performed by family practitioners. However, these physicians are mostly unable to offer effective services as they are expected to attend daily to more than 40 patients within a four-hour time span. Additionally, people in greatest need of vision care tend to be geographically isolated in villages scattered throughout the country. The availability of
technology is also very limited in the field. As Dr. Benone Cărstocea stated in an interview, there are locations where machines as old as one hundred years are being used as ocular diagnostic tools (in Romania).

**Barriers to Healthy Vision**

**Limited Professional Advice**

In Romania there is limited information regarding ocular prophylaxis. A few informative pamphlets are available at private ophthamologic practices, but this means that only patients to such practices are able to access them. Because of the high private health care cost, not many people can afford such services. As of 2010, the average consult in Oradea, Romania, costs 700 RON, which is equivalent of $24. Average monthly salaries in Oradea are only 1940 RON ($646) as of February 2010 (Saliarii mai mici).

**Corruption in the Healthcare Field**

There is also a pressing issue of corruption in the Romanian medical field. It is known that there are still doctors who do not give the proper (or any) medical care unless the patient pays bribes beyond the standard fee. Statistics show that 29.72% of doctors receive bribes and 36.58% receive “Thank You” awards (Craciunas). It can thus be said more bluntly that 29.72% of doctors can rightly be accused of corruption. However, the benefits of Western advances in ophthalmic care are available for those who can afford to pay. These include lenses such as Air Optix Aqua and DAILIES, exams with expert machinery such as PlusoptiX A09, and eye-care solutions such as AOSept Plus and SoloCare Aqua (Spune din Priviri).

**Government-Funded Hospitals and Universities**

Because of the financial crisis, most patients seek help at government-funded hospitals. In such locations the doctor must divide a four-hour schedule between eye exams (for out-patients and in-patients), hospital rounds, surgery, and administrative tasks. Patients wait between one and two hours to be seen (first come, first serve basis) and once inside the doctor’s office, they are rushed through the exam—an arrangement which leaves no time for educating the patient.

This raises the question of whether pharmacists might provide an educational link between doctors and patients. Recently, more emphasis has been placed on exploring this idea, but as with all things new, it takes time to implement. As of now, the government-funded medical system gives the appearance of being staffed with personnel who, to some degree or another, lack adequate preparation. There are various reasons for this lacuna, including a lack of materials and access to too few faculty. It is also alarming that in the Transylvanian system of universities, 74% of people report having heard from others about cases of professional dishonesty, and 36% know of such cases from their personal experience (Coruptia din Mediul Universitar).

**Impact of the Internet**

A key to disease prevention is education of the public. Educational materials concerning the importance of drinking water, eye-relaxation, wearing eye glasses, and sleeping sufficiently exist on the Internet, but such materials written in Romanian are limited (Spune din Priviri).

**Current Movements to Decrease Vision Health Problems**

The popular “Did you know...” articles have been adapted by Romanian online magazines. New mothers, for example, can find articles that answer concerns or state facts regarding the care of newborns. This information includes how newborns see most clearly within a 25 cm range, and how
the size of an eyeball does not substantially change through the years (Stiati ca…). The particular set of facts conveyed through such materials is not especially critical insofar as they do at least help stimulate people’s inquisitiveness, inducing them to seek more (and more instructive) information. One can also find online advice on various blogs. This decidedly western idea is gaining currency in Romanian culture, too. One can find information pertinent to various eye-care topics and concerns, such as “ways to alleviate ocular discomfort from excessive computer usage (Raspunsuri de la cititori). One reader, Vasile Niculescu, answers this question with good advice. Such networking helps break down geographic barriers to information exchange. (The reader is from Bucharest and the inquirer is from Oradea.) However, it bears noting that Internet advice must be taken cautiously, as the persons giving advice may not be professionals or experts in the subject.

Many of the online educational materials available in Romanian concern the importance of beautiful, healthy eyes, and explain medical terminology and conditions “in plain language” that the average reader can understand. Besides stating the problem, such articles often suggest solutions, whether this be something that can be accomplished at home or purchased off the shelf. Romanian doctors in specialized fields can be found on the Internet writing articles or reviewing others’ writings prior to publication. Thus, Dr. Ionut Costache advises pregnant women to check with their ophthalmologists especially during the last trimester, since retina formation exerts a nutritive effort, and contractions during labor can sometimes rupture the retina and lead to blindness (La varsta de 3 ani). Dr. Mircea Filip makes available to the public a list of expected costs related to eye care.

Another example is the article “Ochi Frumosi si Sanatosi” (Mihailan) wherein several ophthalmologists discuss macular degeneration and ocular disease prevention. The importance of lutein and Vitamins A, E, and C are mentioned (Mihailan). There is a downside to this otherwise helpful article. For instance, because it is featured in an online magazine sponsored by pharmaceutical funds, a particular drug (Vizual Aktiv) is recommended for a particular ocular condition (Mihailan). It is left to the reader to discern meaning from the business propaganda when choosing which products to purchase.

Advice regarding the vision of children can also be found on the Internet. In a 2009 poll of 232,700 students in Bucharest, it was found that ophthalmologic problems were the most commonly encountered health problems (Chirileanu). These difficulties interfered with students’ academic life, introducing further complications such as depression, even from a kindergarten level. “Organizatia Mondiala a Sanatatii” reported in 2002 that more than 161 million people worldwide suffer a vision deficit, out of which 37 million are blind—1.4 million of them being younger than 15 years (Lentilele de contact). Dr. Gina Tanase, Bucharest medical center director, states that positive vision rehabilitation (up to 20% of vision acuity) is attainable in patients older than five years of age, with treatment ranging from 10 sessions to a full six-month recovery period (Bendelic). As for the older population, an experiment
conducted by Dr. Johanna Seddon on 935 people between 67 and 71 years of age revealed the unhealthy effects of excessive smoking, obesity, or unwise eating habits (Maresan).

It must be noted that while useful information exists online in Romanian, the majority of the Romanian population does not possess the financial or educational resources to access the Internet, so this information remains out of reach to most. Unfortunately, these lacking Internet access are precisely the people in greatest need of medical attention: they are primarily of median to old age, with limited educational, medical, and socio-economic status.

Various Ophthalmological Research Efforts in Romania

A number of research projects are ongoing in Romania in various specialized areas within the field of ophthalmology. Examples include “Modern treatment of Dry Eye Syndrome (DES)”, a study conducted by a team of doctors/researchers in Chișinău, Moldova (Lopata). The study was based on 78 patients with DES of various etiology and moderate severity. Three different, inoffensive, non-or mini-invasive treatments were judged fruitful (Lopata).

Another group from the USMF “Niculae Testemițanu” and “Spitalul Clinic Republican” focused on the comparative study of different imagistic modalities in orbital trauma complicated with intraorbital foreign body (Lopata). With conventional and radiological techniques they determined efficiency in diagnosis and localization of the roentgen-positive intraorbital foreign body in 145 patients with orbital trauma. The group identified strong and weak points of different imaging methods as well as the preferred diagnostic sequence depending on the foreign body characteristics and possible localization (Lopata).

Even at the University of Medicine and Pharmacy in Oradea there exist some impressive thesis projects. One example is Dr. Tomina Popescu’s dissertation on correlation between diabetic retinopathy and subclinical arterosclerosis (Popescu). The subject pool consisted of 100 patients from Spitalul Clinic C.F. Craiova. They were screened for a year (2008), regularly given check-ups and evaluations (Popescu). Strong correlating factors were proven to be hypertensive stress, smoking history, and presence of plaques.

Other research is noted on various topics, ranging beyond dry-eye syndrome studies to one project investigating minute, genetic details. For example, an investigation of Dr. Lilia Dumbrăveanu from the ophthalmology department at USMF “N.Testemițanu” (Dumbrăveanu) researched the role of major histocompatibility complex HLA in the diagnostics of uveitis associated with seronegative ankylosing spondylitis. Dr. Iulia Lopata, from the same department, investigated the critical role of the structure of the tear film in the interaction between contact lenses and the anterior surface of the eye (Lopata).

It is notable that these studies addressed ways to alleviate ongoing ophthalmologic conditions, but none of them focused on prophylaxis and its probable positive effects in ocular disease prevention. While certain diseases “come with age,” with proper home-based, sanitary habits, the age at which these conditions appear could be pushed back.

Vision Health Disparities in Romania

International collaborations are symbolic of the linking elements between developed and developing countries. They emphasize that accessible, high-quality care is the main challenge to be overcome. NEI, in its support for international research, has cooperated for more than 25 years with populations-based visual impairments surveys in Nepal, China, Chile, India, South Africa, Malaysia, and Brazil (Bridbord). However,
many more European developing countries such as Romania remain underserved when it comes to ameliorating visual health disparities. The need for research and promotion of proper health care in such places remains critical.

Romania thus provides an interesting venue for reviewing visual health disparities. An October 2006 survey reports that there are a total of 40 Romanian national ophthalmology residences divided among the principal municipalities—and concomitantly main medical centers—such as Oradea, Arad, Iasi, Timisoara, and Bucharest. It must also be taken into account that the 2,740 total national residency seats in the medical field include, but are not limited to, ENT, family practitioners, radiologists, urologists, dentists, pharmacists, even legal medicine practitioners (Numarul de locuri). These numbers further reflect the deficits in ophthalmologic care in Romania. The “Capital” newspaper reported that in Bucharest, more than 5% of people wearing eyeglasses did not receive a prior eye checkup, whereas 19% of them had not had an eye exam in more than three years (Jumatate din România).

Additionally aggravating the situation is that the population most critically in need of vision care is geographically isolated in villages throughout the country. They lack transportation, and none of the practicing ophthalmologists engage in house calls. It must also be noted that there is no notion of optometrists in most European countries such as Romania (“In Romania”). Thus, the research and educational interventions that would be most beneficial to these individuals must be brought to them.

Legislation itself creates a gray area for treatment of ocular conditions such as dicromatism (Toma). In Romania, approximately 0.4% of the male population is affected (Hurbea). In the ordain Nr. 87 from 03/02/2003, Anex 1, paragraph “Oftalmologie”, number 4, it is stipulated that discromatopsies are among the medical maladies deemed incompatible with driving a vehicle. This law was modified on 12/4/2003, leaving it to the ophthalmologist to decide how the condition can affect driving. If the doctor considers it to be an issue, a stamp of “INAPT SOFER” (inapt driver) is placed upon the medical record (Hurbea). This of course creates disparities in how this group of patients is evaluated and regarded.

**Methodology**

My plan of action in the research project focused on the effectiveness of educational seminars promoting preventive ocular health practices. Data collection and analysis consisted of three main components: a pre-seminar interview to assess the knowledge pertaining to potential ocular health implications, an educational workshop on ocular preventive care, and a post-seminar interview (format identical to the first). The second interview was distributed within two weeks of the first. Thus, individual personal knowledge modification was assessed and measured. Close observation, recording, and analysis were avenues of data collection.

Seven hundred twenty-three subjects were recruited on a voluntary basis and without incentive offered. Cooperation with local family practitioners, medical university professors, and middle/high school directors allowed me access to a large subject pool. UMCIRB approval was obtained prior to start of research, and this approval was subsequently renewed in February 2010. UMCIRB approved informed-consent documentation for participants (and for parents of those under 18 years of age) was given to participants. Students tested were from a pool of various schools in metropolitan Oradea, such as Scoala Generala Oltea Doamna, Scoala Dacia, Liceul Emanuel Gojdu, and Liceul...
Lucian Blaga. Rural areas represented in the study include: Alparea, Baile Felix, Bors, Capalna, Gepiu, Ineu de Cris, Osorhei, Paleu, Sacadat, Sanmartin, Santandrei, and Sarand—all villages in Bihor County.

Educational Seminars
Eye health concepts were presented to 541 fifth, sixth, seventh, and eighth grade students at various schools in Bihor County, Romania, and to 182 Romanian subjects at the university level and beyond. Goals included eye safety, preventative care, and

Pre-Seminar Interview
Information was gathered regarding birthplace, age, gender, and employment.

The questionnaire was divided into two sections, one pertaining to ocular medical history, and the other addressing personal knowledge about eye care. The first section included the following:

1 Have you ever been told that you have an eye problem or disease? What and when?
2 Does anyone in your family suffer eye problems? Who and what?
3 Have you ever had eye-related surgical interventions or special treatments? Describe.
4 Whom do you seek when you experience personal eye-related pain/discomfort?
5 How often do you have eye exams? What’s covered by the eye exam and/or treatment?
6 Do you wear eyeglasses and/or contact lenses? Since when?
7 When was your last eye prescription changed? Is the prescription from the last exam adequate now?
8 Who wears eyeglasses and/or contact lenses in your family?
9 Do you have health insurance?

The second section was designed in a True/FALSE format. The subject had to distinguish between eye-care truths and myths, and to circle an answer. The following statements were included:

1 “Reading in dim light is hurtful to your eyes.”
2 “Using computers can hurt your eyes.”
3 “Wearing the wrong kind of eyeglasses damages your eyes.”
4 “Children outgrow crossed or misaligned eyes.”
5 “Eating carrots improves your vision.”
6 “People with weak eyes should avoid reading fine print.”
7 “Wearing eyeglasses will cause you to become dependent on them.”
8 “A cataract must be ‘ripe’ before it is removed.”
9 “Contact lenses can prevent nearsightedness from getting worse.”
10 “Eyes can be transplanted.”
internalization of knowledge presented. Students received comprehensive individual brochures. The colorful and informative handouts kept the students engaged and interested. Other concepts included verbally in the presentations were:

Why do we have eyes—purpose?
Why do we need blinking, eyelashes, eyelids, and tears?
What are glasses and contacts for?
What are good ways to protect our eyes?
(e.g., nutrition, eye exercises, avoiding bright lights, no sharing of glasses, makeup, etc.)
Eye structure and communication with the brain.

Brochures
The informational brochure included two parts. One listed the answers to the Eye-Care TRUE/FALSE section of the questionnaire, along with the reasoning behind each answer. The second part gave information regarding eye-injury prevention in various settings such as the home, in the workshop, around children, in the garden, around cars, during sports, and while using fireworks. First-aid tips for eye injuries were also listed, categorized by the various types of injury such as foreign objects in the eye, cuts to the eye and eyelid, blows to the eye, and chemical burns.

The brochure information and questionnaire were offered in both Romanian and English so that participants could answer in whichever language they knew or felt more comfortable with.

Post-Seminar Questionnaire and Interview
Within two weeks, a questionnaire identical to the pre-seminar one was given to participants. Final evaluations of the collected data gauged the retention and the application of the information presented in the seminars. Subjects with affected vision were encouraged to visit ophthalmologists.

The maximum score on the questionnaire was 10/10 (10 questions answered correctly out of 10 possible questions). Thus, for example, if a subject initially scored 3/10 (three correct answers) and then 9/10 (nine correct answers), an overall increase in retained knowledge was indicated.

Data Analysis and Discussion

Although the research history was already built at several primary and secondary schools in Oradea and at the medical office of Dr. Aurelia Marti, my goal was to reach a larger population in this city and in the surrounding villages (e.g., Santandrei, Ineu de Cris, and Paleu). The initial proposed sample size for the research was 500 people, but the final tally amounted to 723 participants. With invitations from several family practitioners (Dr. Aurelia Marti, Dr. Olimpia Perez) and from Dr. Straciuc—University of Medicine and Pharmacology in Oradea, along with access to various academic settings (e.g., Health Classes at Liceul Oltea Doamna, Liceul Lucian Blaga, and Liceul Emanuel Gojdu, secondary schools in Oradea), I was able to access the resulting participant pool.

Examination Results
Data were analyzed on the basis of regional differences (rural vs. municipal), gender, age, education level (fifth through eighth grades vs. university and beyond), economic level (having state insurance vs. having no state insurance), social influence (having family history of ocular issues or not), personal ocular health (having problems with vision or not), and socio-medical status (how often an eye exam was received).

Subjects from both municipal and rural settings showed a positive increase in ocular health knowledge from pre to post-interview. Initial interview scoring averages were 37.57% and 39.57% respectively. Post-educational seminar interventions revealed average scores of 74.55% and...
75.35% respectively. This shows a 37.69% overall increase in knowledge accumulation regarding proper eye-care.

Similar results were observed in other categories as well. For female subjects in municipal and rural settings, initial scores were 37.66% and 36.92% respectively. Post-educational scores were 75.64% and 87.69% respectively. This shows a 39% overall increase. For male subjects in municipal and rural settings, initial scores were 38.03% and 42% respectively. Post-educational scores were 73.31% and 82.44% respectively. This shows a 36.12% overall increase. When comparing female to male subjects, the former had a higher overall increase.

Education level plays a part in the effectiveness of information assimilation. Thus, when comparing fifth through eight grade students with university level/beyond subjects, these findings were noted: initial interview scoring averages of correct answers were 35.54% and 44.61% respectively. Post-educational seminar interventions revealed an effective ocular prophylaxis, with average scores of 68.53% and 95.93% respectively. This shows that prophylaxis is observed to be effective in classes as early as fifth grade. A higher maturity level for subjects at university-type settings shows greater information assimilation. A similar trend holds true for ascending age groups. Positive health knowledge retention was thus observed in subjects with various educational backgrounds.

In order to analyze the effectiveness of the seminars for subjects with different economic levels, I had to define the economic parameter. The defining factor was whether the subject carried state insurance or not. Having state insurance implies that one is employed by the state, or is the child, 18 years or younger, of one employed by the state. Having no state medical insurance implies that the subject might have private insurance (perhaps due to owning a private business or because the participant was able to afford an additional private policy), not necessarily that the participant carries no insurance at all. For subjects with state insurance, initial interview scoring averages of correct answers were 37.90%, and for those with no state insurance were 37.48%. Post-educational seminar interventions revealed an effective ocular prophylaxis, with average scores of 75.26% and 76.53% respectively. This shows that subjects with no state insurance (and thus with a better economic level) scored with 0.27% higher than those with state insurance. Because the difference was small, economic level might not play a part in the change of health knowledge. Additional research could shed more light on this.

Social influence could also play a part in a person's degree of information assimilation. This parameter was examined via family history of ocular issues, whether this may be ocular disease (e.g., astigmatism, conjunctivitis), ocular surgical interventions (e.g., cataract surgery), or affected visual acuity. If a subject's family member had such a history, then by association, the subject could have heard of and learned about various eye conditions, causes, and treatments. For subjects with a medical family history of ocular issues, initial interview scoring averages of correct answers were 38%, whereas those without such a history scored 37.47%. Post-educational seminar interventions revealed an effective ocular prophylaxis, with average scores of 75.83% and 74.82% respectively. This shows a 1.01% difference between groups. This shows that there is a social influence for how much information one can internalize. Positive health knowledge retention was thus observed in subjects with various educational backgrounds.

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had one exam in their lifetime, had two to five exams total, had one exam or more every year, or had an exam every two years. The initial interview scoring averages of correct answers for the above mentioned categories were 36.16%, 37.96%, 38.93, 39.83, and 44.37% respectively. Post-educational seminar interventions revealed an effective ocular prophylaxis, with average scores of 75.28%, 75.47%, 71.19%, 80.33%, and 80.31% respectively. This shows that effectiveness is to a certain degree positively influenced by an increase in personal outreach for ocular care.

Limitations

General Research Limitations
A primary concern is the fact that there was considerable restriction on the time frame during which research was conducted, particularly with trying to organize travel in Romania. Obtaining prior UMCIRB approval was somewhat time-consuming and constraining. Because there were no other principal or secondary investigators, it was considerably harder to examine and to educate a larger subject pool. This reveals the need for constant research and for support of current researchers who are gathering information to be made available as future references and implementations to improve the health of society. Partnerships with more schools in Romania would have also furthered the current studies.

Regional Research Limitations
A significant limitation in hopes for improving the vision health of Romanians is the healthcare system, which lacks the needed workforce. Currently, the national combined number of practicing ophthalmologists and residents is approximately one thousand ("Numarul de locuri"). Additionally, Romania became part of the European Union in 2007. Consequently, the number of young Romanians leaving the country to seek better opportunities has increased considerably. Availability of needed technology in the field is also a huge limitation.

The cost of any ophthalmologic intervention is considerable and can lead people not to seek treatment. For example, the cost of cataract surgery in Romania is approximately 12 million lei (with $1 = 23000 lei, the cost is approximately $522 dollars), of which insurance covers no more than 2.4 million lei (approximately $104) (40.000 de cazuri de cataracta operate anual in Romania). It must also be noted that the average monthly income for a middle-aged worker is $270.

Further Questions
The investigation showed that there is a positive educational impact in rural groups and in municipal subjects. Investigations in rural settings should be conducted which adjusts for any influencing factors such as an education in the city, social ties to city subjects, etc.

To further assess the effectiveness of the ophthalmologic prophylaxis seminars it would be necessary to re-examine the subjects. This would include completion of the prophylaxis questionnaire and the conduct of comprehensive eye exams. It could be thus established whether healthy ocular care habits are followed, and whether they are in correlation with good results in the examination. This subject reevaluation should be at an interval of every two years for a duration of at least 20 years. The reason for such a timeframe is that eye exams are recommended every one to two years and the time in which an ocular condition can appear is faster in younger subjects. This screening would determine the success rate of subject education. At the moment we can show that people have a positive education growth, but we have yet to correlate it to disease prevention and/or postponement.
Conclusions

The research conducted in Oradea has shown a great success in regards to the educational interventions. There was a significant rate of information retention as evidenced in final assessments. With Romania just entering the EU, the working, middle-class population is leaving the country in greater numbers, in hopes of finding better-paying jobs in neighboring European countries. In the process, they leave behind those who need medical attention. These people are the ones who need to be reached, and the sooner the better. Of course, because over half of the tested subjects in Oradea are in “need of ophthalmologic attention” category, there is an obvious need for further research, for implementation of efficient educational interventions promoting preventive care, and for assistance to individuals requiring immediate medical attention.

Upon my return from Romania I plan to adapt the research to rural eastern North Carolina, USA. I will identify high-risk groups in local communities through regular vision screenings. Afterwards I will be able to apply my experience, my broader understanding of the subject, and my cultural sensitivity to the promotion of ocular preventive care. Meanwhile, I will assess the individual knowledge modification and information retention change with respect to each participant's personal ocular health behavior. My future goal is to promote a healthier vision status in the at-risk identified population.
ACKNOWLEDGMENTS

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A Game-Theory Analysis of US Efforts to Curb the Colombian Cocaine Trade

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Abstract
In the United States, efforts to disrupt the cocaine trade have centered on coca eradication in nations such as Colombia. In spite of funding increases for eradication initiatives, cocaine production levels in Colombia did not decrease between 2004 and 2009. Current US intervention strategy involves fumigating coca fields with herbicidal spray; the most herbicide is dispensed to the areas with the most coca cultivation. While this approach seems valid from a conventional viewpoint, it does not consider the motivations of individual farmers and thus results in an improper allocation of funding. By approaching the scenario from the level of the farmer as opposed to a nationwide perspective, this problem can be solved using game theory, a branch of mathematics that can be used to determine the optimal choice for rational actors in a given competitive scenario. For this analysis, Colombia was broken down into smaller regions called departments, and regional data on coca production from the UN Office on Drugs and Crime was utilized to determine estimated payoffs to Colombian farmers by region for coca and a licit alternative, coffee. The results of the analysis suggest that coca production levels in Colombia can be significantly decreased with only modest increases to herbicidal spraying: fumigating approximately 4,000 more hectares could eradicate almost 19,000 hectares of coca. More precise figures on coca cultivation and more accessible information on the export value of licit crops could yield a more accurate analysis.

In 2007, the number of Americans 12 years and older addicted to cocaine reached 2.1 million, a little under 1% of the population. Every day, 2,500 Americans use cocaine for the first time. Approximately 42% of 12th graders mentioned in a US survey that they had “fairly easy” to “very easy” access to cocaine. These alarming numbers only begin to reveal the growing cocaine crisis in the United States. The US—which is responsible for approximately 60% of the
world’s illegal drug consumption—has taken the lead in efforts to curb the cocaine trade, both domestically and abroad. Of the two possible ways to reduce the amount of cocaine consumption—reduction in demand and reduction in supply—the United States has primarily targeted the latter, specifically through intervention in Colombia, the world’s largest producer of the coca crop since the 1990s. During the Clinton administration, the United States gave Colombia 860 million dollars worth of aid—three-quarters of which was used by the government for Colombian military development—in a program known as “Plan Colombia.” By equipping the Colombian police force and military with drug eradication equipment, the United States hoped to stop coca production at its source by targeting cocaine-selling guerrilla groups and coca-growing communities. Since then, the US has loaned Colombia growing sums of money to combat the cultivation of coca, with a large percentage of funds still devoted to improving Colombia’s security forces. Although the US government has been partially successful in reducing the cultivation of coca in Colombia, production figures from 2001 through 2006 still hovered at 1997 levels, despite increased funding and greater efforts to eliminate the coca crop. As a result, UN Office on Drugs and Crime Executive Director Antonio Maria Costa claims that even greater funding is what is needed to solve the coca problem. Through a game-theory analysis of the Colombian farmer, this paper attempts to explain how the United States can better use its resources in Colombia. With a greater understanding of the Colombian farmer’s choices and relative payoffs, the UN, United States, and Colombia can better allocate their resources to greatly reduce the illegal coca trade.

Currently, the United States allocates its funds in Colombia from a “top-down” perspective: it distributes the most herbicidal spray to the area that grows the most coca. While this may be the best approach by conventional wisdom, this course of action makes one major and invalid assumption: that the only way to stop coca production is by destroying as much of it as possible. Colombian farmers grow the coca crop not because they want to create large amounts of illegal cocaine but rather because it is the most profitable economic decision for their livelihood. If growing licit crops became more lucrative than growing illegal alternatives like coca, then Colombian farmers would gradually defect to the more profitable crops: the licit ones. By understanding that each Colombian farmer is self-interested and not necessarily interested in the success of all Colombian farmers, the scenario can be reduced to a game that pits an individual Colombian coca farmer—representative of the group as a whole—against the US and its drug eradication efforts. Thus, a game-theory approach lends itself well to this situation, as it is a strategic interaction between two or more parties that want to maximize their own gains, sometimes at the expense of other players. Because both the Colombian farmer and the Colombian government want to maximize payoffs, game theory is applicable to the analysis of the Colombian coca scenario.

**Background**

Coca cultivation in the Andes is rooted in tradition. Primarily in the region around Bolivia, the coca leaf is an integral part of the Andean life, whether chewed for cultural, religious or simply recreational purposes. In Colombia, however, the growth of the coca bush is a rather novel occurrence that has its origins in the rise of the illegal cocaine trade. After it is harvested, coca leaf can be transformed into coca paste with the addition of sulfuric acid and certain combustibles. Following
Saumil Jariwala

a variety of chemical reactions—including acidification, oxidation, and neutralization with a base—the coca paste becomes cocaine base. The illegal drug known as powder cocaine is actually cocaine hydrochloride, a compound that can be easily synthesized from cocaine base. By the end of this transformation process, the value of the cocaine has risen from one dollar per kilogram of raw coca leaf to 1,762 dollars per kilogram of wholesale powder cocaine.

The source of this highly addictive drug is the plant Erythroxylum coca, which is generally grown in the lower altitudes of the Andes and matures within 18 months of planting. After this growth period, the coca bush averages about three to six harvests a year and produces approximately 1,446 kilograms of coca leaf per harvest. Compared to other lucrative alternatives, such as coffee, coca is a rather high-yielding and fast-growing crop. This further complicates US intervention efforts, as only a few bushes are needed to produce a substantial amount of cocaine.

The Colombian police and armed forces have reduced the coca supply primarily through two direct methods of involvement: aerial fumigation and manual eradication. Manual eradication involves the deployment of troops into coca-rich regions and the uprooting of all coca bushes in the area. This process is only efficient on a small-scale, can be used only in easily-accessible locations, and puts the troops in danger; for these reasons, manual eradication is limited to a small scope. However, manual eradication is very effective: after coca bushes are removed by manual eradication, it takes approximately eighteen months until another set of illicit crops can fully mature. In addition, manual eradication specifically removes drug-producing crops, not legal crops. Aerial fumigation, also known as aerial spraying, involves the dispensing of an herbicide—usually a variant of the Monsanto product Roundup—in a targeted region to kill any coca crops growing in a particular area. Aerial fumigation is useful as it inexpensively destroys large swaths of coca with little effort, but the process often acts as a sword in places where a scalpel is needed: aerial fumigation removes both illicit and licit crops in an area, and it simply destroys one harvest of the coca plant instead of the entire bush. Because it is inexpensive and relatively simple to apply, aerial spraying is the premier method used by the United Nations, the United States, and Colombia to curb coca cultivation in Colombia.

In this model, we have assumed that every farmer is faced with the decision to grow either the illicit coca crop or the common licit alternative coffee. In Colombia, growing illicit crops can be nine to ten times as lucrative as growing legal alternatives such as coffee. However, because coca is such a labor-intensive crop, coca cultivation requires about three times as much labor as coffee cultivation. Thus, the decision to grow coca over other licit alternatives is ultimately a financial decision and not one based off of lack of expertise or convenience of labor.
Game theory allows a mathematical analysis of interactions between two ideally rational groups with distinct interests, whether cooperative or diametrically opposed. Put simply, game theory is a branch of mathematics that allows two agents to optimally obtain resources in a given competition or scenario. Whenever two parties are concerned with maximizing their gains and minimizing their losses, a general branch of game theory known as minimax game theory is often applied. The major stipulation of this theory is fulfilled in this simulation: that the payoffs used must have constant values and be independent of any particular strategy. While the created game has overarching similarities to a minimax game, some of the underlying assumptions for minimax game theory do not apply to this model, rendering some of the tools of this subfield of game theory inapplicable.

Mathematics has previously been used to analyze the Colombian cocaine trade. Research—in particular much work by Daniel Mejia—focuses on all stages of the problem, from coca cultivation through interdiction, trafficking, and ultimately consumption. One paper by Mejia et. al in particular utilized game theory to analyze drug production and trafficking—a separate phase of the cocaine trade—through an advanced game with multiple stages and rational actors. Much of the current research involves using mathematics to analyze the economic effects of certain policies: for example, how crop subsidies would affect supply and demand. Our research is distinct in that it proposes a new outlook on the situation, a reassessment of the roles of individual Colombian farmers.

As a preliminary approach to the problem, a two-player, two-strategy game was created in which a single Colombian farmer is interacting with a coalition of the UN, the United States government, and the Colombian government. See figures 1-3. The Colombian farmer has two choices: either to grow the coca crop on his plot of land or to grow a licit alternative, simulated here as coffee, Colombia's largest licit agricultural export. The farmer is limited to playing only these two pure strategies. The government coalition is also limited to two pure strategies: to either aerially fumigate only coca crops or do nothing. The payoff for the farmer is crop revenue, evaluated as US dollars per hectare for the sake of universality. The payoff for the government, however, is the number of coca plants, evaluated as coca leaf revenue per hectare. By minimizing the amount of coca grown, the United States is limiting the supply of cocaine which is its ultimate goal in giving foreign aid to Colombia. In this model, the game is played under idealized conditions, as both the farmer and the government coalition have more strategies and the opportunity to use mixed strategies in real life. Minimax game theory cannot be applied here because one player is aware of the other's moves and payoffs. In the game, the government coalition is aware of the farmer's actions, as the government can aerially survey the farmer's lands, and it acts after the farmer does. Since one player is aware of the other's actions, certain techniques from minimax game theory cannot be used, as that player could take advantage of the greater information he has to improve his payoff. If the coalition of governments knows that the farmer is going to grow coca—perhaps from conducting an aerial survey—then it will aerially fumigate his crops, but otherwise it won't bother. This preliminary game uses data that are too nonspecific to provide specialized and actionable results, but nonetheless it is useful as an introduction to this game-theory analysis and as a generalized simulation of the scenario.

The values payoffs used in the normal form of the game are as follows:
Revenue_{Coca} = \left( \text{Average Yield in kg}_{\text{hectare-year}} \right) \left( \text{Average Colombian Price in US Dollars/kg} \right)

Revenue_{Coffee} = \left( \text{Average Yield in kg}_{\text{hectare-year}} \right) \left( \text{Average Colombian Price in US Dollars/kg} \right)

Expenses_{Coffee} = \left( \text{Average Yield in kg Coffee}_{\text{hectare-year}} \right) \left( \text{Production Cost in US Dollars/lb Coffee} \right)

Expenses_{Coca} = \left( \text{Average Yield in kg Coca}_{\text{hectare-year}} \right) \left( \text{Production Cost in US Dollars/kg Coca} \right)

Other mentioned values include Effectiveness_{AF}, the average effectiveness of aerial fumigation in destroying coca fields. When fields are aerially fumigated, farmers only profit and incur cost from the crops that survive, so Revenue_{Coca} and Expenses_{Coca} become the following.

With proper data, the game can be evaluated to provide a meaningful solution. In 2006, coca leaf was sold for an average of $1 per kilogram, and the average annual yield was 6300 kilograms per hectare per year. The coffee crop’s price was set at $199.22 for 125 kilogram bags, and the average yield in Colombia was 450 kilograms per hectare per year. The values marked as expenses in the matrix are the cost of production of these crops, with literature values place the average production cost per pound of coffee at $0.80. Not enough information was available to generate a specific dollar value for coca leaf production expenses, but data from Bolivia suggest that, on average, production costs expend 30% to 35% of coca leaf revenue. For this analysis, we use 30% as our benchmark.

The government coalition’s strategy of not aerially fumigating is iteratively dominated by the aerial fumigation strategy, leaving a 1x2 matrix. When we eliminate the lower payoff for the farmer, there remains only one solution: aerially fumigate and grow coffee. This value from the model is counter to what actually occurs in Colombia, as the results suggest that coffee is slightly more lucrative than coca. If this were true across the board in Colombia,
this would mean that it does not make rational sense for farmers to grow coca in Colombia. If we suppose the model is valid, the question is then raised of why some Colombian farmers do indeed cultivate coca. We propose a simple explanation. To simulate this game over time, it is simply played for every year in the simulation. Using the solution we found earlier, the result is a payoff of 553.899*t to the farmer, where t is equal to the number of years. However, if the government coalition does not always choose the optimum payoff—if it makes a mistake one year—the resulting total payoff for the farmer would be different. If the government does not aerially fumigate the crops one time in 100 years, then the average expected payoff for growing coca is 568.008, a value higher than 553.899.

While it is unlikely that the government coalition would make a mistake if it monitored only one farmer, the likelihood of this error becomes more pronounced as the analysis is extended to a greater and greater number of farmers. In addition, the analysis becomes more relevant: the actual scenario in Colombia involves the monitoring of thousands and thousands of farms, not just a single plot of land. The analysis becomes even more useful when the values used are more specialized. The values used thus far have been Colombian
national averages. By centering games around specific regions, this analysis can take advantage of more precise values that take the geographic and economic differences between each region into account.

**Region-by-Region Analysis**

As the simulation is limited to regions of Colombia, however, the information states of each player change. In larger regions, the coalition becomes less informed about what crops are
planted where, and limited resources prevent the conducting of unlimited aerial surveys. In larger regions, the single Colombian farmer from the initial simulation is replaced with a group of Colombian farmers. While each farmer may be aware of what the government is doing to his particular plot, each farmer makes a decision independent of what is happening to other farmers and their respective plots. As a result, each player is unaware of the specific actions of the other, although knowledge of the other players’ motivations remains. Once the game is extended to this level, it is necessary to allow players to employ a mixed strategy. It is unlikely that the farmers would collectively decide to grow either coca or coffee: crop cultivation will be divided among the farmers in percentages. In addition, limiting the coalition of governments to two moves— aerially fumigating all coca or none of it—is a simplification of its capacity to act. By allowing mixed strategies, the game allows the farmers to make independent decisions and grants the government coalition a greater capacity to act. In expanding the game, an additional assumption is made that the farmers will want to maximize their collective payoffs rather than their individual ones. However, because the game is expanded and not entirely revamped, the collective payoff is analogous to the payoffs of the individual farmer in the initial analysis.

The regions used in this study merged 21 of Colombia’s 33 departments into seven regions: these departments were selected if there was any evidence of coca cultivation. Because of the large amount of data available from the United Nations’ Office on Drugs and Crime’s 2006 Colombia Coca Cultivation Survey, the regions were combined in the same manner as in that report. The regions are demonstrated on the maps of Colombia in Figure 5.1

1 Please note that, for parts of the paper, the Central region is mentioned, which is a combination of Sur de Bolivar and Catatumbo.
The values used in the simulation for coca are depicted below in the table in Figure 6. The nationally regulated price of Colombian coffee was used, $199.22 for 125 kilograms of coffee. Information on the annual yield of coffee by department or region was not available, so the national average value was used.

In five of the seven games in Figure 7, the payoff to the farmer of coca cultivation under aerial fumigation was less than the payoff for growing coffee. This means that, in most regions, farmers would generally choose to grow coffee instead of coca if the United States were aerially fumigating all fields. However, this is clearly not the case, as the region with the lowest average payoff for growing coca actually produces the second most coca in Colombia. To find out exactly why payoffs differed so markedly from actual conditions in Colombia, the probability of how much the government coalition aerial fumigates has been derived.

By inserting these payoffs into the regional matrices, the average payoffs for growing coca and growing coffee for every farmer can be determined. These values are available in Figure 7.

As the values above show for every region, it is (on average) in the farmer’s interest to grow coca, as the payoff over multiple years from growing coca would be higher than that from growing coffee. The margin is smallest in the Pacific region, the department second in total coca cultivation. Therefore, in order to find out how much more the government coalition needs to aerially fumigate to make it more lucrative on average to grow coffee, the probability P of aerial fumigation was derived in each regional matrix. This value of P reveals what percentage of coca fields the government coalition needs to aerially fumigate in order to make the average payoff for growing coca lower than that for growing coffee.

<table>
<thead>
<tr>
<th>Region</th>
<th>Average Annual Yield (Kg/Ha/Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meta-Guaviare</td>
<td>9,900</td>
</tr>
<tr>
<td>Orinoco</td>
<td>8,552</td>
</tr>
<tr>
<td>Sur de Bolivar</td>
<td>6,288</td>
</tr>
<tr>
<td>Putumayo-Caqueta</td>
<td>5,559</td>
</tr>
<tr>
<td>Catatumbo</td>
<td>5,510</td>
</tr>
<tr>
<td>Sierra Nevada</td>
<td>4,840</td>
</tr>
<tr>
<td>Pacific</td>
<td>2,705</td>
</tr>
<tr>
<td>All regions</td>
<td>6,343</td>
</tr>
</tbody>
</table>

Figure 6.
### Coalition of United Nations, US Government, and Colombia

<table>
<thead>
<tr>
<th>Regional Colombian Farmers</th>
<th>Aerial Fumigation</th>
<th>Do Nothing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grow Coffee (q)</td>
<td>(Revenue_{Coffee} - Expenses_{Coffee}, 0)</td>
<td>(Revenue_{Coffee} - Expenses_{Coffee}, 0)</td>
</tr>
<tr>
<td>Grow Coca (1-q)</td>
<td>(1-Effectiveness_{AF})(Revenue_{Coca} - Expenses_{Coca})</td>
<td>(Revenue_{Coca} - Expenses_{Coca} - Revenue_{Coca}) - (1-Effectiveness_{AF})(Revenue_{Coca})</td>
</tr>
</tbody>
</table>

Figure 7. General form for each region. This is the normal form game that will be used to evaluate payoffs for each region in Colombia.

### Coaliation of United Nations, US Government, and Colombia

<table>
<thead>
<tr>
<th>Meta-Guaviare Farmers</th>
<th>Aerial Fumigation (p)</th>
<th>Do Nothing (1-p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grow Coffee (q)</td>
<td>(553.899, 0)</td>
<td>(553.899, 0)</td>
</tr>
<tr>
<td>Grow Coca (1-q)</td>
<td>(831.6, -1188)</td>
<td>(6930, -9900)</td>
</tr>
</tbody>
</table>

Figure 7. This is the normal form game that contains values for the Meta-Guaviare region in Colombia.

### Coaliation of United Nations, US Government, and Colombia

<table>
<thead>
<tr>
<th>Orinoco Farmers</th>
<th>Aerial Fumigation (p)</th>
<th>Do Nothing (1-p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grow Coffee (q)</td>
<td>(553.899, 0)</td>
<td>(553.899, 0)</td>
</tr>
<tr>
<td>Grow Coca (1-q)</td>
<td>(718.768, -1026.24)</td>
<td>(5986.4, -8552)</td>
</tr>
</tbody>
</table>

Figure 7. This is the normal form game that contains the values for the Orinoco region in Colombia.

### Coaliation of United Nations, US Government, and Colombia

<table>
<thead>
<tr>
<th>Sur de Bolivar Farmers</th>
<th>Aerial Fumigation (p)</th>
<th>Do Nothing (1-p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grow Coffee (q)</td>
<td>(553.899, 0)</td>
<td>(553.899, 0)</td>
</tr>
<tr>
<td>Grow Coca (1-q)</td>
<td>(528.192, -754.56)</td>
<td>(4401.6, -6288)</td>
</tr>
</tbody>
</table>

Figure 7. This is the normal form game that contains the values for the Sur de Bolivar region in Colombia.
Figure 7. This is the normal form game that contains the values for the Putumayo-Caqueta region in Colombia.

<table>
<thead>
<tr>
<th>Coalition of United Nations, US Government, and Colombia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Putumayo-Caqueta Farmers</td>
</tr>
<tr>
<td>Aerial Fumigation (p)</td>
</tr>
<tr>
<td>Do Nothing (1-p)</td>
</tr>
<tr>
<td>Grow Coffee (q)</td>
</tr>
<tr>
<td>(553.899, 0)</td>
</tr>
<tr>
<td>(553.899, 0)</td>
</tr>
<tr>
<td>Grow Coca (1-q)</td>
</tr>
<tr>
<td>(466.956, -667.08)</td>
</tr>
<tr>
<td>(3891.3, -5559)</td>
</tr>
</tbody>
</table>

Figure 7. This is the normal form game that contains the values for the Catatumbo region in Colombia.

<table>
<thead>
<tr>
<th>Coalition of United Nations, US Government, and Colombia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catatumbo Farmers</td>
</tr>
<tr>
<td>Aerial Fumigation (p)</td>
</tr>
<tr>
<td>Do Nothing (1-p)</td>
</tr>
<tr>
<td>Grow Coffee (q)</td>
</tr>
<tr>
<td>(553.899, 0)</td>
</tr>
<tr>
<td>(553.899, 0)</td>
</tr>
<tr>
<td>Grow Coca (1-q)</td>
</tr>
<tr>
<td>(462.84, -661.2)</td>
</tr>
<tr>
<td>(3857, -5510)</td>
</tr>
</tbody>
</table>

Figure 7. This is the normal form game that contains the values for the Sierra Nevada region in Colombia.

<table>
<thead>
<tr>
<th>Coalition of United Nations, US Government, and Colombia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sierra Nevada Farmers</td>
</tr>
<tr>
<td>Aerial Fumigation (p)</td>
</tr>
<tr>
<td>Do Nothing (1-p)</td>
</tr>
<tr>
<td>Grow Coffee (q)</td>
</tr>
<tr>
<td>(553.899, 0)</td>
</tr>
<tr>
<td>(553.899, 0)</td>
</tr>
<tr>
<td>Grow Coca (1-q)</td>
</tr>
<tr>
<td>(406.56, -580.8)</td>
</tr>
<tr>
<td>(3388, -4840)</td>
</tr>
</tbody>
</table>

Figure 7. This is the normal form game that contains the values for the Pacific region in Colombia.

<table>
<thead>
<tr>
<th>Coalition of United Nations, US Government, and Colombia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific Farmers</td>
</tr>
<tr>
<td>Aerial Fumigation (p)</td>
</tr>
<tr>
<td>Do Nothing (1-p)</td>
</tr>
<tr>
<td>Grow Coffee (q)</td>
</tr>
<tr>
<td>(553.899, 0)</td>
</tr>
<tr>
<td>(553.899, 0)</td>
</tr>
<tr>
<td>Grow Coca (1-q)</td>
</tr>
<tr>
<td>(227.22, -324.6)</td>
</tr>
<tr>
<td>(1893.5, -2705)</td>
</tr>
</tbody>
</table>
By inputting this derived $P$, the simulation reveals how the economic situation in Colombia needs to change for coca production to be unprofitable.

$$\text{Payoff}_{\text{Coca}} < \text{Payoff}_{\text{Coffee}} = 553.899$$

$$P = \frac{\text{Sum of Hectares of Coca Aerially Fumigated (by Department)}}{\text{Total Hectares of Coca Grown}}$$

$$P = \frac{\text{Sum of Hectares of Coca Aerially Fumigated (by Department)}}{\text{Sum of Hectares of Coca Aerially Fumigated (by Department)} + \text{Hectares of Coca Cultivated}}$$

<table>
<thead>
<tr>
<th>Department</th>
<th>$P$</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meta-Guaviare</td>
<td>$\frac{14714+25915}{14714+25915+20540}$</td>
<td>0.6642</td>
</tr>
<tr>
<td>Orinoco</td>
<td>$\frac{5485+1400}{5485+1400+6829}$</td>
<td>0.5020</td>
</tr>
<tr>
<td>Sur de Bolivar</td>
<td>$\frac{18022+2662+5588+2146+1068+41}{18022+2662+5588+2146+1068+41+11643}$</td>
<td>0.7228</td>
</tr>
<tr>
<td>Putumayo-Caqueta</td>
<td>$\frac{4575+26491}{4575+26491+17221}$</td>
<td>0.6434</td>
</tr>
<tr>
<td>Catatumbo</td>
<td>$\frac{1687}{187+488}$</td>
<td>0.7756</td>
</tr>
<tr>
<td>Sierra Nevada</td>
<td>$\frac{0+0+0}{0+0+0+437}$</td>
<td>0</td>
</tr>
<tr>
<td>Pacific</td>
<td>$\frac{59865+1536+0+0}{59865+1536+0+0+18807}$</td>
<td>0.7655</td>
</tr>
</tbody>
</table>

$$553.899 > P \times \text{Payoff}_{\text{Aerial Fumigation}} + (1 - P) \times \text{Payoff}_{\text{Do Nothing}}$$

$$\text{Payoff}_{\text{Coffee}} = P \times \text{Payoff}_{\text{Aerial Fumigation}} + (1 - P) \times \text{Payoff}_{\text{Do Nothing}}$$

$$\text{Payoff}_{\text{Coca}} = P \times \text{Payoff}_{\text{Aerial Fumigation}} + (1 - P) \times \text{Payoff}_{\text{Do Nothing}}$$

The values above reveal that, on average, the government coalition needs to fumigate about 97% of fields in order to make coffee cultivation the more lucrative of the two options. There are exceptions however: in Meta-Guaviare and Orinoco, no $P$ value will make coffee cultivation more lucrative, and in the Pacific region, only about 80% of fields need to be aerially fumigated. The figures for Orinoco and Meta-Guaviare are somewhat misleading, as this analysis assumes that fields can be sprayed only once per harvest. If we allow fields to be sprayed twice per season, the equations and payoffs change.
By plugging in \( N = 2 \), the average yields, and the average Colombian price for Meta-Guaviare and Orinoco, the following results appear:

\[
\text{Revenue}_{\text{Coffee}} = (1 - \text{Effectiveness}_{\text{AF}})^N \times (\text{Average Yield}) \times (\text{Average Colombian Price})
\]

\[
\text{Expenses}_{\text{Coca}} = 0.3 \times \text{Revenue}_{\text{Coffee}}
\]

where \( N \) is equal to the number of times a field is aerially fumigated per harvest.

Inputting the profit values as the payoffs in the equations used for solving for \( P \), the following \( P \) values are revealed:

**Meta-Guaviare**

\[
\text{Revenue}_{\text{Coca}} = (1 - 0.88)^2 \times (9900) = 142.56
\]

\[
\text{Expenses}_{\text{Coca}} = 0.3 \times \text{Revenue}_{\text{Coffee}} = 42.768
\]

\[
\text{Revenue}_{\text{Coca}} - \text{Expenses}_{\text{Coca}} = 99.792 = \text{Profit}_{\text{Coca}}
\]

**Orinoco**

\[
\text{Revenue}_{\text{Coca}} = (1 - 0.88)^2 \times (8552) = 123.149
\]

\[
\text{Expenses}_{\text{Coca}} = 0.3 \times \text{Revenue}_{\text{Coffee}} = 36.945
\]

\[
\text{Revenue}_{\text{Coca}} - \text{Expenses}_{\text{Coca}} = 86.204 = \text{Profit}_{\text{Coca}}
\]

\[
\text{Payoff}_{\text{Coca}} < \text{Payoff}_{\text{Coffee}} = 553.899
\]

\[
553.899 > P \times \text{Payoff}_{\text{Aerial Fumigation}} + (1 - P) \times \text{Payoff}_{\text{Do Nothing}}
\]

**Meta-Guaviare**

\[
553.899 > P \times 99.792 + (1 - P) \times 9900
\]

\[
P > 0.9537
\]

**Orinoco**

\[
553.899 > P \times 86.204 + (1 - P) \times 8552
\]

\[
P > 0.9448
\]
These data suggest that if the government coalition sprays about 95% of fields in Meta-Guaviare and 95% of fields in Orinoco two times per season, the coffee cultivation will be more profitable than coca cultivation there.

While the data for Orinoco and Meta-Guaviare are intriguing, the data from the Pacific region reveal insight into more efficient eradication methods. For coca cultivation to be less lucrative than coffee on average in the Pacific region, \( P \) needs to be in the \( P_{\text{Calculated}} \) range.

\[
P = \frac{59865 + 1536 + 0 + 0}{59865 + 1536 + 0 + 0 + 18807} = 0.7655
\]

\[P_{\text{Calculated}} > 0.8039 \]
\[\Delta P > 0.0384\]

Base Coca Production = 18,807 hectares of coca annually in the Pacific region.

\[(59865 + 1536) \times 0.8039 = 76378.9 \text{ Hectares (Theoretical)}\]

\[59865 + 1536 + 18807 = 80208 \text{ Hectares (Current)}\]

Needed Reduction = Current – Theoretical = 3829 Hectares of Coca annually

\( P \) is a percentage calculation. Thus, if aerial fumigation is increased by 3.84% or more in the Pacific region, then policymakers should see Colombian farmers in that region gradually defect to other, licit crops. Defections could reduce coca production by up to 18,807 hectares annually with as little as 3,829 Hectares of increased fumigation. In contrast, if the United States maintains its current approach, it would require the full 18,807 hectares to be fumigated.

**Discussion of Results**

The framework reveals ways that the government coalition can discourage farmers from growing coca. The solution appears to be—as UNODC Executive Director Costa mentioned—greater funding for aerial fumigation efforts. Although the pure strategy payoffs for coca cultivation are lower than coffee cultivation under the right conditions, not enough aerial fumigation is occurring to yield this result. For the UNODC to have increased success combating coca cultivation, the amount of aerial fumigation will have to increase. To allocate this extra funding most efficiently, this study suggests that aerial fumigation increases need to be restricted to one region at a time, as reducing the payoff of coca cultivation is only worthwhile if the payoff is lowered to a level below that of coffee cultivation. Another way to decrease coca cultivation would be to increase the efficiency of aerial fumigation. While using a more effective herbicide is one solution, another would be to spray all regions twice per harvest: this would change the effectiveness of aerial fumigation from 88% to over 98.5%, reducing the percentage of coca fields that need to be sprayed. However, this statistic is somewhat misleading, as it means that the United States would have to spray around 90% of fields twice instead of about 100% of fields once, thereby leading to a tremendous increase in aerial fumigation. Such a large increase in spraying herbicides poses environmental and ethical concerns. Another purported option—subsidizing farmers to encourage
licit crop growth—is shown by this model to be a very expensive solution. Without greater aerial fumigation efforts, the government coalition would have to subsidize farmers multiple times the market selling price of the licit alternatives they grow. Therefore, the model suggests that aerial fumigation is considerably less expensive—provides “more bang for the buck” so to speak—than crop subsidies, which explains why the use of aerial spraying by intervening bodies is currently so prevalent in Colombia.

This analysis not only advises the Colombian government to fund more aerial fumigation, but it also reveals the best regions to increase aerial fumigation in. If the government coalition aerially fumigated about 4% more land in the Pacific region—the region with the second most coca cultivation—then the average coca payoff would be less than the average coffee payoff, which should result in widespread abandonment of the coca crop. The government coalition should target its efforts in that particular region, as large gains are possible there with only a modest increase in activity. The eradication of approximately 3,829 hectares of coca in the Pacific region should result in the eradication of approximately 18,807 total hectares of coca. To put this potential change in perspective, the government coalition would have to triple the current amount of aerial fumigation in the Meta-Guaviare region, the region with the highest amount of coca cultivation, in order to achieve comparable results with the Pacific region.

Before the United Nations, United States, and Colombia decide to pursue greater aerial fumigation efforts, the ramifications of current coca eradication methods need to be mentioned. Although game theory allows researchers to follow the rational decision-making process of two players, it does not reveal other non-quantitative motivations and consequences. In this particular scenario, there are two sets of implications—moral and environmental—that are not considered in this analysis. The first to be considered, moral, involves the livelihood of Colombian farmers. Those farmers who decide to grow coca do not always do so for selfish reasons; it can be impossible to make enough money growing other, less lucrative crops, and although the coalition of governments does want to eradicate the coca trade, doing so might destroy a way of life and force thousands of farmers to seek a new way to make a living. In addition, greater aerial fumigation could have an untold environmental impact. Information is available that indicates that current levels of aerial fumigation are having a detrimental impact on the environment, and increasing the amount of herbicide dispensed in Colombia will only lead to greater environmental damage. While the government coalition could potentially eradicate coca cultivation in Colombia by increasing the aerial fumigation levels, a decision needs to be made about whether or not it is environmentally worthwhile to move in this direction; if the UN, USA, and Colombia decide they do not want to pursue this action, perhaps they should decide whether or not aerial fumigation and foreign intervention is the proper response to the cocaine trade at all.

Limitations

It is necessary to briefly mention the limitations of this model. With any game-theory model, one of the underlying assumptions is that all parties must act rationally and always choose greater payoffs, which is not always the case in the real world. In addition, while this model takes many of the economic incentives for growing coca into consideration, other non-financial (and often non-quantifiable)
motivations do exist. In some cases, farmers grow coca not necessarily because it is more financially lucrative but rather because of the pressure and threats from narco-terrorist or guerrilla organizations, such as the Revolutionary Armed Forces of Colombia (FARC). However, we posit that this kind of scenario should be considered an exception rather than the norm. Because the major reason is essentially economic in nature, economic frameworks are directly applicable to model this scenario.
CONCLUSION

This study involves the analysis of coca cultivation in Colombia for the purpose of developing strategies that can improve the efficiency of aerial fumigation efforts in Colombia. The game theory framework reveals that, with enough aerial fumigation, the government coalition can make licit crop growing more profitable than coca cultivation, thereby reducing the amount of coca cultivation in Colombia. However, the government’s current levels of aerial fumigation are insufficient to make coca cultivation uneconomical on a widespread level. Most of the viable solutions to the problem of coca cultivation in Colombia involve aerial fumigating the coca crop to a greater degree, by either spraying fields twice or spraying more coca fields. This report discusses an approach to reducing the coca trade in Colombia by assessing coca cultivation from a behavioral standpoint. By specifically targeting modest increases in eradication, large decreases in coca cultivation can be attained. Ultimately, the government coalition can make more educated decisions about where coca eradication efforts should be increased by considering the economic perspective of individual farmers.

ACKNOWLEDGMENTS

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Building Community Capacity in Resource Poor Neighborhoods: Community-University Partnerships

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Hillary Geen, Jessica Glovas, Lacey Hancock,
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Faculty Mentor: Leslie Hossfield
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ABSTRACT
Community based research, service learning opportunities, and community university partnerships give university students the opportunity to work directly in the community with real life situations. The Public Sociology program of the University of North Carolina at Wilmington has partnered with the Wilmington Housing Authority, a local public housing agency, to create the Community Campus at Hillcrest. The Community Campus at Hillcrest provides a resource-rich environment in a resource-poor community. Public Sociology students complete research and service learning projects at the Community Campus. The following paper discusses three research projects that were completed. Each project’s goal was to assist in building community capacity within the surrounding community.

COMMUNITY CAPACITY IS DEFINED AS the relationship between human capital, organizational resources, and social capital used to solve problems and improve a community (Chaskin 2001). Chaskin (2001) identifies four elemental characteristics in building community capacity: 1) a sense of community; 2) a level of commitment; 3) the ability to solve problems; 4) and access to resources. Social agency, the independent ability to act on one’s will, is a critical component in building community capacity. Four core strategies to building community capacity include 1) leadership development; 2) organizational development; 3) community organizing; 4) fostering collaborative relations among organizations (Chaskin 2001).

The University of North Carolina Wilmington (UNCW) Public Sociology Program working in partnership with the Wilmington Housing Authority (WHA) has created the WHA UNCW Community Campus at Hillcrest. The Community
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Campus is located in a public housing community. The Community Campus at Hillcrest provides a resource-rich environment within a resource-poor community. A variety of programs for people of all ages are provided free of charge to members of the surrounding community. Programming has been implemented through multiple UNCW departments, Cape Fear Community College, and a variety of other local non-profit organizations. Each program that takes place at the Community Campus is designed to meet the needs of the community based on prior research and needs assessments. Programs that are provided through UNCW also allow for service learning opportunities for the students that assist with these programs. The UNCW Public Sociology program is based at the Community Campus. Students work each semester to address critical issues identified by residents of Wilmington Housing Authority. The overarching goal of the Community Campus is to build community capacity in a resource-poor community using Chaskin's (2001) model for the creation of community capacity.

Service learning should be focused on empathy and empowerment (Marullo, Moayedi, Cooke 2009, and Stoecker 2005). A well-designed program will provide reciprocal rewards for both the students and the community. Community-based service learning and research is most effective when done in collaboration with the community. Service learning and community-based research is an excellent way to improve campus and community relationships and allows both the university and the community to be more productive (Marullo et al 2009; Strand, Marullo, Cuforth, Stoecker, and Donohue 2003; Ward and Wolf-Wendel 2000).

There are five key practices that must be considered in order to create an effective collaboration. 1) Collaborative partners must work together to become effective problem solvers. Partners need to be creative and flexible when problems arise. Each must work to come up with initial planning as well as when unexpected problems arise (Marullo et al 2009; Strand et al 2003). 2) Partnerships must commit to avoiding the temptation to take shortcuts. Each partner must be willing to work together to create best practices for their project. Once the best practices are decided upon, they should be adhered to. When decisions are made early in the relationship it is easier to create task lists and time lines. Many collaborations find the creation of memorandums of understanding helpful (Marullo et al 2009; Strand et al 2003). 3) It is important that partnerships do not end up with hierarchical structures. Collaborations are most beneficial when all participants have equal value and respect for one another. Partners should keep in mind that each member is bringing their own strengths and weaknesses to the project. The varying skills and experiences of each participant help to make the collaboration strong.

4) The sharing of resources is an important aspect of collaboration. Each partner brings a variety of resources; whether they be knowledge, experience, enthusiasm or financial; all are important and necessary. 5) All participants should have a role in the production of results. Collaborations are formed to meet the needs of the community it is serving. Each partner in the collaboration must make a concerted effort to produce the results that will help to meet the needs and goals set forth at the beginning of the project. Once the project is completed, partners must work together to disseminate the findings and implement changes (Marullo et al 2009).

Community-university partnerships need to have similar directives in order to be successful (Strand et al 2003). At the beginning of the partnership, partners should share a worldview and common mission. They should agree upon their goals and
strategies. Each should have mutual trust and respect. While participating in the project, each partner should have equal power and control. Communication is very important and each should make an effort to listen to the views, thoughts and concerns of others. Partners need to be understanding and flexible enough to meet needs of the collaboration. Partnerships should be satisfying, organized and able to create long-range social change (Strand et al 2003).

According to Chaskin (2001), the best way to empower a community is to help build community capacity. Chaskin implied the meaning of community capacity to be “the interaction of human capital, organization resources, and social capital existing within a given community that can be leveraged to solve collective problems and improve or maintain the well-being of a given community. It may operate through informal social processes and/or organized effort” (Chaskin 2001:295). Social capital comes in the form of relationships between people. As community members build relationships, they build social capital (Coleman 1988). Human capital is the knowledge and skills that a person has. Social capital assists with the growth of human capital. People with strong relationships and strong networks have more opportunity to gain human capital (Coleman 1988). Community-based service learning and research can lead to advocacy which in turn may empower the community and build community capacity (Mooney & Edwards 2001).

**Context of Research**

The Hillcrest Community—Wilmington, North Carolina

According to statistics provided through a personal communication with the Wilmington Housing Authority on site property manager at Hillcrest in September 2009, 372 residents live in the Hillcrest Community. The majority are females (69%), who are more likely to be the heads of households (77%) than males. The racial composition of the Hillcrest Community is mostly African American (97%), with 1% White, and 1% unspecified race, and less than 1% American Indian. Among these residents, 4% are also of Hispanic descent. Over one-third of the population is disabled. Hillcrest Community housing units range from one to three bedrooms. Most families consist of only one person (66%); thirty-three (33%) percent of families have between two to four persons and only 1% of families have five persons; the average family size is two persons. None of the families have more than five persons. Members of over half of all households (52%) have lived in the Hillcrest community for more than 10 years; 35% have lived in Hillcrest for over 20 years and 28% of households have lived in the community for five years or less. Thirty percent (30%) of the families living in the Hillcrest Community have earned income from employment. Families receive assistance from Social Security, Pensions, Temporary Assistance for Needy Families (TANF), and general assistance. Some families receive assistance from more than one source. Some families with earned incomes also receive some form of assistance as well. The average annual income per family is $9,893.

Over the course of two semesters, UNCW Public Sociology students identified critical social issues, designed a research protocol to investigate these issues and carried out research. Each student completed IRB training and the research protocol was submitted and approved by the UNCW IRB. The first semester consisted of on-site class meetings where the students determined needs for research and became familiar faces in the community. The second semester consisted of both on-site class meetings and a 160-hour internship experience that
gave the students not only hands-on experience in the community by allowing them to work with one or more of the programs that take place at the Community Campus, but also an opportunity to complete community based research to address the issues that were previously determined. In the sections below, three distinct research agendas are described in which applied research projects have been created—all to help build community capacity among Resource-Poor residents in Wilmington, North Carolina. These research agendas are not listed in any ranked order and are considered of equal importance.

I. Nutrition and Food Security in Resource-Poor Communities

Prior Literature
Food insecurity is defined as being “a lack of access to enough food for an active healthy life, which results from limited or uncertain access to nutritionally adequate and safe foods in socially acceptable ways” (Metallinos-Katsaras, Sherry, and Kallio 2009:1790). Nutritional food insecurity happens not only in developing countries but in the United States, as well. It affects mostly low income, minority families in both urban and rural areas (Huddleston-Casas, Charnigo, and Simmons 2008). Over 17 million households in the United States were considered food insecure in 2008 (Nord, Andrews, and Carlson 2009).

Findings suggest a cycle of food insecurity; food being the main source of energy that provides nutrients which give the ability to provide quality labor that can help secure work which in turn provides a person the ability to earn money so that they may buy food (Jha 2009; Gersovitz 1983; Yngve, Margetts, Hughes, and Tseng 2009). Research (Yngve et al 2009) shows that nutritious foods such as fruits and vegetables are more expensive than processed filler foods. Low income families usually spend more of their money on foods that will sustain them but not necessarily provide them with the nutrients that they need (Metallinos-Katsaras et al 2009).

Prior research (Metallinos-Katsaras et al 2009; Gundersen & Kreider 2009) shows that children in low income families who have not received proper nutrition often become obese. This tendency towards obesity later leads to long term health problems such as diabetes and other chronic diseases (Metallinos-Katsaras et al. 2009; Gundersen & Kreider 2009). Poor prenatal nutrition can also be detrimental to a child’s health (Gundersen & Kreider 2009). Nord, Andrews, and Carlson (2009) found that about two-thirds of food insecure households use coping strategies to deal with their predicament. Common coping strategies are eating a less varied diet, participating in federal food and nutrition assistance programs, and obtaining emergency food from community food pantries or emergency kitchens to make up for the lack of food. Nord, Andrews, and Carlson (2009) found that only a little more than half of all food insecure households in the United States participate in federal food and nutrition assistance programs. Research suggests that the best way to combat this epidemic is to provide more access and availability to food stamps for those families that are eligible (Huddleston-Casas et al 2008; Jha 2009). The high price of foods also needs to be addressed in order to help impoverished families take advantage of a larger variety of healthy choices (Jha 2009).

Statement of Problem

The focus of this component of the research project was to determine the community’s access to and use of affordable, nutritious food in two ways: 1) assessment of food insecurity through a modified USDA survey; and 2) measurement of established and increased nutrition knowledge revolving
around a children’s after-school nutrition program called Friends, Food, and Fun that includes participation in the upkeep of a community garden in the Hillcrest Community. The Friends, Food and Fun program was created and implemented at the Community Campus through community partners and two Public Sociology interns. Guest speakers, such as local chefs, farmers, and other community volunteers, worked with the children to plant, harvest and prepare foods from the garden. The program included a nutrition lesson that gave the children information regarding the nutritional facts about the foods that were planted in the garden and later cooked and tasted.

The big-picture goal of this aspect of the research project was to increase community capacity and social agency in the resource-poor community of Hillcrest in Wilmington, North Carolina. The plan was to build community capacity in four ways: 1) build a sense of community through involving resident children in Friends, Food, and Fun; 2) secure a level of commitment from interns, local businesses and volunteers to assist in the creation and implementation of the program; 3) identify and solve existing problems specific to the community’s food insecurity issues; and 4) increase access to resources through utilization of the community garden. Additionally, four core strategies to building social agency were exercised: 1) leadership development in teaching residents how to utilize the community garden; 2) organizational development in the construction of Friends, Food, and Fun; 3) community organization surrounding the community garden by increasing community participation; and 4) fostering collaborative relations with local organizations, businesses, and volunteers.

**Methods and Data Analysis**

To understand food security levels in families in a resource-poor community, a modified USDA survey on food security was sent home to guardians of the children that were participating in the WHA/UNCW Community Campus at Hillcrest nutritional program, Friends, Food & Fun. Fifteen surveys were sent home with a request to be completed by a guardian and returned. Eight surveys were completed and returned. The survey consisted of 17 questions regarding at home food security and accessibility to healthy food (see Appendix 1).

In order to understand the access to and knowledge of nutritious foods in children in resource-poor communities, The Friends, Food and Fun pre- and post-survey (see Appendix 2) was administered on the first and last days of the Hillcrest after-school program Friends, Food, and Fun. The ten-week program consisted of various nutrition-based events surrounding fruits and vegetables planted in the existing community garden. Fourteen questions regarding the children’s knowledge of the food pyramid, the basic logistics of gardening, and the foods they chose to eat most frequently at home and at school were asked. Sixteen surveys were completed on the first day, and 23 were completed on the last day. The individual and cumulative averages were calculated from the data to determine the participants increase or decrease in nutritious food decision making.

**Findings**

Food Security Findings

The data collected from the modified USDA food security surveys showed that seven of the responding families receive some sort of food assistance from the government, such as WIC, food stamps, and/or free or reduced school lunch. Some participants receive one of these services while others receive two or even all three to provide food for their families. In addition to this, findings also show that among the participants
who utilize food assistance programs, one family relies on the use emergency food assistance programs, such as soup kitchens, food banks, food pantries, or other "free" food resources on a monthly basis in order to be sufficiently food secure. Three of participants surveyed indicated that they have changed or reduced essential healthy foods from their diets. Reasons given for reducing essential healthy foods were the cost of the food, lack of transportation to purchase food or the availability of these foods where they are able to shop. Of the five basic food groups, participants were more likely to eliminate fruits, protein and dairy products from their diet.

Nutrition Knowledge Findings
Following the close of the ten-week program and the administering of the post survey, cumulative averages were compared. Findings show that the average knowledge of the children's food pyramid and basic gardening increased between the pre- and post-surveys by three percent (70% to 73%). Additionally, when asked about food eaten most frequently at school and at home, as well as favorite foods, the average amount of fruits and vegetables names in these categories increased from 1.18 times per child to 2.46 times per child between the pre- and post-survey. Statistical testing was not completed due to the small sample size.

Discussion and Implications
The Modified USDA Food Insecurity survey findings indicate that the absence of nutritious foods in resource-poor communities can be attributed to high costs, lack of transportation, and lack of availability. These findings suggest that adding resources, such as the presence, maintenance, and use of the community garden, may help to reduce the expensive costs and aid in the access to nutritious foods. Additionally, the findings suggest that by bringing in community ties to increase nutrition knowledge, a greater interest in and preference for nutritious foods, like fruits and vegetables, can develop within children. The current research implies that the relationship between human capital, organizational resources, and social capital may be used to assist with food insecurity problems and build community capacity. By increasing community connections and the level of community participation around the community garden, the residents can increase their sense of community, which in turn will help to build social capital. By working together to reduce food insecurity in the neighborhood by using the community garden as a resource, the community can work together to build community capacity. All four of Chaskin's (2001) elemental characteristics in building community capacity will be met when a committed community works together to build relationships while solving problems and gaining access to resources.

II. Nutritional Access of Resource-Poor Communities Through EBT Usage at the Farmer's Market

Statement of Problem
Nord et al. (2009) reported that over half of all food-insecure households participate in federal food and nutrition assistance programs. Information from the Modified USDA Food Insecurity survey shows that the resident participants of Hillcrest have at times changed or reduced essential healthy foods from their diet because of cost, transportation, or availability. Food and nutrition benefits distributed by the state of North Carolina are accessed by using an EBT (Electronic Benefits Transfer) Food Stamp card to purchase food items at grocery stores (New Hanover County Department of Social Services 2010). This
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aspect of the research project measured the interest level of Hillcrest residents in participating in the new debit, credit and EBT Food Stamp card acceptance program that is currently available at the Riverfront Farmers’ Market, which could increase access to nutritious food alternatives. This project also sought to establish transportation from Wilmington Housing Authority for those who are unable to utilize the Farmer’s Market due to limited transportation.

EBT Use at the Farmer’s Market
In North Carolina, Electronic Banking Transfer (EBT) Food Stamp cards usage at the Farmers’ Market is a fairly new process. In 2004, the North Carolina 21st Century Farmers’ Markets was developed through LeafLight Inc. in cooperation with the USDA Food and Nutrition Service, and Supplemental Nutritional Assistance Program (LeafLight 2010). Leaflight, Inc. administers the program in partnership with the North Carolina Department of Agriculture & Consumer Services, Got to Be NC Agriculture, North Carolina Department of Health and Human Services, North Carolina Division of Social Services, Food and Nutrition Services program, and the Physical Activity & Nutrition Branch of the North Carolina Division of Public Health (LeafLight 2010). The North Carolina 21st Century Farmers’ Markets program developed a way to implement a more convenient payment system for North Carolina residents who are purchasing items from agricultural retailers such as farmer’s markets and farm stores. The new payment system offers an electronic form of payment for purchasers, which includes EBT Food Stamp cards as well as debit and credit (LeafLight 2010). By 2010, farmer’s markets in eighteen counties in North Carolina currently accept EBT Food Stamp cards and the number of markets is consistently increasing nationwide.

Wilmington’s Riverfront Farmers’ Market began participating in the 21st Century Farmers’ Market program near the end of the fall of 2009.

According to the organization Leaf Light Inc., the process in which customers use their EBT Food Stamp cards at the Farmers’ Market is simple. Local farmers bring their produce or product to the market. The customer starts at a stand where a market representative will use a standard point of service (POS) machine to run their EBT Food Stamp card. The customer is then given wooden tokens equaling the purchase value. The wooden tokens are given in $1 increments that can be used on Supplemental Nutrition Assistance Program (SNAP) eligible foods. According to the United States Department of Agriculture Food and Nutrition Service, funds may be used to purchase breads, cereals, fruits, vegetables, meats, fish, poultry, and dairy products as well as seeds and plants that will produce food for the family to eat (USDA 2010). Customers using their debit or credit card are given tokens in $5 increments that can be used to purchase anything. The tokens can be used at any participating vendor and are treated like money in the transaction. At the end of the business day, the farmers turn in the tokens they received and complete paperwork for redemption. LeafLight, Inc. then processes the transactions and the farmers receive a check or deposit for the value of tokens received. The processing is typically completed in less than a week.

Methods

A convenience sample of 42 residents in the Hillcrest community was used to measure the level of interest in gaining transportation from Wilmington Housing Authority (WHA) to the downtown Riverfront Farmers’ Market and interest in taking advantage of the newly implemented...
EBT Food Stamp card acceptance program. Thirty-five residents were contacted through door to door canvassing and were given a qualitative verbal survey to better understand their feelings concerning the subject while the remaining seven were asked to complete a quantitative written survey while attending a program taking place at the Community Campus. Three questions regarding the participant’s use of EBT cards, knowledge of the Farmer’s Market and interest in transportation to the Farmer’s Market were asked of all participants:

1) Do you use EBT cards?
2) Do you know about the Downtown Farmers Market?
3) If transportation through WHA were available to the downtown farmers market once a week, would you take advantage of it?

Findings

The data collected show that 83.3% of survey participants were interested in using their EBT cards at the Riverfront Farmers’ Market if transportation were made available to them. Of the 11.9% who said they would not use this program, reasons were mostly because they were not interested in the Farmers’ Market or had their own transportation.

While surveying residents, it became apparent that many residents were displeased with the current public transportation system, Wave Transit, in Wilmington. Upon reviewing the Wave Transit bus routes, it was found that there were a limited number of buses stopping near Hillcrest and they were not easily accessible. Previous studies by UNCW Public Sociology students (2009) also found that Wave Transit bus routes make it difficult for residents to use public transportation to meet their daily needs such as looking for and/or going to work, trips to the store and doctor’s appointments. Based on the Wave Transit bus routes in place at the time of the study, if a Hillcrest resident were to take the bus to the Riverfront Farmers’ Market, they would spend at least an extra hour of their day on the bus going to and coming home from the farmers’ market not including the time waiting for the bus to arrive at the stop. Residents who were surveyed indicated that they would be interested in going to the farmers market if transportation outside of the local bus transit system were readily available to them. Several indicated that the benefits of shopping at the farmers market were not worth the extra time needed to take the bus.

Discussion and Implications

This research indicates that if transportation was more readily available to public housing residents, there might be more interest to use the local farmers’ market as an EBT food source. A meeting was held with Wilmington Housing Authority transportation officials to discuss the research findings and the possibility of them providing transportation to the residents. Although the Wilmington Housing Authority representatives believed that it is an excellent idea for residents of the public housing community, they feel there would be too many scheduling and cost concerns for the Wilmington Housing Authority. At the completion of this research a final decision had not been made by the Wilmington Housing Authority. Additional discussion took place regarding the limited access of public transportation to public housing communities. Through the discussions with Wilmington Housing Authority representatives, it was determined that Hillcrest is not the only community experiencing transportation difficulties. Many residents of Hillcrest and other public housing communities are senior citizens. Age and health related conditions make it even
more difficult to make use of the available Wave transit system. By gaining access to the Riverfront Farmer’s Market and the opportunity to use EBT Food Stamp cards, residents have increased access to fresh, local nutritious foods that may not be available at the most convenient grocer. This research is consistent with Huddleston-Casas et al.’s (2008) findings regarding low income minority families in urban areas having food insecurity issues. As previous research (Nord et al. 2009) suggests a common coping strategy for food insecurity is the use of Federal food and nutrition assistance programs, such as EBT Food Stamps. This research suggests that members of the Hillcrest community have an interest in using EBT at the farmer’s market to gain additional “access to nutritionally adequate and safe foods” (Metallinos-Katsaras et al. 2009:1790). However, this research implies the ability to utilize the Riverfront Farmer’s Market may be hindered due to inadequate transportation.

III. Community–University Partnerships and Building Community Capacity: An Evaluation of the Community Campus at Hillcrest

Statement of Problem

This research evaluates the Community Campus at Hillcrest, established through a community–university partnership and designed to build and foster community capacity and social agency in a resource-poor area. Four fundamental characteristics of community capacity include a sense of community, a level of commitment, the ability to solve problems, and access to resources (Chaskin 2001). Additionally, there are four main strategies for building community capacity: leadership development, organizational development, community organizing, and fostering collaborative relations among organizations (Chaskin 2001). Through the incorporation of the strategies designed to build community capacity within its programming, the Community Campus’ primary goal is to foster an environment that enables the four characteristics of community capacity to thrive. The goal of this research was to assess participants’ attitudes about the community campus, identify any need for future programs that incorporate community building strategies, and ultimately determine the impact the community campus has had on the community and on building community capacity.

Method and Data Analysis

This project measures participants’ attitudes about the Community Campus and the programs it offers, while assessing how participants utilize the facilities available at the Community Campus. The data were from a sample (n=9) of residents in the resource-poor community of Hillcrest in Wilmington, North Carolina that houses the Community Campus. The sample was obtained through snowball sampling techniques that included each strata represented in the population of the surrounding community. Snowball sampling was chosen due to the link between networks and connections and community—the primary focus of this research. As community leaders and decision makers, two resident council members were also included in the sample to assess their attitudes about the progress of the Community Campus. In order to best evaluate and explore each participant’s experiences, attitudes and feelings about the Community Campus and its perceived impact on the community, a qualitative approach was chosen. In depth, face-to-face interviews were conducted consisting of 10 open ended and probing questions designed to measure participants’ attitudes about the Community Campus and the programs it
offers. Questions (see Appendix 3) were included to measure how and how often each participant utilizes the programs and facilities at the Community Campus, knowledge of the Community Campus, thoughts and feelings about the Community Campus and its perceived impact within the community. Additional questions that were designed to gather data about what types of future programming residents would find beneficial to their community were also included in the interview process. All respondents, including resident council members, were asked the same set of interview questions. Each interview was recorded, transcribed and the data were coded for thematic patterns.

**Findings**

The following three themes emerged from the interviews conducted with the sample of Hillcrest residents described in the previous section.

**Theme One: Positive Impact on Children in the Community in the Areas of Education and Mentoring**

“When the kids leave school they continue to learn at the center.” – Resident and parent

“If I have an impact on just one child, I know I have done my job.” – Resident and volunteer

Of the residents interviewed, eight reported the largest impact of the Community Campus within the community has been with the children/youth in the areas of educational development and positive mentoring. Of the programs currently offered, half are geared towards children/youths with primary focuses being on aspects of educational development. The Community Campus offers a range of programs that are designed to be both fun and academic, These programs typically take place during the Community Campus’ after school program and include opportunities for educational development such as homework help, tutoring, arts and crafts classes, dance classes, gardening, nutrition programs, poetry and literature exercises, and time to utilize the computers.

While greater impacts may be noted in the areas of educational development, it is also important to note that the children have made the community campus very much a part of their daily lives and community life, developing and encouraging their sense of community. According to the WHA UNCW Community Campus Afterschool Attendance Report provided by the on site coordinator in April 2010, an average of 17 children visit the Community Campus daily to participate in some form of programming, while 27 of the 42 school-aged children who live in Hillcrest have visited the Community Campus at least once. Many of the children that visit the Community Campus are regular participants in the children’s programming that is offered. Additionally, the parents of children who are involved with programs at the Community Campus are more likely to utilize programming and become involved themselves through volunteering. Of the residents interviewed, two were parents of children who attended programming at the Community Campus and both parents had utilized programming and volunteered at the Community Campus.

**Theme Two: Access to Resources Builds Human Capital, Social Capital, and Social Agency**

“I was using the computers here one day and happened to put my resume up on one of the job boards, and that is how I got my current job. There are some of us that don’t have the resources to go to the unemployment office or the library on a daily basis to get online to look for work. Having access to the computers is helpful when you’re seeking work.” – Resident
Residents use the computer lab facilities to build human and social capital by gaining access to a wider job market and thereby increasing their chances of becoming employed. Of the adults interviewed, six said that they were more likely to use the computer lab and attend computer classes more frequently than any other program or facility. The number one use of the computers was to find employment and apply for jobs. Residents cited a lack of access to computers in the home and/or the difficulty with transportation systems to the public library or Employment Security Commission to use job-seeking resources, such as computers, as the largest obstacles while seeking employment. Additionally, the close proximity and easy access to computers with no time limits were cited as primary reasons for using the computer labs on site. It was also noted that on several occasions interview participants referred to the Community Campus as the “resource center.” Because access to resources is one of the four fundamental characteristics of community capacity, the computer lab facilities work as a strategy towards this goal by providing a needed resource within the Hillcrest community.

Theme Three: Strengthens Community’s Ability to Solve Problems

“Anything that needs to be done as a whole for the community, I can go to the community campus and ask someone for their help and they have no problems helping.” – Resident and resident council member

It was noted that four of the residents interviewed felt they could turn to the Community Campus for help with community-based events, organization, or programs. Of the four of respondents who said they felt they could turn to the Community Campus, two were resident council members. Two participants reported working closely in the past with the Community Campus organizing community events or volunteering with a program, one of whom was a resident council member. The other two respondents reported feeling they could rely on the partnership with the university to aid them if and when they needed help organizing an event, reaching a particular goal, or solving a problem within the community. By aiding the community with “translating commitment into action,” (Chaskin 2001:297) the Community Campus has improved the community’s ability to solve problems. Residents’ commitment to community goals and projects can be realized more greatly by working in partnership with the Community Campus.

Discussion and Implications

This research suggests that the Community Campus has made notable progress in the area of building community capacity in the two years since its establishment by implementing capacity-building strategies within its programming. These capacity-building strategies include fostering leadership development, organizational development, community organizing, and collaborative relations among organizations (Chaskin 2001). Because the Community Campus thrives on the organizing within both the community and the university, as well as the organization and collaboration between the two, these strategies are paramount to the goals of the Community Campus. Among the resident children of Hillcrest, a positive impact in the areas of education and mentoring is additionally noted as promoting a sense of community and building community capacity. In the areas of providing access to resources, building a sense of community, and building problem-solving abilities, the Community Campus has made significant advances towards promoting these particular fundamental
Characteristics of community capacity within the Hillcrest community.

Additionally, frequent evaluations should be conducted by future public sociology interns and Community Campus coordinators to ensure that programming is continuing to meet community needs and resident input is part of program formation. By talking with residents about individual and community need, programs can be more efficiently designed with a particular community need in mind. By addressing community needs directly expressed by residents, the Community Campus will be better equipped to provide access to appropriate resources needed in the community. Additionally, consistent resident input will increase the level of community commitment to the growth and progress of the community.

Further, in order to continue to work towards its intended goal of building community capacity, the Community Campus at Hillcrest must promote individual levels of commitment from residents through promoting resident volunteerism and involvement at the Community Campus and within the community. The organizational level of commitment from the university, as well as local business and organizations outside of the community, is strong. However, the individual level of commitment of residents has yet to reach a threshold, as only a portion of current programming has included resident input during formation. Increasing the level of commitment from community members must be made a priority, as it is a large part one of the four fundamental characteristics of community capacity. Increased resident involvement in all aspects of programming and program development will build a level of commitment by building individual level social agency for residents, increasing leadership development among residents, and fostering community involvement with organizing of the Community Campus.

Future Programming Suggestions

Of the working-aged residents interviewed (those under the age of 65 and/or not retired), 71.4% said they would like to see some form of career services and/or skills building classes. The implementation of a career services program that included instruction of resume writing, job search techniques, and interview skills would further increase human and social capital, as work-seeking adults would increase their chances of becoming successfully employed, while making important contacts and forming networks. An increase in social and human capital would also result in an increase in social agency. Additionally, the high demand noted for a career services and skill-building program indicates a need within the community for this particular resource.

Another noted demand was for some form of athletic team for the youth within the community. The implementation of a community-based team would create a sense of community amongst team members and coaches, while utilizing existing resources (ball fields and courts) within the community. Additionally, a community team would help promote a level of commitment amongst team members, parents, and residents to the community. By developing leadership skills and building social agency, residents would be a part of the organizational development of the team and events. Moreover, the university community-based team would foster collaborative
relations with other communities, the university, city, and local businesses.

CONCLUSION

The Community Campus at Hillcrest is still a new community and university collaboration. It is a work in progress and is continuously working to improve the relationships between the community and the university. The collaboration offers excellent opportunity for community based research project as described earlier in this article. However, there is still not as large a level of community participation and commitment as one would hope. The experiences that are available allow for empowerment within the community for the residents as well as the students involved. Community and university collaborations are beneficial to all people involved. Community service learning is an excellent way for students to become involved in a variety of forms of social research. It is imperative that universities work with the community to grow partnerships that can be effective. As the Community Campus collaboration continues, lessons are learned and improvements are needed and made to reduce the gap between the community and the university. By continuing to strive to produce programs and research issues that are relevant and needed by the community, the Community Campus will continue to work to build Community Capacity in the Hillcrest community.
REFERENCES


APPENDIX 1

Modified USDA Survey on Food Security

INTRODUCTION
We are interested in learning more about access to affordable food for Housing Authority residents.

The questions below are about food and your family’s needs.

1. Circle the line below that describes you and your family:
   When I shop, I am able to choose from a variety of foods that are high in quality
   When I shop, I am able to choose from a variety of foods that are not high in quality
   When I shop, I am usually limited by the variety of foods carried in the store

2. Circle the line below that best matches you:
   I eat healthy foods from all food groups daily or almost daily
   I eat healthy foods from all food groups a few times a week
   I eat healthy foods from all food groups at least once a week
   I rarely eat healthy foods from all food groups

3. What are you most concerned about when buying food? Rank these with 1 being the most important and 5 being the least important.
   Food Price
   Quality of Food
   Nutritional Value of Food
   Food Taste
   Food Convenience

4. Circle the line below that describes you:
   I eat 2-3 servings of both fruits and vegetables most days
   I eat 2-3 servings of fruits, but less or no servings of vegetables most days
   I eat 2-3 servings of vegetables but less or no serving of fruits most days
   I do not eat 2-3 serving of fruits or vegetables most days

5. Where do you buy the majority of your groceries? Rank these with 1 being where you buy the majority of your groceries to 5 being where you buy the least.
   Supermarket (Food Lion, Harris Teeter)
   Superstore (Wal-Mart)
   Small Grocery Store
   Convenience store without gas
   Convenience store with gas
6. What do you consider when deciding where to buy groceries? Rank these with 1 being the most important factor and 5 being the least.
   - Nearness to the store
   - Transportation
   - Food Variety and Quality Offered at the Store
   - Prices at the Store
   - Other (what are they?)

7. Do you rely on any food assistance programs like Food Stamps, WIC, or the school lunch program to help supply food for you and your household? Check the box below that describes your household:
   - Yes
   - No
   If you checked Yes, please check which ones below:
     - Food Stamps
     - WIC
     - School Lunch Program
     - Other (please list)

8. Do you rely on any emergency food assistance programs like soup kitchens, food banks, food pantries or any other “free” food resources? Check the box below:
   - Yes
   - No
   If you checked Yes, please check which ones below:
     - Soup Kitchens
     - Food Banks
     - Food Pantry
     - Other Free Food Resources (please list)

9. If you do use emergency food assistance programs, please tell us how often. Circle the line below that describes your household:
   - Daily
   - Weekly
   - Monthly
   - Occasionally throughout the year
   - Less than once a year
10. How often do you utilize fast food restaurants as a source of food? Check the box that describes you:
   - Daily or almost daily
   - More than once a week
   - At least once a week
   - A few times a month
   - Less than once a month

11. What are your reasons for buying fast food? Rank these with 1 being the most important reason to 4 being the least important reason.
   - Fast food restaurants are near by
   - Fast food restaurants are easier to access than the grocery store
   - Fast food is cheap
   - I would rather eat fast food than prepare food from the grocery store

12. How do you feel about the nutritional value of your daily food intake? Circle the line that describes you:
   - The food I eat is very nutritious
   - Sometimes the food I eat is nutritious
   - The food I eat is not always nutritious
   - I rarely eat nutritious foods

13. How interested would you be in learning about how to include nutritious food in your diet and learning to cook with these foods? Circle the line that describes you:
   - Very interested
   - Somewhat interested
   - Not very interested
   - Not interested at all

14. Here are some reasons why people don’t always have enough or the kinds of the foods they want to eat. Please indicate if any of the following is a reason why YOU don’t always have enough or the kinds of food you want.
   - Not enough money for food
   - Kinds of food I want are not available
   - Not enough time for shopping or cooking
   - Too hard to get to the store
   - On a diet
   - No working stove available
   - Not able to cook or eat because of health problems
   - Don’t know or not applicable
   - Other: (please list)
15. People have made several statements about their food situation. For these statements, please indicate whether the statement was often true, sometimes true, or never true for your household in the past 12 months.

The first statement is “I worried whether our food would run out before we got money to buy more.” This was:
- Often true
- Sometimes true
- Never true
- Don’t know

The second statement is “Someone in my household has had to cut the size of a meal or skip a meal because we did not have enough food” This was:
- Often true
- Sometimes true
- Never true
- Don’t know

16. If Food Stamps and/or WIC benefits were accepted at the local Farmers Market, how likely would you be to shop at the Farmers Market? Check that box that applies to you:
- Very likely
- Somewhat likely
- Not likely at all

17. Are there any foods that you have omitted from your diet or have gone without on a consistent basis because of cost, transportation, or availability?

☐ Yes
☐ No

If yes, indicate the food group/s that these foods are from?
- Grains
- Fruits
- Vegetables
- Protein
- Dairy
- Fatty Foods

Thank you for helping us understand more about food security!
APPENDIX 2

Friends, Food, and Fun
Spring 2010

What is your name? _____________________________________________
Are you: Male or Female
How old are you? ________________
Are you allergic to any foods? ___________________________________

1. Which of the following foods should you eat the least of?

2. Which snack will you give you the most energy?

3. Which snack is best for your eyes and skin?

4. Which snack gives you strong bones?
5. What are the three things that our garden needs to grow?
   a. A bowl, milk, and spoon
   b. Sunlight, water, and dirt
   c. Air, hard work, and love

6. Which is healthier?

7. Which is healthier?

8. Which is healthier?

9. Which is healthier?
How many meals do you eat a day? _________________

How many snacks do you have at home in a week? _________________

What are two things you usually eat for dinner?
______________________________
______________________________

What are two things you usually eat for lunch at school?
______________________________
______________________________

If you could choose anything, which are your three favorite foods?
______________________________
______________________________
______________________________
Community Campus Evaluation Interview Schedule

1. Do you know about the Community Campus/center in the Hillcrest community? If so, how did you hear about it?

2. Have you ever been to the Community Campus? If not, is there any reason why? If so, how often do you visit the Community Campus?

3. Do you know what programs are offered?

4. What programs/facilities do you use most often?

5. If you do not currently participate/use any of the programs/facilities, what program would you most likely participate in?

6. Are there any programs you would like to see started at the center that you feel the community would benefit from?

7. What existing program would you say you benefit from the most? If none, what kind of program do you feel you would benefit from?

8. What are your thoughts and feeling about the Community Campus?

9. What would make the Community Campus more meaningful for you?

10. Do you think the Community Campus has had an impact on your neighborhood? If so, what?
About the Student Authors

Hannah C. Ainsworth
graduated from Salem College in 2010 with a Bachelor’s of Science degree in Chemistry. She has worked on the Salem College American Ginseng Project since February of 2008. During that time, she has presented this research at a Regional and National Meeting of the American Chemical Society. In addition to this project, she conducted Physical Chemistry research at Kent State University’s Liquid Crystal Institute, sponsored by the National Science Foundation’s REU summer program. She is currently doing research at Wake Forest University’s school of Medicine while applying to graduate schools for the coming year.

Jonathan Brooks
is from Charlotte, North Carolina. He received a BA in history with a minor in anthropology from the University of North Carolina – Wilmington in May 2010. The article presented is part of an ongoing research project. The research was presented at the UNCW undergraduate research showcase. He is currently enrolled in the graduate program at UNCW, pursuing a MA in global history, concentrating on West Africa and the trans-Atlantic world.

Brittany Autumn Burke
is a recent graduate from the University of North Carolina at Greensboro majoring in Anthropology and double minoring in Sociology and Spanish. She was given the opportunity to live and conduct research in the Andean highlands of Ecuador in the months of July and August, 2009. Since arriving back, she has compiled a manuscript of her own project involving social support and disaster management. Traveling the east coast, she has presented her findings at various research expos and anthropology club meetings. She hopes to continue her studies at graduate school in the upcoming future.

Margeaux Corby
graduated summa cum laude and Phi Beta Kappa from Elon University in May 2010. She majored in biology and journalism, held three different editor positions at the school paper, The Pendulum, and participated in several volunteer projects serving minority and displaced populations. Margeaux’s research was funded through the $15,000 Lumen Prize, awarded to select Elon University students following submitted research proposal and rigorous interview process. She currently works with disabled clients by providing rehabilitative and respite services. Margeaux is applying to medical school and hopes to continue her health communication research as a physician.

Endya L. Frye
is a senior biology at North Carolina Agricultural and Technical State University, and is an active member of the University’s Honors Program where she holds various leadership positions. In addition to her academic endeavors and attaining recognition by the College of Arts and Sciences as Undergraduate Student of the Year, Endya is a member of several honors societies. She is the current
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president of the Minority Association of Pre-Medical Students at NC A&T. Upon graduation Endya intends to pursue a career in medicine. Her research interests include understanding various aspects of the autoimmune disease Systemic Lupus Erythematosus.

Diana Gliga is a graduate of East Carolina University. She received a Fulbright Scholarship to study eye conditions of her native Romanians. She is currently enrolled as a medical student at Brody School of Medicine. She conducted biological and health science research during her undergraduate terms.

Rachana Gyawali came from Nepal to Winston-Salem, North Carolina in 2006 for her undergraduate. She received her B.S. degree in biology from Salem College in 2010. During her undergraduate, she got an opportunity to participate in the ongoing American Ginseng project at Salem College. She was actively involved in this project for the last two years. In addition, she has done a couple of internships at Wake Forest University Baptist Medical Center and at Targacept. Currently, she is pursuing her graduate studies in the department of Biology at Texas A & M University.

Saumil Jariwala currently attends the University of Pennsylvania under the Huntsman Program. As a senior at the North Carolina School of Science and Mathematics, Saumil completed his game-theory research and also served as Student Body President. Saumil’s other activities included Quizbowl and Model United Nations. Outside of school, Saumil is an Eagle Scout from Boy Scout Troop 374 and a First Degree Decided Black Belt in TaeKwonDo. At the end of his senior year, Saumil was honored to be named a United States Presidential Scholar. In his free time, Saumil enjoys singing and reading about international affairs.

Kimberly Lancaster is a graduate of the University of North Carolina Wilmington with a BA in Public Sociology with a concentration in Human Resources and Inequalities. She received the Sociology Academic Excellence award for her graduating class. She is currently enrolled as a graduate student in the Criminology and Public Sociology Masters Program at the University of North Carolina Wilmington. Her current research is focusing on community university partnerships and the organizational collaborations that take place specifically at the Community Campus at Hillcrest where she is working as the Campus Coordinator.

L. Tiara Murphy graduated from Salem College in May 2010 with a B.S. in Biology. She spent three of four undergraduate years as a member of the American ginseng independent research team, and thoroughly enjoyed the experience. She is currently a first-year medical student at the University of South Alabamas College of Medicine in Mobile, AL. Undergraduate research has provided a solid basis both for research at the graduate level and has given additional insight into the process of clinical testing.”

Smriti Sharma is originally from Kathmandu, Nepal. She received her undergraduate degree from Salem College in May 2010 with a major in Chemistry. She was involved in Ginseng project for 2 years while her years at Salem. During the time, in addition to presenting the research in Salem College,
she had presented the research in different national and regional conferences. She currently works at an Environmental Chemistry lab in Nicholas School of Environment at Duke University. She plans to pursue her graduate education in Environmental Chemistry in Fall 2011.

**Amanda Smith**
is currently senior at University of North Carolina Wilmington. She will graduate in December 2010 with a BA in Public Sociology with a minor in Journalism. She is a member of Alpha Kappa Delta, the international sociology honors society. Amanda has presented this research at the 5th annual UNCW Undergraduate Research and Creativity Showcase, as well as the 8th annual Colonial Academic Alliance Undergraduate Research Conference. She will also be a panelist at the upcoming North Carolina Governors Conference for Women in November 2010. After graduation, she plans to pursue her MA in Sociology and is considering a PhD thereafter.

**Christina Tomlinson**
is currently a graduate student at University of Missouri-Kansas City, where she is pursuing a Master’s degree in history. She graduated summa cum laude in 2010 and received her BA in history from Campbell University in Buies Creek, NC. Presently, she is part of a museum consulting team that is aiding in the relocation of the Black Archives of Mid-America in Kansas City, MO. She hopes to continue in higher education and plans to pursue a PhD specializing in medieval social history and gender studies. Her research interests include early medieval German history, the Migration Period, and women in the Middle Ages.
Dr. Michael F. Bassman
is the first Distinguished Honors Professor in the new Honors College at East Carolina University. Previously, Dr. Bassman was Associate Vice Chancellor and Director of the Honors and EC Scholars Programs. In addition, he founded the ECU undergraduate research program and initiated Explorations for the state of North Carolina. Dr. Bassman was a co-founder of the Ethnic Studies Program and served as Coordinator for ten years. His area of expertise is Holocaust Studies and he serves on the North Carolina Council on the Holocaust.

Dr. Andrew F. Clark
is Professor of African and Global History at UNC Wilmington. He received his Ph.D. from Michigan State in African History, with a focus on West Africa, in 1990. He has published extensively on African history and society, and teaches a variety of courses in African and global history. He has published numerous book reviews in Africanist journals, has presented many papers to professional conferences and gives public lectures on a number of topics related to Africa and international affairs. Since his Peace Corps service (1978-1981) in Senegal, he has traveled extensively in West Africa and is currently completing a manuscript on slavery, Islam and independence in Senegal and Mali. He is a past president of the Association of Third World Studies and is currently the Country Specialist for Senegal and Guinea with Amnesty International.

Dr. Nita A. Eskew
is an Associate Professor of Chemistry at Salem College. She is collaborating with Dr. Jeanine Davis of North Carolina State University and Dr. Jennifer Cruse-Sanders of the Atlanta Botanical Garden on an interdisciplinary research project focusing on the bioactive molecules in American ginseng, a medicinal plant native to North Carolina. Nita received both her BS and PhD degrees in chemistry from the University of North Carolina at Chapel Hill. Prior to joining the Salem faculty, she worked in the chemical industry on various products including polyurethane, organic dyestuffs and pigments, and spandex fiber.

Dr. Annette G. Greer
is Co-Director, Office of Interdisciplinary Health Sciences Education where she teaches Interdisciplinary Rural Health courses primarily in online environments. In addition to rural health, Dr. Greer teaches public health and adult education. She collaborates with faculty from the College of Human Ecology to teach an Honors Seminar that combines art and health. Dr. Greer has been involved in interdisciplinary education for over twelve years. Along with her advanced degrees in nursing, Dr. Greer has associate degrees in Agriculture Science and Agricultural Business. She serves on the NIH/NCI National Advisory Board of the Agricultural Health Study and represents farm spouses. She has published on interdisciplinary education.
and service-learning in allied health and nursing journals. Dr. Greer’s dissertation research on learner-centered pedagogy has been published internationally in journal articles, a book chapter, and as a book.

**Dr. Leslie Hossfeld**
Director of Public Sociology
Undergraduate and Graduate Programs
at UNCW. She received the 2005 Faculty Fellow in Public Policy and Public Engagement at the Institute for Emerging Issues at North Carolina State University. Her research focuses on poverty and job loss in rural North Carolina. She has made presentations to the United States Congress and to the North Carolina Legislature on the subject of job loss and rural economic decline and recovery. Dr. Hossfeld is co-founder of the Southeastern North Carolina Food Systems program, an economic development project focused on keeping food dollars within the local economy.

**Dr. Eric Jones**
Research scientist, University of North Carolina at Greensboro, has focused his recent work on understanding how the structuring of social relations following extreme events (e.g., natural disasters, pioneer colonization, and immigration) impacts individual outcomes and recovery. His general research interests concern cross-cultural vulnerability and resilience under conditions of environmental and/or social change. He recently coauthored the edited volume *The Political Economy of Hazards and Disasters* (2009, AltaMira Press), published the innovative methodological piece “Extreme Events, Tipping Points and Vulnerability: Methods in the Political Economy of Environment” in *Environmental Social Sciences: Methods and Research Design* (in press, 2010, Cambridge University Press), and performed the application of social network analysis to cooperation among pioneer colonists in “Wealth-Based Trust and the Development of Collective Action” (2004) in the journal *World Development*.

**Dr. Patrick M. Martin**
Serves as an assistant professor at North Carolina A&T State University. Before joining North Carolina A&T State University, he graduated from Virginia Union University with a BS in Biology and then earned a Ph. D. in Cell and Molecular Biology from the University of Virginia. He is currently a member of the Wake Forest University, School of Medicine, Comprehensive Cancer Center and maintains an active research laboratory that focuses on the molecular regulation of aggressive cancers and health disparities in cancer. He is also very interested in developing new curriculum and has developed a biotechnology certificate program, new courses involving cancer pathogenesis and cancer health disparities.

**Dr. Arthur Murphy**
Head and professor of anthropology, University of North Carolina at Greensboro, has been very involved in research in urban economic systems and in cultural dynamics of disaster recovery. His disaster research has covered floods, volcanic eruptions, and hurricanes in the United States, Mexico, and Ecuador. He is the coauthor of *Social Inequality in Oaxaca* (1991, Temple University Press), *The Mexican Urban Household* (1990, University of Texas Press), and coeditor of *The Political Economy of Hazards and Disasters* (2010, AltaMira Press).

**Dr. Jaclyn Stanke**
Associate Professor of History at Campbell University, where she has taught since 1999. She received her PhD in History from Emory University in 2001. A specialist in the Cold War, she has...
written and published articles on Anglo-American relations following Stalin’s death in 1953, the Cold War and the American South, and American popular perspectives of the Solidarity movement in Poland. She is currently working on a larger project documenting American popular culture and popular perspectives of the 1980s as the Cold War went from a deep freeze to a sudden end.

**Dr. Virginia (Ginger) S. Wilson**
taught history for thirty years at the NC School of Science and Mathematics and served as Dean of Humanities. She retired in 2010, but hopes to do some part-time teaching. She received the NCSSM Outstanding Teacher Award and the UNC Board of Governors Award for Excellence in Teaching. She was awarded the National Council for the Social Studies Service and Outstanding Secondary Teacher Awards. She is an Adjunct Associate/Assistant Professor for Duke’s Undergraduate and MAT Teacher Education Programs. She serves on the Board of Directors of the North Carolina Council for the Social Studies.

**Dr. Donald Woolley**
is a researcher in the Department of Psychiatry at Duke University studying Post Traumatic Shock Disorder in children. He is also an adjunct assistant professor in the Department of Sociology at Elon University and is unclear about when he accidentally became a Socio-Biologist.
Submission Process

Who is eligible?

The primary author or authors must be undergraduates at a 2 or 4 year college or university in the state of North Carolina working on original research under the direction of a faculty mentor. Works may be co-authored.

What to Submit?

We are seeking research papers, critical essays (literature/research reviews, articles written on a particular topic), or media submissions of performing/fine art endeavors.

Explorations, the Journal of Undergraduate Research and Creative Activities for the State of North Carolina, will be published primarily online, providing opportunities for a variety of text and media submissions in the following disciplines:

- Biological, Earth, and Physical Sciences
- Business and Legal
- Creative Writing and Discourse
- Humanities
- Mathematics
- Performing Arts
- Social Sciences
- Technology and Engineering
- Visual Arts and Design

How to Submit?

Guidelines for publication:

1. Submit all articles (without images) in Word documents (.doc) only, and indicate where images, graphs, maps, or charts should appear.

2. Submit images, graphs, maps, and charts as separate files. For creating graphs and charts (in Excel, Illustrator, or Paint): make the image as LARGE as possible. This will ensure its visibility in the publication.

3. Images need to be saved as .jpegs, preferably at high resolution (300dpi).

4. If images are not yours, please obtain permission in writing and cite the copyright owner.

5. Use grayscale (no colors) on all charts, tables, graphs.

6. Submit everything in its original file. (Example: article as Word doc, image as .jpeg.) Do not convert files. Do not embed images into your article. Create an Appendix to indicate image placement.

Please attach your submissions and all additional forms in an email addressed to: csurf@uncw.edu.

Deadline: February 1, 2011 and June 1, 2011

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Suggestions for Success

1. Make sure your name is on everything you submit

2. Use your initials and submission title as the title of your paper and/or any other email attachments, this way everything can be easily identified.

3. Turn in your required forms with your submission. Submissions sent without all required forms will not be accepted. Detailed information at www.explorationsjournal.com.

4. Once your work has been blind reviewed, you may submit your work yourself or your faculty mentor may submit it. If you are a single author, you will be the main contact. If you are one of multiple authors, decide who will be the main contact and have him/her submit on behalf of all.