“No man should escape our universities without knowing how little he knows”

J. Robert Oppenheimer (1904 – 1967)
THE OWL

THE FLORIDA STATE UNIVERSITY
UNDERGRADUATE RESEARCH JOURNAL

1. LETTER FROM THE EDITORS

4. THE EFFECT OF PLURALISTIC IGNORANCE ON WOMEN’S INTEREST IN S.T.E.M. FIELDS
   ABIGAIL LYNNE MULDOON

14. FAIR TRADE TEA AND SUSTAINABLE DEVELOPMENT AMONG INDIGENOUS PEOPLES OF AMAZONIAN ECUADOR: A CASE STUDY
   SAMANTHA WOOD

22. ANALYSIS OF PELVIC MORPHOLOGY AND BIRTH PRACTICES: COMPARISONS OF MODERN AND PREHISTORIC HUMANS
   JESSICA ENGEL

38. FEATURED ARTIST
   ERIC LABREA

40. BY HAND AND BY MACHINE: EXPLORING FURNITURE DESIGN EVOLUTION
   DEPARTMENT OF INTERIOR DESIGN

46. FEATURED ARTIST
   DAN SCHMAHL

48. THE FANTASTIC AND ILLUSORY WORLD OF SPAM*: HOW MARKETING PROMOTES DECEPTIVE AND DESTRUCTIVE “FOOD”
   JORDAN MacKENZIE
58. FEATURED ARTIST
   SHANNON GROVES

60. COMMUNICATION IN ROUTINES BETWEEN CAREGIVERS AND CHILDREN WITH DOWN SYNDROME
   KELSEY HENDERSHOTT

78. THE NAMING OF THE OWL

79. HISTORY OF SCURC

81. PAST MEMBERS OF SCURC

82. EDITORIAL BOARD & SCURC MEMBERS 2012–2013

83. ACKNOWLEDGEMENTS
LETTER FROM THE EDITORS

Dear Reader,

In native Seminole culture, an owl can sometimes be a terrible omen. More often, however, it foreshadowed a need to prepare for coming obstacles. Our university, as a public institution dealing with its own share of obstacles amid the less-than-ideal national economic climate, has thrived scholastically. Both the recognition of and diversity among undergraduate researchers at the Florida State University have grown, despite the often stifling eco-political conditions. This academic victory is clearly demonstrated with the sustained success of this entirely student-run publication, made possible only by the unwavering support and encouragement of our university’s administration, staff, faculty, and student body.

Named after the original seal employed from 1851 to 1901 by West Florida Seminary, this journal has highlighted the continually astounding work of Florida State University’s emerging undergraduate scholars. The goal and mission of The OWL and the entire Student Council for Undergraduate Research and Creativity has, in keeping with native Seminole mythology, been to showcase the transcendence of these obstacles and communicate the necessity of continued academic vigilance.

Therefore, as yet another monument to this unabashedly UNCONQUERED top-tier institution, to its campus unmatched in facilities and scholastic resources, to the dedicated and hard-working administrators and staff, to the selfless faculty and advisors, to the generous and enthusiastic alumni and parents, and, most notably, to the dynamic scholastic resilience of our undergraduate students, it is with great honor and humility that we present to you the third volume of The Owl, The Florida State University Undergraduate Research Journal.

In Vires, Artes, Mores,

Katie Rybakova
Brian Denny
Co-Editors-in-Chief
Florida State University’s
Undergraduate Research Journal
is accepting submissions for publication
We encourage students from all disciplines to submit.

The deadline for submissions is
Nov 1st, 2013

http://diginole.lib.fsu.edu/owl/
fsurjsubmissions@gmail.com
THE EFFECT OF PLURALISTIC IGNORANCE ON WOMEN’S INTEREST IN S.T.E.M. FIELDS

ABIGAIL LYNNE MULDOON
Faculty Advisor: Dr. Joyce Ehrlinger
Department of Psychology

Abigail Lynne Muldoon graduated from FSU in the spring of 2012 summa cum laude and with honors in the major of psychology. She is currently pursuing a Masters of Women’s and Gender studies from DePaul University in Chicago, IL. She plans on earning her Ph.D in social psychology researching gender.

Although women earn 50% of all bachelor’s degrees in the United States, they earn less than 20% of computer science and engineering degrees. There is much research focusing on the lack of women in science, technology, engineering, and mathematics (STEM) fields, but research has yet to investigate the role of pluralistic ignorance in women's avoidance of these fields. Pluralistic ignorance occurs when individuals privately reject a norm, but publicly support it because they assume the majority of other people support the norm. This project examines relationships between one’s views and the stereotypes they believe their friends hold regarding computer programmers and interest in computer programming. It was predicted that participants would engage in pluralistic ignorance, which would affect interest in computer programming. Additionally, it was predicted that women would engage in pluralistic ignorance to a greater degree than men, or alternatively, that men and women would engage in the same level of pluralistic ignorance, but this would have a greater impact on women's interest in computer programming. Significant trends were found for women perceiving that their friends hold more stereotypical views than men, and between men’s perceptions of their friends’ stereotypes and their interest. No relationship was found between women’s views and women’s interest in computer programming.

Women are well represented in collegiate level education. For example, in 2008, women earned 57.4% of all bachelor degrees awarded in the United States. However, women are underrepresented in science, technology, engineering, and mathematics (STEM) fields. That same year, women earned only 17.7% of all computer science bachelor degrees and only 18.5% of all engineering bachelor's degrees awarded in the United States.¹ In 2006 women earned only 13.4% of all bachelor degrees awarded in engineering technologies.² Women’s underrepresentation in computer science and engineering fields presents costs to both women who do not pursue careers in this vital and
critical field as well as to the development of this discipline already lacking diversity of perspective. For these reasons, it is important to determine the barriers preventing women from pursuing education in the STEM fields.

There is an abundance of multi-disciplinary research that helps to shed light on why a gender gap exists in STEM fields. Some researchers favor cultural explanations citing that men are socialized to embrace STEM careers while women are deterred from choosing them. Others support biologically-oriented factors such as men having superior spatial-abilities needed for these careers. Regardless of the source of the gender gap, most researchers have found it is evident among children for interest in STEM disciplines. For example, although boys and girls in preschool have similar interests in computers, a gender gap in how they perceive people in STEM careers emerges as early as elementary school. When asked to draw a typical scientist, an analysis of kindergarteners through fifth graders revealed that boys almost never drew female scientists and only .5% of the drawings from both genders were of female scientists, despite the sample being half (49%) girls. In addition, boys tend to have greater accessibility to resources such as computers than girls, which results in a decreased level of interest in STEM fields for girls. Boys are also given more encouragement toward technology and other STEM fields than girls.

One issue of particular interest for my thesis is that stereotypes about computer science and computer programming are often somewhat negative. Undergraduate students report they think of typical computer science majors as men who possess low social skills, are introverted, reserved, and not interested in sexual relationships with others, and have a high need for achievement, order, and consistency. Computer science students and professionals are also thought of as “geeky”. All of these traits are seen as less desirable in social situations. However, given the ubiquity of technology and computers in society, I suspect many women as well as men are interested in computers and STEM fields. Those who are interested in STEM fields as a career may not pursue them because they are aware of the stereotypes concerning computer science individuals. Although interested individuals may not endorse or fit into such stereotypes, fear of judgment from their
peers could prevent these individuals from pursuing careers in STEM fields. My thesis examines how men and women view people in computer science and, further, how they think their friends view people in these fields. I examine whether people believe there is a larger difference than actually exists between their own views of people in computer programming and the views their friends hold. My thesis also explores whether this perception leads women to show lower interest than men in computer programming.

Pluralistic ignorance occurs when a majority of individuals privately reject a norm, stereotype, or idea but publicly support it because they mistakenly assume that the majority of other people support the norm. I propose that a majority of individuals believe their friends hold more stereotype-based views of people in computer programming than they personally believe. Individuals may hide their interest out of fear of being thought of as geeky, introverted, lacking social skills, and generally fitting the negative computer programmer stereotype. Individuals, especially women, may fear judgment from their friends over pursuing interests in computer programming. This fear may result from the perception that one’s friends hold stereotypes regarding computer programmers that are more negative. Therefore, I expect women do not differ as much from men in their interest in computer programming as one might guess, given the gender gap in these careers. It is possible women do not agree with rigid stereotypes about computer programming, but falsely believe the majority of their peers do hold this view of people in computer programming. They might set aside their interest in computer programming in order to mask what they perceive to be a difference in attitudes between themselves and others. If students who do not identify with the stereotypic computer programmer shared their interest in programming with their peers, they might discover other students who also do not fit the stereotype yet share and interest in computer programming.

In this study, participants’ own views regarding the stereotypes about computer programmers were compared to what they said about the views that most of their friends likely held. I hypothesized that participants would show signs of pluralistic ignorance in that they would say their friends hold more stereotypic views of computer programmers than they did. If this is true, it is expected that the amount of pluralistic ignorance people show will
correlate with the amount of interest they have in the field.

To account for the gender gap in STEM fields, two potential explanations are proposed. First, it is possible that women engage in pluralistic ignorance to a greater degree than men. If this is the case, a larger difference in women than men is expected when comparing reports of their own beliefs about computer programming and how they think their friends view people in that field. Alternately, it is possible that men and women engage in the same amount of pluralistic ignorance, but this error has a larger impact on women’s interest in computer programming than it does on men’s. If this latter theory is true, no difference in how men and women view computer programmers or how they say their friends view people in this field may be found, but there might be a higher correlation between men’s and women’s pluralistic ignorance and their interest in computer programming.

**Method**

**Participants**

One hundred participants (46% men) participated in this study in exchange for $0.50 through Amazon Mechanical Turk (Mturk). MTurk is an online marketplace that allows users to complete online surveys and studies for monetary compensation. All participants were U.S. citizens, and they ranged in age from 19 to 65, (mean age =33.6, SD = 12.0). They were 83% White, 8% Black, 3% Hispanic, 2% American/Indian/Alaskan Native, 4% Asian, and 1% other.

**Procedure**

Participants first provided demographic information, including their student and professional status. Participants were then asked to rate 16 specific characteristics with respect to how well they described individuals who are interested in computer programming. Participants answered these questions using a 7-point scale ranging from Strongly Agree to Strongly Disagree. Five of the characteristics were meant to reflect stereotypes about computer programming (nerdy, interested in science fiction, intelligent, shy, and socially awkward). The remaining 11 characteristics were filler items (strong, warm, and honest) designed to reduce focus on the measures of interest. This first set of questions was designed to measure participants’ endorsement of computer programming stereotypes. Participants then answered 16 parallel questions designed to measure their perceptions of how much their friends endorse computer programming stereotypes.
Finally, the participant completed a questionnaire assessing their general interest in computer programming. Participants answered three questions designed to measure the participant’s own interest in computer programming (“I enjoy learning about and participating in computer programming,” “I find computer programming interesting,” and “I like tinkering with computers and learning about how they work”). Participants also answered these questions using the same 7-point scale.

Results

Two participants were outliers and were removed from all analyses, which left a sample of 101 participants. To determine if participants demonstrated pluralistic ignorance regarding beliefs about computer programming, I calculated the average of how strongly participants associated stereotypical traits with computer programmers (α=0.79). I then calculated the average of how strongly participants thought their friends would associate the same stereotypical traits with computer programmers (α=0.86).

Influence of Gender on Pluralistic Ignorance

A 2 Gender (male vs. female) x 2 Target (self vs. friends) repeated measures ANOVA was conducted to determine if participants’ own beliefs differed from expectations of their friends beliefs in the stereotypical traits they associated with computer programmers. This analysis revealed a significant main effect of target, F(1,99) = 8.65, p < 0.005, indicating that participants offered less stereotypical ratings of computer programmers when describing their own views than when reporting what they expected their friends think. This provides some initial evidence that pluralistic ignorance does exist regarding prevalence of stereotypes about computer programmers.

The repeated measures ANOVA indicated no interaction between gender and target, F(1, 99) = 0.36, p = 0.55. This suggests men and women did not differ in the amount of pluralistic ignorance that they showed. There is no difference in the degree to which men and women perceive they hold less stereotype-based views of computer programmers than their friends (Table 1).

A set of t-tests was conducted comparing the individual cells to better understand the data. These analyses revealed marginally significant differences between men and women suggesting that women expect their friends’ views of programmers to be more stereotypical than do men, t(99)=−1.17, p<0.10. While there was no significant difference between men and women in their
own views, the difference that was evident shows that women’s views were more stereotypical than men’s views. This suggests that women might hold more stereotypical views than men, t(99)=-1.03, p=0.30.

**Pluralistic Ignorance and Gender’s Influence on Interest in Computer Programming**

Looking at male participants, there is no correlation between how stereotypically they view computer programmers and how interested they are in programming, r(48)=0.11, p =0.48. There is, however, a significant positive correlation between how stereotypically they think their friends view programmers and their own interest in programming r(48)=0.30, p <0.05. This provides some initial evidence that the more that men believe their friends hold stereotypical views regarding computer programming the more interest they express in computer programming.

<table>
<thead>
<tr>
<th>Survey Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Own Views</strong></td>
</tr>
<tr>
<td>Men</td>
</tr>
<tr>
<td>Women</td>
</tr>
</tbody>
</table>

Looking at female participants, there is no significant correlation between their interest in computer programming and the stereotypical nature of their beliefs, r(53)=-.11, p =.43. There also is no significant correlation between their interest in programming and their perception of how stereotypically their friends view programmers, r(53)=-.12, p=.38. However, to the degree that there is a correlation between these measures and women’s interest in computer programming, it is in the predicted negative direction. Although the correlation does not reach significance, there was a weak pattern in the data suggesting the more women thought their friends held stereotypic views, the less interested women were in computer programming.

**Discussion**

In this study, evidence of pluralistic ignorance, defined as thinking one’s friends hold more stereotypic views than one’s self, was found regarding computer programmers. I proposed two potential ways in which pluralistic ignorance might relate to a gender gap in computer programming interest. The first was
women would engage in pluralistic ignorance to a greater degree than men, and the level of pluralistic ignorance one holds would predict interest in computer programming. While I did find a marginal trend of women perceiving their friends held more stereotypical views of programmers than was perceived by male respondents, I did not find a significant difference between men and women in the prevalence of pluralistic ignorance. This study did not support the hypothesis that the difference between the respondents’ own views and what they expected their friends believe would be larger for women than for men.

The second potential pattern that was suggested was both men and women would engage in pluralistic ignorance to the same degree, but this error would have a larger impact on women’s interest in computer programming than men’s. If this were true, I would expect to see a greater negative correlation between women’s perceptions of their friends’ views and their interest in computer programming than between the same correlation for men. Although not significant, there was more support in the data for this pattern than for the previous pattern. There was no significant correlation between the stereotypical nature of women’s own views and their interest in programming. There was also no significant correlation between women’s perceptions of their friends’ views and their own interest in computer programming. However, this latter correlation was negative, as predicted, for women yet positive and significantly correlated for men.

The current findings support the idea that pluralistic ignorance plays a role in the gender gap in computer programming. Although pluralistic ignorance appears to exist in both men and women, I found evidence of a significant relationship between beliefs about friends’ views and interest for men. The current findings suggest that, for women, believing friends hold more stereotypical views regarding computer programmers might decrease interest in programming. But for men, believing friends hold stereotype-based views was actually associated with increased interest in programming.

It is important to keep in mind that causation was not addressed in this study. Therefore, we do not know whether, for men, a belief that their friends hold more stereotypic views regarding computer programmers causes them to be more interested in programming. This study also did not include measures of other variables that might be causally related to both men’s interest in programming and their beliefs about their friends’ views.

Assuming this finding replicates in future research, it is plausible men who reported greater interest in computer programming are also involved with programming and have hobbies or careers relating to computers.
Because a majority of the stereotypes surrounding computer programmers are negative in nature, it is possible these individuals are treated negatively due to being perceived as “nerdy,” “socially awkward,” or showing an interest in programming.

If the men who reported an interest in computer programming have been treated negatively because of their interest, they may believe that their friends and peers think of computer programmers more stereotypically than they actually do.

I also found a marginal trend where women, more so than men, believed their friends hold somewhat more stereotypical views of computer programmers. Although the support is weaker than expected, this pattern might suggest women think their friends hold stronger stereotypes regarding computer programmers than they actually do. If those interested in computer programming encountered a negative social situation where they were treated negatively for being interested in computer programming, they may perceive their peers or friends as holding more stereotypic views than they actually do. This might lead women to hide their own interest in this field. One necessary step for future research would be to examine how treatment by one’s peers impacts people’s expectations about what their friends believe. Negative treatment of those interested in computer programming could be experimentally manipulated in order to show that increases in negative treatment cause beliefs that one’s friends hold more stereotypical views of computer programmers than they actually do.

This study finds pluralistic ignorance exists for men and women regarding computer programmer stereotypes. However, evidence was not found that there is a stronger relationship for women than men between pluralistic ignorance and interest in computer programming. A relationship was found between participants’ expectations regarding their friends’ beliefs and their own interest in programming. The direction of this relationship differed between men and women. The correlation between men’s interest in programming and perceptions that their friends view programmers stereotypically was unexpected and worthy of further research to better understand. While women’s interest in programming did not correlate with their own views of programmers or their expectations regarding their friends’ views, women should continue to be encouraged to pursue their interest in STEM fields. The factors that account for the gender gap in STEM fields need to be identified and studied so women will be better represented in within the community.
FAIR TRADE TEA AND SUSTAINABLE DEVELOPMENT AMONG INDIGENOUS PEOPLES OF AMAZONIAN ECUADOR: A CASE STUDY

Samantha Wood
Faculty Advisor: Dr. Michael Uzendoski
Department of Modern Languages and Linguistics

Samantha Wood is a Senior from Gainesville, Florida, and is finishing her major in Social Sciences with a minor in Psychology. A lifelong traveler, she is intrigued by cultural diversity worldwide. She hopes to continue her education in the field of Anthropology, with a special interest in Latin America.

Guayusa is a traditional tea found in the Amazon region of Ecuador. For generations the indigenous Kichwa people have been drinking it ceremonially in the morning hours to energize their bodies and souls. Historically, this tea has had immense cultural significance, but our research aimed to assess what guayusa means to modern-day Kichwas. Runa, a newly formed company, works with local farmers to cultivate and sell guayusa in the United States and Canada. With both a non-profit and a for-profit side of the company, Runa hopes to increase local income and standard of living while making a profit. As our host community embarked on the beginning stages of involvement with this company, we were interested to see how Runa operated in terms of cultural sensitivity, and assessed the cultural and financial implications of this project within the community. We conducted interviews to understand where guayusa fits into the daily life of the Kichwa people today, and how they feel about the Runa initiative. Ultimately we found that within this community, involvement with Runa is mutually beneficial. Indigenous farmers see it as one of a variety of economic initiatives that bring in money in an ecofriendly and culturally acceptable way.

There has been a recent surge in “fair trade” and “green” businesses selling products that are marketed as being socially and environmentally responsible. Typically, a fair trade company interacts directly with producers to sell their product to a wider, often international, market. These companies operate with the goal of increasing the local standard of living for the producers while also making a profit. One such fair trade company is Runa Tea which works with indigenous Kichwa communities in Ecuador to cultivate and sell a traditional tea called guayusa. Runa has very recently begun working with a Kichwa community called Sapo Rumi which, like most indigenous communities in South America, is struggling to maintain its traditional culture in the face of globalization.
and environmental destruction. This summer, my research partner, Evan Marcus, and I traveled to this Kichwa village to study the ways an indigenous community views and engages in sustainable development initiatives. Our analyses were conducted during a four-week stay in Sapo Rumi, Ecuador, and a subsequent two-week internship in the city of Tena, Ecuador. We approached the study in a cross-disciplinary way, using my background in Anthropology and my partner’s background in Finance. Our research goals were to understand what guayusa tea means to modern-day Kichwas in Sapo Rumi, observe the cultural and financial implications of Runa’s engagement within Sapo Rumi, and evaluate whether Sapo Rumi’s involvement with Runa offers an alternative to other potentially harmful economic activities. As I will show, the relationship between Runa and Sapo Rumi is a positive one. Both culturally and economically, the Runa initiative is acceptable and beneficial to the indigenous people, as well as to the company.

Background Information

In the Amazon, people create their livelihoods through direct and constant interaction with the natural environment. In order to survive, Amazonian natives have established an often mutually beneficial relationship with nature by utilizing available resources while reciprocating with respect and concern for the environment. Philippe Descola and other ethnographers have documented the ways that indigenous peoples conduct themselves in relation to their surroundings and have described their interactions with the environment as almost social in nature.¹ That is, they do not treat the forest as an inanimate resource but rather as a member of the extended family. Whereas the Western school of thought typically defines “nature” as a system of occurrences that are completely uncontrollable and separate from human interaction, Amazonian people live within a paradigm that incorporates all entities, whether human, plant, animal, or spirit, into its sphere of social interaction.² As a result of this worldview, it is not surprising that native Amazonians view resource extraction and commerce very differently than Westerners do. Though many indigenous communities aim
to maintain traditional practices, virtually all have been affected by the ever-expanding world market and are attempting to figure out a balance between their ancestral practices and their increasingly globalized world.

Historically, Western business ventures have entered the area with profit as their single goal and have operated with disregard for the people or environment affected by their operations. More recently, however, many companies have realized that it may be more economically and socially beneficial to create a business model that not only makes a profit but also diminishes adverse affects on the producers. For example, after Runa co-founders Tyler Gage and Dan MacCombie realized the great qualities of Amazonian guayusa, they set out not to create a business that would simply make profit, but to create one that would also nurture a better livelihood for guayusa farmers. Runa’s organization contains both a for-profit and a not-for-profit arm. The for-profit arm manages all buying, processing, and exporting, while the not-for-profit arm focuses on conservation, environmental and crop management, and the farmer’s association. The farmer’s association, otherwise known as the Producer Executive Body, is a representative group of farmers involved with Runa that meets to discuss operations, goals, and grievances. While a pound of guayusa is sold at $0.35 per pound, Runa puts an additional 15% into a Social Premium Fund, which is managed by the Producer Executive Body and is allocated exclusively to community development.

Runa is making a profit through selling guayusa tea, but they are also taking major steps to ensure that their successes are coupled with the successes of those making their product possible. The farmers involved with Runa not only gain access to increased income but also become integrated in a regional social group dedicated to community development. This ensures that they are not only making money but are also included in important decisions and are able to voice concerns. Because of differing worldviews, it can be difficult to navigate through market operations within a society that typically does not function on such terms. During my time working at Runa, however, I observed nothing

They set out not to create a business that would simply make profit, but to create one that would also nurture a better livelihood for guayusa farmers.
Guayusa: Then and Now

Guayusa tea (*Ilex guayusa*) has been grown and consumed by the people of Sapo Rumi for generations. Traditionally, it was consumed during a ceremony before sunrise. Everyone would gather around a fire, and the women would heat and serve the tea while people sang songs and told stories. Dreams from the night before would be shared and interpreted in order to plan the coming day; according to the Kichwas, dreams can foretell anything from a good hunting day to imminent death. Guayusa contains extremely high levels of caffeine and antioxidants, so it was consumed to gain physical strength and prepare for a day of work. Aside from physical strength, Kichwas also believed that guayusa made their spirit strong and increased ability to fight off any bad energy. The plant itself was considered by the people to be very special, with powerful spirit guardians protecting it.

Like most traditional practices, the culture surrounding guayusa and the guayusa ceremony is changing. We wanted to investigate the significance of guayusa tea in a modern-day Kichwa village and formulated research questions to help us understand people’s perception of this tea, what it means to them, and how it fits into their daily lives. In order to address these questions, we used participant observation, interviews, and pile sorts, which is a method of study used to elicit judgments of priority among items of social concern in a cultural domain. This is done by having participants arrange index cards containing culturally relevant concerns such as “clean water” and “family” by order of importance in daily life. Undoubtedly our most valuable method, however, was simply conversing with people in a casual way. We found that we could learn the most while sitting around the dinner table or working side by side in the field; basically, we were able to learn the most about their life by living their life.

We found that although guayusa remains a symbolic and valued part of modern daily life, the culture surrounding it has changed in more recent generations. Our observations and interviews showed that all community members still drink guayusa almost every day, however they do not hold a traditional ceremony and simply drink it with breakfast. They still believe that waking up and drinking guayusa is the best way to prepare their bodies for the work day but have strayed from drinking it only hot and often serve it chilled or at room temperature. Most people describe the physical alertness and cleansing properties of the tea as its most powerful benefits, while only
a few reference the cosmological or spiritual significance of the plant which was important in generations past.

**Cultural and Financial Implications of Runa within Sapo Rumi**

When we arrived in Sapo Rumi, the community was in the very first stages of involvement with Runa. We worked alongside the locals to clear a 50 X 50 meter plot of forest and planted 150 guayusa saplings given to us by Runa. Since the plants are so young and our trip was so short, we were not able to observe the entire process from planting to selling.

However, through both formal and informal interviews, we worked to understand how people view Runa’s operations within the community. For example, when asked about the commoditization of guayusa and the idea of outsiders drinking it, perhaps without full understanding of its cultural symbolism, the vast majority of community members expressed little concern. In fact, they were happy to share their tea and saw it as mutually beneficial; others got to experience the effects of the tea and Sapo Rumi got paid for production.

One older member of the community, who acts as the community leader and medicine man, expressed reservations towards selling guayusa based on cosmological and symbolical reasons. He still supports Sapo Rumi’s involvement with Runa, but worries that if Runa doesn’t treat the people or the plants with respect the guardian spirits of the forest and of the guayusa plants will punish him and Runa. Though only one member of the community expressed these feelings, I believe that his view is significant to the anthropological findings of this study, particularly due to his elevated political and cultural status.

We found that Sapo Rumi’s economy is relatively stable and that most of their basic survival needs are met. Before our research began, we knew little about how much income they earned. Once we arrived, we found that Sapo Rumi’s main economic endeavor was local tourism. Unlike most communities in the area, Sapo Rumi is uniquely suited for tourism because of its natural beauty and small size. Local tourists come from neighboring communities to swim in the lagoon, play sports, and listen to music, and residents are able to charge for entrance at the gate and also operate a small store, which brings in money for each household.
Involvement with Runa as an “Economic Alternative”

During our research we realized that our initial idea of Sapo Rumi’s involvement with Runa as an economic alternative to other economic activities was not entirely correct. Though involvement with Runa would indeed bring extra income to the community, residents explained that they planned to use these extra funds to supplement their tourism endeavor. Along with using the income to build infrastructure, many members of the community were excited by the prospect of being able to bring visitors to the guayusa garden, showing them how it is grown, and explaining its significance to their culture. It is therefore possible that marketing guayusa could actually revive, rather than undermine, some of their fading traditions.

Our initial hypothesis was that, given the means to gain extra income, the community would bypass cattle ranching or other environmentally destructive economic activities. What we learned was that they already had a way to bypass such activities through income gained from tourism and that involvement with Runa could help them make this source of livelihood even more successful. A combination of natural assets, as well as the arrangement with Runa, makes it possible for Sapo Rumi to avoid environmental destruction, even though the Runa initiative does not act as an economic alternative on its own.

Conclusion

It is unrealistic to think that the cultural significance of guayusa would remain unchanged forever. Because of globalization, young people are growing up in a very different world compared to that of their ancestors. Runa is not necessarily accelerating Sapo Rumi’s integration into the global economy, but is instead giving it the tools it needs to survive an inevitable trend. Through involvement with Runa, the community is able to make extra money and also be a part of an activity that celebrates traditional Kichwa culture. Some older members of the community stated that if Runa makes guayusa a popular product in the Western world, they hope that the young people may feel a new sense of cultural pride.

Like most studies, this one remains a work in progress. My partner stayed in Ecuador while I returned home. When he returns, we will be able to answer some of the questions posed at the end of our study: we hope to know how long each harvest will take, and how much the community makes per harvest, taking into account plant mortality. Also, we are interested to
know how the community uses the extra income from guayusa sales to help increase tourism, whether new tourism endeavors will be started, and whether these projects will, in turn, attract more visitors and bring more income.

It remains to be seen whether Runa will continue to function as it does today, with respect for the farmers and indigenous people in the area. After all, even fair trade companies that market themselves as “green” are often compelled to endorse priorities and take actions that are not always in the best interest of the people and communities they purport to serve. Our results nonetheless indicate that should Runa continue to handle business in the honest and considerate way they have done thus far, the project will be of mutual benefit to the enterprise and to Sapo Rumi.

Florida State University’s
Undergraduate Research Journal
is in need of Editors, Designers, and Research Ambassadors.

If you have: undergraduate research experience and solid writing skills or publishing experience, please consider joining our team!

For more information, please visit the Office of Undergraduate Research or send an email to fsurjsubmissions@gmail.com
Obstetrics has changed drastically with improvements from the scientific community, but there are still many places of the world where modern medicine is underutilized. This study compares cultural practices of childbirth and pelvic morphology in industrialized humans and prehistoric humans. Morphological changes in the female pelvis were investigated using the Paleo-Indian population and Windover samples for the prehistoric data, as well as the Tague and Lovejoy samples and measurements from the Midwife Information and Resource Service for the industrialized data. Investigations of ethnographic accounts illustrate variations in birthing practices and facilitate comparisons for successful birthing. Results suggest a narrowing of the birth canal has occurred when comparing industrialized humans to prehistoric humans; thus, modern females may face more difficulty in labor. Moreover, wide adaptability in practices from culture to culture does not suggest a definite successful method, but highlights common procedures spanning groups that can point towards more effective means of giving birth.

In the last century, practices in obstetrics have drastically changed due primarily to the work of Doctors De Lee and Williams, who revolutionized procedures in childbirth and established obstetrics as a form of surgery and crisis management. Obstetrics with modern humans differs from non-human primates in the space and ease of passage during labor, particularly with the necessary rotation of the neonate, the newborn at the time of birth. This results in humans’ increased difficulty and need for attendants during birth, as well as an extension of birthing into a more social context since the time of our early hominid ancestors. The objective of this study is to identify physiological shifts related to childbirth between prehistoric humans and modern humans and to evaluate potential birthing problems from past and current populations.
Differences amongst prehistoric and postmodern humans

Past studies have assessed early hominid pelvic anatomy as being influenced first by bipedalism and later by brain size.¹ Today, there exist dramatic birth canal differences between humans and non-human primates. Other primates’ birth canals are wider anterior-posteriorly, while humans’ birth canals are wider medio-laterally. Secondary to this difference and a direct problem in human birth is that neonatal shoulders exhibit greater width than in other primates. Meanwhile, the birth canal in chimpanzees and gorillas is more than spacious enough to allow passage of the infant.² In one study, an Australopithecine pelvis was compared to those of a modern human and chimpanzee. Results showed that the pelvic morphology of Australopithecus africanus was more similar to the modern female human than to the female chimpanzee. The similar pelvises suggested both the A. africanus and modern humans require rotation of the neonate in the birth canal, but these conclusions are still contested. Researchers advocate that human mechanisms in obstetrics are quite dated and have their roots in ancestral origins.³ Additionally, it seems modern birthing habits have a rather in-depth history. Fossil records suggest that pelvic features of prehistoric and modern humans do not differ that much.⁴ However, in Upper Paleolithic groups, women in labor would frequently move and adjust their position by standing, squatting, and leaning forward to best accommodate the labor process. Labor in an upright position versus lying down allows the woman’s pelvis to create a much easier and navigable passage for the baby to exit through.⁵

History of Birth Process

Clinical studies have centered on the sweeping surge in caesarian rates, noting the mother’s lack of knowledge, familiarity, and ease with the birthing process as primary motivators.⁶ The cultural concept of a ‘normal birth’ is a relatively contemporary notion based on the influx of European and American thought and the introduction of technology. The arrival of the 19th century ended the perception of a birth assisted by a midwife as a natural birth. Intervention by doctors grew to be commonplace, and the implementation of sharp instruments during labor commenced. By the 20th century...
century, hospital births were most desirable due to the attractive procedures for the birth process, such as general anesthesia.9

The main question for this study surrounds how obstetrics has evolved from prehistoric humans to modern humans. Contiguous with this inquiry are the morphological changes that affect the birthing process and what procedures are best suited in obstetrics for modern humans. Thus, we address both the physiological and social aspects of obstetrics simultaneously. The null hypothesis is that the increase in human brain size induces complications on the smooth and swift passage through the birth canal, with maximum difficulty evident in modern humans. Furthermore, the cultural response to these difficulties will demonstrate an increase in medical intervention with both supernatural and clinical elements, and an increase in laissez-faire attitudes for the mother about the birth process, particularly in industrial human populations.

**Prehistoric Humans**

Birthing practices in unindustrialized societies of today shine a light on methods that would have occurred in similarly functioning hunter-gatherer societies of the past. Modern medicine has yet to reach all corners of the world, and rituals and herbal remedies fill the need to attend to human health. Similar to modern medicine, an attendant is present during childbirth; however, the assistance provided may also fulfill social and spiritual needs to ensure a successful birth.10

In many simple societies, the women will work until they can no longer stand the pains of labor. In most circumstances, the mother will be surrounded by the support and love of female members of her family during the birth. It is also normal for young girls to be present at births to demonstrate what is to come for them. Rituals play a significant role in all stages of the birth, but contrast drastically among groups. Whether it is squatting, kneeling, sitting, or standing, some variation of a vertical position is almost always chosen. This posture provides an easier path for the child to be delivered; thus, delivery is relatively short and less painful.11

*The Kankanaly-Igorot*

The Kankanaly-Igorot of Northern Luzon, a Philippine island, utilize practices in childbirth derived from a belief in magic. Throughout the pregnancy, the mother wears a chain of snake vertebrae in the belief that it will prevent complications. Additionally, initial movements of the child are
believed to indicative of the sex of the child. For example, movement on the right side indicates a male child, while movement on the left side indicates a female child.\textsuperscript{12}

At most births, the husband and a female relative accompany the mother. The mother will frequently use a squatting position and brace herself with a nearby window ledge. In some situations, the father plays a significantly more involved role; the mother will sit on his thighs and he will hold her to provide support. This method closely resembles an obstetric chair. The attendant catches the child upon delivery and helps massage the abdomen of the mother to initiate the placenta’s release. The father buries the placenta to ensure wicked spells do not reach the child, thus living a salubrious life. The burial of the placenta is also symbolic for the Igorot perspective on opposites; the child’s life depends on the burial, signifying death, of the placenta. In the days that follow, the umbilical cord falls off and is buried in a similar fashion. However, with males, the cord is buried close to the placenta; with females, it is buried near the house, but far from the placenta.\textsuperscript{13}

\textit{Gold Coast Colony}

In the Gold Coast Colony area of primitive Africa, animal and plant life plays a significant role in the preparation and aftermath of childbirth. Organs from various animals are ingested for ritualistic purposes but cause minimal side effects. Vaginal insertion of the same organs can result in serious scarring and contraction. The mother consumes herbal remedies of various plants to strengthen both her and the child. The maternal grandmother orchestrates the birth, and all other familial female attendants take guidance from her. At the occurrence of a complication, a male priest or herbalist may be summoned; although, his involvement in the process will be strictly non-intrusive and primarily drug based.

Delivery position varies with either squatting or kneeling down, and lubrication with shea butter is implemented upon a slow or tiring labor. Furthermore, assorted berries and animal excrements are placed within the birth canal, which causes the cervix to relax. Yet, there can be serious side effects to this practice; women may suffer sloughing of tissue, bleeding, and blistering. A thick porridge consisting of cassava, corn, or millet provides the mother with strength and is believed to offer more firm contractions. Additionally, ingestion of a form of Azadirachta indica roots aids to prevent postpartum hemorrhaging. Children born in this region generally have low birth weights; however, there is no evidence to suggest malnutrition.
Furthermore, these babies increase in weight much faster in comparisons to European babies.\textsuperscript{14}

\textbf{!Kung San}

The !Kung San in northwestern Botswana manage birth somewhat differently. A clan of women stress to the mother the importance of staying calm, free of fear, and courageous for the safety of her and her child's lives; yet, she faces the actual birth process alone. The mother is expected to recognize the labor pains and remove herself to a more solitary place. The practice of squatting during the labor process is the most commonly utilized in the !Kung society. From there, she must withstand the pains of labor and deliver her child, including the cutting of the umbilical cord. It is not until the child is fully stabilized that she may even tell anyone that she has gone into labor. In most situations, the first cries of the baby are the alert to the community of the arrival of the child. The exception to this practice is the birth of the first child, during which the mother receives assistance from older female relatives.\textsuperscript{15}

Within hours of delivery, the mother returns to the village with the child, introduces them to family members, and begins feeding the infant. This method of solitary labor is recognized as having significant dangers. One account describes a woman that gave birth surrounded by a pack of barking stray dogs. Yet, the reasoning behind these practices is relatively sound. The society acknowledges there is only so much an attendant could do for the mother; furthermore, if persistent cries from the mother are heard, older females in the community will come to her aid. Additionally, past experiences have shown the people that interference can directly lead to infections due to the lack of training of the assistant. Moreover, solitary birth instills a significant amount of courage to persevere and enable the safety of mother and child and is initiated only after a mother has birthed her first child with the aid of attendants.\textsuperscript{16}

\textit{Cherokee}

Cherokee Indians hold the role of midwife to a much greater standard. Near the end of the pregnancy, four women are chosen to attend to the mother. This group is comprised of female relatives, including an experienced midwife. When the mother's labor pains start, she is given a warm concoction derived from the bark of Wild Cherry prunus serotina. A medicine man or woman is called upon, and the attendants remain available to collect any necessary herbal ingredients.\textsuperscript{17}
To begin the process, the attendants may circle the house to ward any interference from witches that may target the child and mother. The mother is normally in some variant of a sitting posture for the birth. In some cases, this involves sitting on the father’s legs. A particular species of fungus is spread on the navel of the child after the cutting of the umbilical cord to prevent disease from arising. When the complication of a slow birth develops, a warm remedy of Impatiens biflora used to cleanse the mother’s external reproductive elements; ultimately it is believed to surprise the child, thus encouraging a speedy delivery. Furthermore, attendants will speak with promises of toys, such as a bow and arrow or a loom, to lure the child out. Once the child is born, one of the attendants will care for and clean the child while the remaining attendants tend to the mother’s needs as she prepares to deliver the placenta. Several remedies derived from the roots Smilax glauca, Tsuga caroliniana, and Platanus occidentalis are used for blood clotting. Depending on how many years in the future he would like another child will determine how many mountain ridges away the father buries the placenta. The mother rests for a few days before resuming her duties with some dietary restrictions in place for several weeks. A female elder in the community chooses the child’s name.18

Ethnographic accounts highlight the unique characteristics evident in each group. Each population, through its own means, strives to utilize traditional practices that will prove most successful for the health and lives of both mother and child. While there are many differences around the world, these women share exceedingly similar skeletal structures; therefore, it will not come as a complete surprise that there are commonalities in practices among populations. Social interaction and attendants are particularly persistent in several of these cultures with an exception in the !Kung San. Herbal remedies and birth postures prove to be the most common aspects of variability in comparing populations. These ethnographic accounts demonstrate birthing practices that are comparable to those of prehistoric humans.

Modern Birthing Practices
Fertility and childbirth have played major roles in societies for much of human history; however, it was not until the early 1500s that Eucharius Rosslin’s The Rosengarten, the first obstetric textbook, was available and met great popularity in urban areas. Obstetricians became the primary care facilitator for women in labor, while the midwives were summoned only in complications, contrary to their roles in early history. The Rosengarten
allowed men, as doctors, to enter the birth process, which before this point was quite rare. Hugh Chamberlen was a doctor stemming from a long family line of obstetricians and was the originator of the Chamberlen forceps. Compared to modern forceps, these had a curve to fit the baby’s head but not to fit the pelvis. William Smellie made improvements to the forceps and also established procedures that are still used today for using the tool. In the 19th century, maternal mortality was particularly high; women faced epidemics that made them too weak to survive childbirth. James Young Simpson, the physician to the Queen of Scotland in 1847, developed the model of obstetric forceps that is still used today and experimented with chloroform as a means of anesthesia. Caesarian sections first began to appear in the mid 1700s and were performed without anesthesia, frequently resulting in hysterectomy.19

The 20th century drew attention to the need for antenatal care. Additionally, the vacuum extractor was invented in Sweden and was shown to cause less damage internally to the mother. A breakthrough in antibacterial solutions improved childbirth by preventing infections and ultimately saving lives. The implementation of drugs to prevent hemorrhaging was soon to follow. Moreover, the 20th century saw a shift in attention to the child as more technology was developed to monitor the child’s progress during the pregnancy.20

The shape of the female pelvis exhibits many of the complications women face in childbirth. In comparison to other related species, humans face more difficult birthing biomechanics. The human birth canal is widest in its transverse dimension, while other primates have a wider sagittal dimension (Figure 1). In contrast to the human pelvis, the pelvises of the great apes, labeled in Figure 1 as Pongo, Pan, and Gorilla, show a significant difference in the ratio of infant head size to pelvic size. The head of the infant is at its maximum in the sagittal dimension for both non-human primates and humans. The massive breadth of a human child’s shoulders upon delivery poses an additional complication. To allow the child to pass through the outlet of the pelvis, the fetal head must be arched such that the occiput, or the back and lower part of the cranium, lines up with the pubic bone, rather than with the sacrum, the triangular bone at the base of the spine, as in non-human primates. Due to this difficulty, human mothers are unable to catch the child themselves as it is birthed. Consequently, an extreme care of maneuvering in rotation and flexion must occur for the child to make it through the outlet; thus, many children are born facing posteriorly rather than anteriorly, which occurs in other primates.21
Caesarian rates have seen a significant increase across the world in the last fifteen years, particularly the more industrialized areas. The global caesarian rate was at 25.7% in 2010, with a 43% rate in Mexico and a 33% rate in the United States, and the rate is on a continuously sharp rise.\textsuperscript{22} In many cases, caesarian sections were implemented although the mother was not at risk and/or had not approved the procedure. The rise in rate can be attributed to many possible factors, such as an increase in payment and less risk of malpractice for doctors, as well as greater turnover of patients in the hospital. Past studies show that women with private insurance are more likely to have a caesarian section than indigent women. Cases are appearing in the United States where there is no risk to the mother, but a caesarian section is still performed. Furthermore, a caesarian section has the potential for side effects that will affect the mother’s next birth, such as rupture of the uterine scar.\textsuperscript{23}

Home or “natural” births have re-circulated into western culture, but still face some skepticism. These practices have been labeled as primitive,
feminist, or spiritually based; however, they can represent a holistic approach to childbirth. By World War I, childbirth had acquired a primarily pathological approach. The return of natural childbirth peaked with the belief in an overly civilized world; women had lost touch in their health, and suffered extensive and painful labor as a result. Many women across the world are choosing what they deem to be a more satisfying birth with less medical interference and lower costs. The Netherlands is the current leader in home births, with 30% of all births occurring in a domestic setting. While home birth has a stigma of being less civilized, studies in the United States show no difference in neonatal mortality rates than in a hospital.

Childbirth has transformed significantly in more recent history. Improvements in tools and new knowledge have improved medicine, and during this time, childbirth was enveloped into the domain of surgery. Now, even healthy women may face surgical procedures before, during, or after labor. Some women have sought out alternatives methods, such as home births or birthing centers. The ultimate goal is the security of the lives and health of mother and child, but medical professionals debate on which measures are the most successful.

Materials and Methods
This thesis project focuses on the comparison of modern-day humans and prehistoric humans. Pelvises from females in the Windover population, site 8BR246, housed at the Florida State University Anthropology Department were utilized to gather data on a prehistoric population, while ethnographic data on birthing practices was used as a social proxy. In a qualitative approach, a review of ethnographic accounts included as part of the comparison of prehistoric human practices to modern birth practices. This population was a hunter-gatherer society and originates from a site in Brevard County, Florida dating 8,522 to 7,421 years ago. Five fully intact female pelvises, including two young adults, two middle-aged women, and one older woman, were used to gather measurements.

Measurements from this population were collected using a tray and fish tank gravel to provide stability of the subject, and calipers and measuring tape to determine the dimensions. Additional pelvic data were derived from a study by Tague and Lovejoy, and from the Midwife Information and Resource Service. Main dimensions of significance are sagittal and transverse (Figure 2). Measurements were taken from three planes: inlet, midplane, and outlet. The inlet is the most superior plane of the pelvis, the
outlet is the most inferior plane of the pelvis, and the midplane is situated between the inlet and outlet. Sagittal measurement is taken from the most posterior aspect of the sacrum to the most anterior aspect of the pubis. Transverse measurement is taken from one lateral side of the plane and continues through the medial aspect to the other lateral side of the same plane. Pelvic dimensional data was utilized to conduct quantitative analysis.

**Figure 2: Diameters of the pelvic brim**

SPSS software was used to conduct statistical computations and comparisons among the different pelvises. Descriptive statistics were initially run to determine mean, median, and standard deviation of the data. The Mann-Whitney U statistical test was used to conduct a non-parametric test and to examine significance in difference between the groups.

**Results**

**Dimensional Data**

Table 1 shows the descriptive statistics for the pelvic dimensions of the Windover population. Variables below include the sagittal and transverse dimensions of the inlet, midplane, and outlet. The application of the Mann-Whitney U test showed low p-values in each comparison of dimensional plane. Therefore, it can be suggested that there is a relatively significant difference between dimensional planes in the Windover and modern samples. Due to the small sample size, a p value of .10 was used to compensate for standard error.
Table 1: Statistics for Windover Population

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet- Sagittal</td>
<td>95.25</td>
<td>127.00</td>
<td>108.59</td>
<td>12.78</td>
</tr>
<tr>
<td>Inlet- Transverse</td>
<td>119.00</td>
<td>144.00</td>
<td>131.63</td>
<td>8.96</td>
</tr>
<tr>
<td>Midplane- Sagittal</td>
<td>101.60</td>
<td>127.00</td>
<td>114.30</td>
<td>9.79</td>
</tr>
<tr>
<td>Midplane- Transverse</td>
<td>123.83</td>
<td>146.05</td>
<td>133.99</td>
<td>9.09</td>
</tr>
<tr>
<td>Outlet- Sagittal</td>
<td>95.25</td>
<td>120.65</td>
<td>111.76</td>
<td>10.63</td>
</tr>
<tr>
<td>Outlet- Transverse</td>
<td>111.13</td>
<td>152.40</td>
<td>129.16</td>
<td>18.02</td>
</tr>
</tbody>
</table>

The following scatterplots (Figures 3, 4, 5) display the sagittal dimension on the y-axis and transverse dimension on the x-axis. The plotted points represent each individual in the data set. Individuals are given abbreviated labels distinguishing their source. Labels with the abbreviation “WS#” denote samples of the Windover population, while “MIDRIS” and “Lovejoy” are modern human samples from the Midwife Information and Resource Service27 source and Tague and Lovejoy28 source.

In studying pelvic morphology, samples from the Windover population and previous studies were utilized for comparison. As seen in Figure 3, the inlet dimensions of the modern pelvises are relatively similar to those of the Windover population. Yet, figures 4 and 5 show distinct differences in midplane and outlet dimensions between the two groups. Figures 4 and 5 show an increase in sagittal dimension and a decrease in transverse dimension in the midplane and outlet for the modern population. The Windover population demonstrates a larger sagittal dimension and a larger transverse dimension in the midplane; the outlet measurements are relatively distributed in low and high sagittal and transverse dimensions. These results suggest a decrease in the transverse dimension and a narrowing of the modern human pelvic cavity from inlet to outlet. As seen in Figure 1, the size of the neonatal head already makes for a tight fit through the birth canal. The cranial breadth is pushing the capacity of the sagittal dimension of the female pelvis. Any decrease in size of the canal would initiate more complications and put both mother and child at risk.
Figure 3: Scatterplot showing dimensions of the pelvic inlet

Figure 4: Scatterplot showing dimensions of the pelvic midplane

Note the difference between Lovejoy, MDIRS, and Windover samples.
Ethnographic Accounts
A review of ethnographic accounts was included in this study. The recordings of George Julius Engelmann in Labor Among Primitive Peoples were utilized to illustrate the percentage of birth postures in use across the world. Engelmann’s data demonstrates the usage of five different birthing postures as recorded in Labor Among Primitive Peoples. His recordings are somewhat dated since they were published in 1882. These percentages are inclusive of populations from all continents and include surrounding islands (see Figure 6). Engelmann’s work provides a thorough summary of practices witnessed in ethnographic accounts.

Figure 6: Birthing postures, worldwide

Source: Engelmann’s Labor Among Primitive Peoples, 1882.
Discussion

This study set out to look at changes in birthing practices, morphological changes to the pelvis over time. Ethnographic accounts were gathered for comparisons of birthing practices and postures.

Pelvic data demonstrates differences between the Windover and modern human samples. Comparison of the transverse dimensions showed decreases in the modern samples, resulting in a more narrow shape. This transformation in form would obstruct a smooth neonate passage and intensify the labor process. The size of the infant's head poses evident problems for ease of fitting through the mother's pelvis. Rotation and flexion would have to be implemented to squeeze the child through such a constricted passageway.

The ethnographic data derived from Engelmann's work suggest the largest percentage of the global population delivered their children in a kneeling posture, with standing posture coming in second. A recumbent posture, meaning lying down dorsal inferiorly, was found to be used least often of the birthing postures. Ethnographic accounts also place a strong contrast between mothers in primitive settings and mothers employing modern medicine. In many primitive cultures, close family or female relatives support the birth process; however, the success of the birth is in the hands of the mother. On the contrary, birth in modern hospitals is completely at the hands of the physicians and nurses. The mother is not always aware of what is occurring within her body. When a complication arises, she may not be informed or may not be asked her opinion on the matter. The medical staff frequently makes a quick decision on how to best handle the risk at hand. Births in primitive societies are relatively shorter, and mothers can resume their normal lives reasonably soon. Primitive societies also value superstitions and ritualistic practices unique to their group that they deem crucial to the success of the birth and ultimately the life of the child and the mother. Births in hospitals can provide more security for the mother and child; necessary equipment and medicines are readily available at the time of a complication.

Other ethnographic accounts illustrate practices unique to several dissimilar and spatially contrasting populations. Some methods hold distinct and somewhat appalling measures to a western perspective. In some instances, plant extracts are applied orally or vaginally to alleviate initial and prolonged pains resulting from the birth, as seen in the Cherokee Indians and the Gold Coast Colony. An additional, remarkable tradition is the
husband’s role as not only emotional encouragement, but also as physical support as his thighs function as a chair for his wife to sit on during birth, as seen in the Kankanaly-Igorot. The placenta and fluids from the birth also hold a particular stigma to the community and must be disposed of in accordance with each group’s unique rituals. Attendance and personal responsibility in the process are extremely important themes across differing cultures.

**Conclusion**

The success of the birthing process is fundamental to the continuation of our species. It is a topic that attracts a great deal of attention with recent increases in cesarean rates and with some families’ choice for natural births. This study was effective in identifying variations in practices for a prosperous birth. Quantitative analysis of pelvic dimensional data was also able to show variations in the birth canal size. Therefore, it can be suggested that morphological changes in the female pelvis may add to increased complications. It is inconclusive as to what specific practices, if any, are most beneficial to mother and child. Variability in mother’s health, infant’s health, mother and neonatal body size, and birthing posture can all play significant roles in the feat of a birth.

**Limitations of the Study and Future Research**

Due to the limited data sample size, an analysis with more extensive data of prehistoric and modern human pelvises would provide for an improved study in the future. Based on Bergmann and Allen’s rules, an additional interesting variable could be implemented on how populations in fluctuating climates may possess differing pelvic dimensions. Qualitative data in the form of interviews with currently practicing physicians and midwives would be beneficial. Furthermore, maternal interviews would provide tremendous additional insight into childbirth complications and female involvement in births.
Rosenberg and Trevathan, 1199-1206.
Parente., 1-11.
Liston, W.A. 2003, Rising caesarean section rates: can evolution and ecology explain some of the difficulties of modern childbirth?. Journal of the Royal Society of Medicine, 96:559-561.
Kohnen, 768-777.
Goodman., 56-64.
Konner and Marjorie, 11-28.
Olbrechts, 17-33.
Drife, 311-315.
Rosenberg and Trevathan, 1199-1206.
Niino, 139-150.
Gibson, 266-268.
Engelmann, 51-227.
Ibid., 51-227.
Ibid., 51-227.
Ibid., 51-227.
Olbrechts, 17-33.
Goodman, 56-64.
Kohnen, 768-777.
I attempt to make sense of what I see around me in my work, and this consists of internalizing observations, letting them mingle with personal experience, and placing them in a rationalized space. What results is something a bit disjointed from everyday reality becoming its own separate reality. Characters are then placed within these realms to react to the space, with the characters usually contained to their own musings and ignorant of the outside. This allows viewers to watch the characters just as scientists watch lab rats, judging and questioning their every move.
By Hand and By Machine: Exploring Furniture Design Evolution

Department of Interior Design
with support from the Donghia Foundation
and the Facility for Arts Research
Students in the Department of Interior Design explore diverse techniques for designing and fabricating custom furniture. This particular project results in each student creating one table and two containers. Small-scale models prepare students for digital production of their plywood table prototype. The pair of containers is then handcrafted in solid hardwood.
The design process begins with an introduction to rapid prototype production provided by the faculty and staff at the FSU’s Facility for Arts Research (FAR). Students learn the particular approaches to, and limitations of, furniture production using Computerized Numerical Control (CNC). Additionally, students gain hands-on experience with the vital aspects of wood-working, including tools, construction, and materials. With this combination of theory and practice, students begin developing concepts for functional tables and containers. Schematic designs include multiple sketches in both miniature and full-scale.
Special Thanks to...
Dr. Marlo Ransdell
Lauren Trujillo
Jeff Smiley
Sebastian Engel
Marci Tempesta
Kelly Platko
Eva Caro
Jon Juilianna
Exploration of the varied possibilities in proportion, scale, aesthetic detail, and joinery design is conducted in AutoCAD and/or Revit. These computer programs are then used to generate the small-scale, laser-cut prototypes. These prototypes provide students with realistic assessments of the advantages and constraints of their specific design, which is progressively refined through additional small-scale prototypes.

After review by both the Facility for Arts Research and the Department of Interior Design, students begin full-scale fabrication of the furniture designs. Over the course of three weeks, final models are produced using domestic maple plywood and a ShopBot CNC router table. The final and longest stage of the design process takes place in the Department of Interior Design woodshop where students hand-craft their paired containers out of walnut, maple, ash, and/or cherry hardwoods.
Through my work I have attempted to neither incite nor visually describe the sensation of the sublime, but to promote the search for such things.

Contemplating the roots of adventure, and what is to be gained by such a seemingly frivolous task, I came to the conclusion that the urge to be overwhelmed by any kind of wild is usually done with hopes of experiencing the sublime.

While taking into account the historical ways in which the sublime has been represented in visual culture, I explore how it fits into contemporary art and society as a whole. I have found that many aspects of American new age movements, as well as 1960’s counter-culture, parallel the underlying thought processes about the sublime addressed in the romantic paintings of the nineteenth century and the abstract expressionist movement in late mid-century America.

I have culled these sources for visual and conceptual cues to better represent something which I hope to be both timely and lasting, a sublime which I believe is universally relevant to everyone experiencing this human condition in which we all take part.
THE FANTASTIC AND ILLUSORY WORLD OF SPAM®:
HOW MARKETING PROMOTES DECEPTIVE AND DESTRUCTIVE “FOOD”

JORDAN MacKENZIE
Faculty Advisor: Dr. Carla Marie Reid
Department of Religion

Jordan MacKenzie is pursuing a double major in French and Interdisciplinary Humanities, with a minor in Linguistics. He studies chiefly the conveyance of meaning in social discourse through proverbs and propaganda and hopes to pursue graduate studies in Linguistics.

Faced with the consequences of the industrialization of agriculture taken to the extreme, the nature of food itself must be reexamined from various nutritional, functional and philosophical standpoints. This essay gives an introduction to the practical and legal aspects of food marketing in the US and considers SPAM® from multiple angles. Post-modern Marxist thought is introduced to propose the notion that the collusion of industry and greed coupled with general obliviousness has given rise to a repressive state apparatus that has no shame in calling nearly anything “food” and can only be addressed effectively by informed consumers.

In a contemporary context, the basic perceptions of food cannot be appreciated without an examination of marketing and the two domains of what a food product is and what the food industry says it is. This is the central question of this examination, which will also consider the marketing, societal role, and nutritional aspect of SPAM®. Furthermore, a background of the conceptualization of marketing and efforts to regulate food labeling will be established. All of this will culminate in a philosophic consideration of the role of marketing in society and also answer the central question of the research.

What is Marketing?
Surprisingly, the notion of marketing is not wholly monolithic and there exist several conceptualizations of what it entails precisely. According to Darrah, an early 20th century theoretician of food marketing, possible
understandings of the term can be 1) what comes of a product after it leaves the original owner, 2) any change that occurs to a product or, 3) whatever change the product undergoes from the time it leaves the possession of the original owner until is eventually purchased by a consumer.¹ For this examination, ‘marketing’ will be taken to entail any change that is made to a product, whether internally or in its form of containment, so as to compel a transaction between a producer or seller and a consumer.

**Advertising and Packaging**

This examination hinges on two central aspects of marketing: general advertising and packaging. Darrah explains that “packaging, rather than being a necessary evil, is a necessary component of an effective sales program. Good packages protect and display the product, provide convenience in buying the item, and appeal to the customers.”² It is important that within any study of food and marketing that the packaging is considered an essential component from the health standpoint, which is also the domain in which the government is most likely to intervene. The Food, Drug and Cosmetic Act of 1938, which replaced the original Pure Food and Drug Act of 1906, is the central legislation that maintains that packaging must keep food safe for consumption and demonstrate the actual amount of product being purchased.³ Though this is a broad national regulatory instrument, individual states can make further regulations as they see fit. The legislation of 1936 is still the cornerstone of legislation for food safety and packaging regulations. Yet it has been amended as recently as 2011, when greater provisions were put in place within the broad category of “food safety.” Of forty-two sections in the most recent amendment to the original act, ironically only two address food safety issues that could be posed through elements introduced into the food: sec. 106. Protection against intentional adulteration (which addresses the threat of food contamination within the context of terrorism) and sec. 113. New dietary ingredients (which states that products cannot contain anabolic steroids if their presence is demonstrated as a legitimate risk).⁴ The reasons for which the mention of nutritionally detrimental preservatives and additives has not been included in either section will be delved into later. It reveals an uneasy balance between government and industry, in which industry arguably has the upper hand.

In 1975, Jim Hightower, a consumer rights advocate, maintained that advertising in the United States had become a process whereby the object was in no way to prepare consumers to make informed or educated decisions at the grocery store, but rather to simply have them recognize a brand and buy
According to his assessment, it is rare that advertising reveals much of anything about the product itself. Instead, it relies on a catchy tune or slogan as a means of implanting a product in the public’s conscious or subconscious with the aim of achieving greater profits. This underlines the entire competitive aspect of the market, as the ability to “win” coveted shelf space in a grocery store often hinges on the demonstrated success of a product, which is often tied to how it is marketed. Hence, the promotional budget of a product will likely determine its overall success. This system, which Hightower termed the “oligopoly of the shelves,” thus makes it difficult for small companies with low budgets to thrive. Granted, when supermarkets have tremendous capacities to produce and market their own generic versions of specific brands, it has been observed that, “manufacturers [have] lost control of their brand,” demonstrating that the oligopoly paradigm does have some limitations. Yet it remains constant in this paradigm that within the large market, small operations are at a severe disadvantage and generally can only “survive” by either consolidation or acquisition by a larger parent entity.

Another central aspect of advertising is the marketing scheme of “tinkering and littering” or “product differentiation,” which entails giving a product the illusion of continued improvement for the good of the consumer but “amounts to little more than frequent and meaningless design changes.” The impetus of these schemes is a need for continued consumer interest in a product. This makes sense within the construct of the “oligopoly of the shelves”, as any sudden loss of interest or notion of a product as “outdated” could be fatal for the venture. Stores want to stock the shelves with products that will be purchased rapidly, as they too have a vested interest in generating the greatest amount of revenue in the shortest amount of time.

Duplicity in Marketing: Regulation, Health Claims, and “Functional Foods”

Marion Nestle, professor of Nutrition, Food Studies and Public Health at New York University, explains that anything fit for human consumption...
undoubtedly has some health “benefit.” Without any strict and honest regulations, various companies create arbitrary claims that are generally logical but so broad as to approach insignificance. Furthermore, Nestle identifies an entire subgenre of “functional foods” created solely with the intent of marketing them according to a health claim.\textsuperscript{11} She exposes most of these products as having negative consequences for health, yet within the absurd domain of the “lesser evil” they can be quasi-demonstrated to be, by comparison, “healthy.”\textsuperscript{12} Governmental regulation is the mechanism that can most effectively limit this frenzy of disingenuous marketing schemes. Essentially, the Nutrition Labeling and Education Act (NLEA) of 1990 set a precedent whereby virtually any health claim, legitimately substantiated or not, could appear on a label. The law achieved a level of ambiguity that presented consumers with the illusion of healthy products. This clever and obfuscatory process had tremendous benefits for the food industry.\textsuperscript{13} The back-and-forth that ensued between the FDA, USDA and industry served to pit the tremendous power and capital of the industry and its lobbyists against disinterested health experts. One needs only to examine the resulting large-scale deregulation to determine who had the most sway over the final law.

What is SPAM®?

Now that a sufficient background on labeling, nutritional dilemmas, and other basic considerations of marketing has been provided, the examination benefits from delving into the existential comparison of what food is as opposed to what we are told it is. SPAM® is located, in the case of Publix Supermarkets, on the central fifth aisle, along with, as listed on the placard at the top of the aisle: cookies, crackers, canned meats, soups, and candies. Ironically, according to the Centers for Disease Control and Prevention, crackers, soups and meats are unambiguously among the top-ten foods that contribute to an excess of sodium in the diet of 90% of Americans. A recent report details that the “average person consumes about 3,300 milligrams of sodium per day, not including any salt added at the table, which is more than twice the recommended limit for about half of Americans.”\textsuperscript{14} Essentially, aisle five is a hotbed for the dissemination of salt to American consumers, many of whom are likely being sold some of these products via illusory yet wholly legal health claims.

The three varieties of SPAM® available at Publix will be taken as exemplary cases in marketing, branding, differentiation, and “health” claims. A 12 oz. can of SPAM® costs, as of April 2012, $2.93. The three varieties in consideration in this examination are SPAM® Classic, SPAM®
LITE and SPAM® 25% LESS SODIUM. From a purely aesthetic standpoint, the labels feature the name of the product in large yellow letters against a dark blue backdrop. SPAM® Classic is actually a bi-lingual reversible tin, the English side featuring a SPAM® burger and the Spanish side showcasing a tin worth of SPAM® that has been scored and spiced so as to resemble a holiday ham. The LITE features a salad with lettuce, carrot slices, radishes, and cubes of SPAM®. The 25% LESS SODIUM features a pasta salad of broccoli, cauliflower, celery, red peppers and SPAM®. The reverse of the reduced-sodium varieties contains a promotion that suggests “Just add SPAM®…Break the Monotony™” and features a grilled cheese sandwich and scrambled eggs to which SPAM® has been added.

The marketing scheme apparent here is not simply the attempt to sell a canned meat product; it is rather the presentation of an entire food context made possible by SPAM® and, as evidenced by just three cans, at least six possibilities as a food item. The trademark, “Break The Monotony™,” even goes so far as to imply a social and personal dimension to the food; it has the ability to give life a new and exciting variety that it otherwise lacks. This social dimension is evidenced in the non-academic novelty book, SPAM® A Biography, which dedicates a section to “Meating [sic] the Nonfood Needs of SPAM® Eaters” and features Swiss army knives, phones, flip flops, and even snow globes that in some way incorporate the SPAM® marketing scheme.15

A pivotal consideration at this point is the branding of SPAM®. As SPAM® is not simply a canned meat per se, it could be argued that it constitutes its own category among food types, that of “SPAM®.” Furthermore, due to extensive blending and introduction of non-food elements, SPAM® could also be argued to entail a preliminary “non-food” item.16 According to the Hormel website,

No single product in history is better known for its heroics during wartime, its accomplishments during peacetime and its popularity during mealtime than SPAM® classic. After more than seven decades in the marketplace, the SPAM® family of products is still the tasty, high-quality kitchen staple made of 100 percent pure pork and ham that the world has come to know and love… The SPAM® family of products are great for yesterday, today and tomorrow. Give it a try, and find out why.17

It is abundantly clear that this is not simply a product, but a vital facet of US and global culture. By consuming it, individuals are given the highly polished impression that they are figuring into something bigger than themselves. SPAM® is not so much a canned meat product as an indispensable
component of a complex social environment that invokes a shared human experience. Even the SPAM® website in this respect does not emphasize the food, but rather creates an alternative reality in which the product almost occupies a subliminal place among pop culture references, social media, and electronic games.\textsuperscript{18}

Refocusing on the product itself, SPAM® is arguably the epitome of the modern convenient food. It is lightweight, portable, does not expire until three years after canning, and according to the label is “fully cooked, ready to eat—cold or hot” and can be fried, baked, microwaved, or grilled. Hormel describes SPAM® Classic as “The Miracle Meat of a Million Uses.”\textsuperscript{19} This marketing scheme, coupled with virtually no generic store brand competition, promotes product recognition and accounts for the longevity of the product in the market.

**Nutritional Content of SPAM® and the Absurdity of “Differentiation”**

In \textit{Spam® A Biography}, which takes a pre-emptive apologist/novelty platform, the section on “What’s in there” states, to the point of absurd comedy:

Perfectly rectangular, pansy pink, soft and mushy, Spam is like nothing found in nature. No wonder people are nervous about its ingredients—a nervousness that comes out in joking speculation that it contains ‘everything but the squeal.’ The truth is that by modern-day packaged food standards, Spam has a very short, and not at all scary, ingredients list.\textsuperscript{20}

Notwithstanding the radically altered aesthetic and moral system conveyed, one must consider why a product would have to make justifications for the ingredient content. Directly to the left of the word “SPAM® Classic” the seemingly innocuous enumeration of “Pork with Ham, Salt, Water, Potato Starch, Sugar, Sodium Nitrite” appears. Interestingly the two differentiated varieties both contain this slightly altered set of ingredients: “Pork with Ham, Mechanically Separated Chicken, Water, Salt, Modified Potato Starch, Sugar, Sodium Phosphates, Potassium Chloride, Sodium Ascorbate, Sodium Nitrite.” Ignoring the fact that a product selectively marketed as pure pork indeed contains chicken, it is evident that the reductions of sodium have been accomplished through the introduction of even more non-food items. Hence one arrives at a strange consideration of what is “healthier”: a product ridden with salt or a differentiated version with less salt but even more preservatives? This recalls Nestle’s argument of “lesser
of two evils.” When personal health is at stake the most informed decision seems to be forgoing both products, yet when ignorance of the detriments of sodium and excessive preservatives is coupled with a tight budget, a bad choice is inadvertently going to be made as the vast majority of affordable products made available by the industry contain large quantities of both.

Though the three tins of SPAM® are marketed using very different schemes, a quick glimpse at their nutrition facts labels reveals they are, largely, the same product. SPAM® LITE proclaims on the label, “50% less fat 25% less sodium 33% fewer calories…than SPAM® classic.” Yet, in marking the difference of the product against the standard version of the product, what is established about nutrition independent of arbitrary comparison? It is as if SPAM® Classic has been accepted as the standard and because differentiated varieties cut back on their respective salt content they are, by natural consequence, healthy. Of course Hormel Foods is in no way brazen enough to explicitly suggest a health claim; however, words such as “less” and “fewer,” used in the branding of SPAM® products, implicitly suggest a parallel to a healthy diet.21 The sole difference between SPAM® classic and 25% LESS SODIUM is the sodium content, which as explicitly stated on the bottom of the label, “has been lowered from 790 mg to 580mg.” Thus, a 2 oz. serving contains just 24% of the recommended DV of sodium as opposed to the original 33%.22 The rationale for loading foods with salt is itself quite explicit. In the words of an anonymous expert in the industry, “The more sodium you add—and it’s cheap to do that—the more you help the flavor.”23 In reducing the salt content of a food already saturated with it, the industry is able to maintain the extended shelf life and flavor of a product and appear concurrently to conform to official standards of health. Because of this system of obfuscation foods like SPAM® occupy a realm in which illusions of tasty, convenient food and nutrition collide and are readily accepted by a public hypnotized by marketing.

Philosophic Appreciation of the Question of Marketing and Existential Consideration of Food
Though on the surface wholly unrelated to the subject of food production and marketing, the philosophy of Louis Althusser, a French structural Marxist, provides a supplementary perspective to the purely nutritional and economic assessment of SPAM® presented thus far. In his formulations of ideology, discourse, and repression, every individual has an imagined relationship to reality, which is in turn embodied in a collective ideology.
of the entire society. By extension, ideology itself is an entire structure of disparate representations, which does not find a basis in reality but is nonetheless imposed on society. A similar assessment of his theory states that for him, “ideology comprises the stream of discourses, images and ideas that are all around us all the time, into which we are born, in which we grow up, and in which we live, think and act.”24 Above all ideology is conveyed through what seems manifest, what is regarded as common sense. In the final assessment, ideology is simply a means of making sense of the world. To this end it is suitable to conceive of food as another form of ideology, especially in a context in which the nature of food, as defined by illusory and duplicitous marketing, bears no resemblance to what food actually is. Yet, as revealed within this examination, several constructs working in concert maintain within collective ideology the notion that ground-up animal protein mixed with a plethora of chemicals and placed into a can is food.

Should the question “but how?” arise, a suitable explanation is also provided in Althusser’s assertion that ideological apparatuses exist as a means of reinforcing ideologies, whether they be logical or completely inane.25 As marketing appeals to social conformity and vague notions of nutrition, it necessarily serves as such an ideological apparatus and effectively reinforces discourse that allows for the continuation of social and economic dominance by manufacturers of food items such as SPAM®. The dominant apparatuses in the American food supply are evidenced by the types of products for sale in the grocery store. This is a reflection of cultural hegemony, itself another means of reinforcing discourse. The marketing of food is also an effective tool for building on cultural assumptions, reinforcing socio-economic hierarchies, and maintaining monopolistic schemes.

**Personal assessment of the question**

Hightower, the consumer rights activist, wrote in 1975 that declines in the food system were present and even more were on the horizon. He said cleverly, “It is not that food firms are trying to produce bad food. Rather they are not trying to produce good food.”26 Food is just one half of what should be an intensely personal and meaningful relationship. When industrial agriculture and mechanized food production is coupled with notions of nutrition that wholly contradict common sense, food becomes nothing more than sludge hardly fit for human consumption. This unholy union requires a degree of spiritual and social revolution whereby the dignity of man and his food is reclaimed. Thus the repressiveness of inauthentic marketing that
holds up the immoral food producers would be thoroughly exposed as a scam. Duplicitious marketing creates a world of wonderful yet tragically false images. However, this illusory world is annihilated every time an informed consumer decides not to buy into that scheme. Food is what we make it and what we say it is. SPAM® is thus only food if we actually accept such a ridiculous notion.

2 Ibid., 242
3 Ibid., 241-242
5 Jim Hightower, Eat Your Heart Out: Food Profiteering in America (New York: Crown, 1975) 112.
6 Ibid., 124-125
8 Roberts, 264-265
9 Hightower, 122
10 Hightower, 124
11 Marion Nestle, Food Politics: How the Food Industry Influences Nutrition and Health (Berkeley: University of California, 2002) 315.
12 Ibid., 333
13 Ibid., 250-260
16 Ibid., 1
20 Wyman, 33
21 Nestle, 39
22 Centers for Disease Control and Prevention, 2012
23 Roberts, 49
25 Ferretter, 82-85
26 Hightower, 74
I am interested in creating mellow, almost meditational visual experiences through video. Through the use of an editing technique called ‘datamoshing,’ I became aware that the imagery I was creating is reminiscent of video games from my youth. The visual anomalies created through this process provide a visual stimulation overload, which befits and references my generation: a generation that watched cartoons every day at home and used computers and the Internet both as aids in learning and as a way to connect with others.

*Telephone* is a short film that juxtaposes the telephone as the old way of communicating with this highly manipulated new style of communication. The glitches and awkward rhythms remind me of myself trying to communicate with new acquaintances face to face after having grown up learning how to communicate through a screen. This social anxiety that current future generations will experience, is a problem. I find myself wondering if the communication style of “the good old days” was better for interpersonal relationships.
Parents welcome smiles, vocalizations, gestures and the arrival of first words as they track their children’s early communication development. The first three years of life are the most important years for language development as children learn to use communication to interact with others, participate in social exchanges, learn about the world surrounding them, and gain new information. While the study of communication has been a focus of developmental research for decades, recent findings have added to our knowledge base about what children learn, when, and importantly, how interactions with caregivers support their growth and development.

Children with developmental delays and impairments may develop...
communication skills at a slower rate compared to their typically-developing peers. Parents and other caregivers can use language intervention strategies to effectively increase communication skills for young children with communication impairments. However, the impact of different activity contexts on caregiver-implemented communication intervention within a child’s natural environment has not been examined in the research literature. The present study examined the communication skills of toddlers with Down syndrome as they engaged in daily routines with their caregivers. More specifically, the frequency of communication acts across routine types and the differential effects of various settings were investigated.

**Language Development in Down Syndrome**

Down syndrome is a chromosomal abnormality caused by the presence of trisomy on chromosome 21. Trisomy refers to the presence of three copies instead of the typical two copies of all or part of chromosome 21, the smallest human chromosome. Due to this abnormality, overall cognitive and communication development is slower in children with Down syndrome. In addition to language difficulties resulting from cognitive impairments it is common for children with Down syndrome to have additional challenges such as facial hypotonicity (low muscle tone), oral structural impairments, reduced nasal resonance, recurrent otitis media (ear infection), hearing loss, and/or motor planning difficulties. These cognitive and physical issues may inhibit the ability to produce and fine tune speech production and result in expressive language delays characterized by reduced speech intelligibility, short phrase length, and limited vocabulary.

**Early Intervention for Children with Down Syndrome**

Early intervention (EI) describes services and supports for children age birth to three with developmental delays or disabilities and their families. For young children with communication impairments, the aim of EI is to improve communication outcomes through participation within natural environments. Communication intervention strategies that are naturalistic, or embedded in the context of everyday activities can increase

The aim of early intervention is to improve communication outcomes through participation within natural environments.
opportunities to practice intervention outcomes through teaching and learning interactions with caregivers. By following their child’s lead, frequently sharing conversational turns, and commenting on their child’s focus of attention, caregivers can support communication skills in everyday activities.

For children with Down syndrome, environmental factors, attention, response to communication attempts, and the use of intentional intervention in functional activities can result in increased communication outcomes if implemented consistently.

Incorporating communication opportunities into daily routines provides a predictable, meaningful framework to embed communication intervention, and increases opportunities to participate in a given daily activity with caregivers. Early intervention for children with developmental disabilities including children with Down syndrome can result in increased caregiver use of intervention strategies in daily routines, which in turn then increases opportunities for children to practice intervention targets.

An important aspect of embedded communication intervention is the context, or activity setting in which caregivers and children participate. Activity settings consist of naturally occurring everyday experiences in which children interact with preferred and familiar activities and routines. Embedding intervention in a variety of activity settings can support the development and use of more sophisticated communication through repetition and scaffolding. Scaffolding is used as a tool to support children in their learning by limiting complexity of a given task and encouraging the child to complete that task with as little caregiver support as possible.

These strategies are utilized frequently among specialists, and are two important factors of Enhanced Milieu Teaching intervention.

Enhanced Milieu Teaching (EMT)

EMT is a parent-implemented, evidence-based intervention used with young children to increase communication skills with a focus on communicative initiations. It includes teaching caregivers how to arrange the child’s environment, increase responsive interaction, and use milieu teaching, or prompting. EMT is beneficial with children in the early stages of communication development who have developmental/communication delays including intellectual disability, autism, specific language impairment and severe impairments to increase overall rates of communication. The understanding that EMT is an effective form of intervention for children with developmental/communication delays, encouraged the development of the KidTalk Tactics Project.
KidTalk Tactics Project

The KidTalk Tactics Project (KTTP) is a research study at the Florida State University and Vanderbilt University investigating parent-implemented early communication interventions for young children age birth to three with communication delays and disorders. In KTTP, parents participate in 24 intervention sessions with a communication coach to learn how to support their child’s communication in daily routines and activities.

The present study examined how EMT strategies embedded in the child and family’s preferred routines impacted the communication skills of children with Down syndrome. Previous studies have identified EMT as an effective intervention for young children when delivered in a clinical setting with limited research on the use of these strategies by caregivers in natural environments using daily routines as the context for intervention. In addition, previous studies measured child communication outcomes using standardized tests, which may not provide detailed information of children’s communication. The present study measured child communication by gestures, vocalizations, single words/signs and multiple utterances/signs in typically occurring daily activities with caregivers. Archival video data from KTTP was used to answer the following questions:

1) What was the frequency of total communication acts in caregiving, pre-academic, and play routines for children with Down syndrome?
2) What was the change over time in the types of communication acts (gestures, vocalizations, words/signs, and multiword utterances/signs) across routines used by children participating in KTTP?
3) What was the frequency of communication initiations and responses to communication in these routines?

Method

Participants

Parent-child dyads were identified through KTTP archival records according to the following inclusionary criteria: (1) consent for participation in KTTP was obtained following the child’s first birthday and before the child produced word combinations, (2) caregivers consented to standardized assessments and videotaping for data collection, and (3) caregiver-child dyads completed a minimum of 24 intervention sessions to ensure sufficient data to analyze across time points. All child participants were diagnosed with Down syndrome prior to participation in KTTP. Three dyads met the inclusion criteria and are described in the following table.
Participating caregiver-child dyads agreed to participate in a research study on caregiver-implemented intervention for children with language delays and disorders.

Table 1: Child and Caregiver Characteristics

<table>
<thead>
<tr>
<th>Pre-Intervention Child Characteristics</th>
<th>Kelly</th>
<th>Elizabeth</th>
<th>Jasmine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in Months</td>
<td>18</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
<td>Female</td>
<td>Female</td>
</tr>
<tr>
<td>Race</td>
<td>Caucasian</td>
<td>Caucasian</td>
<td>Caucasian</td>
</tr>
<tr>
<td>Primary Language</td>
<td>English</td>
<td>English</td>
<td>English</td>
</tr>
<tr>
<td>CSBS Standard Score</td>
<td>102</td>
<td>74</td>
<td>90</td>
</tr>
<tr>
<td>MSEL-ELC</td>
<td>97*</td>
<td>70</td>
<td>73</td>
</tr>
<tr>
<td>PLS-4-AC</td>
<td>75</td>
<td>68</td>
<td>71</td>
</tr>
<tr>
<td>PLS-4-EC</td>
<td>73</td>
<td>79</td>
<td>77</td>
</tr>
<tr>
<td>PLS-4: Total Language Score</td>
<td>71</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td>Mother’s Age</td>
<td>36</td>
<td>36</td>
<td>35</td>
</tr>
<tr>
<td>Mother’s Highest Level of Education</td>
<td>Bachelor’s Degree</td>
<td>Bachelor’s Degree</td>
<td>Graduate Degree</td>
</tr>
<tr>
<td>Family Income ($50,000+)</td>
<td>($50,000+)</td>
<td>($50,000+)</td>
<td>($50,000+)</td>
</tr>
</tbody>
</table>


*Kelly’s MSEL score was at 24 months.

Setting

All KTTP intervention sessions took place in the child’s home with the caregiver present and were video recorded. Caregivers selected a variety of naturally occurring daily routines as the context for embedded communication intervention throughout the 24 KTTP sessions.

Research Design

The present study was a post-hoc descriptive study of the communication of three children with Down syndrome in the context of daily routines. A sample of each child’s communication was coded in three different family routines prior to participating in KTTP, and at baseline (prior to intervention), as well as at the beginning (sessions 7, 8, 9), middle (sessions 15, 16, 17), and end of
intervention (sessions 23, 24, 25). The purpose of a baseline measure is to gain an understanding of a child’s established communication prior to intervention, for data analysis. This approach allowed the researcher to describe communication in different types of routines as well as at different time points during the intervention.

Sample Selection and Coding
In order to measure each child’s communication three, three-minute video clips were identified at four points during KTTP; baseline (pre-intervention), beginning of intervention, middle of intervention, and end of intervention, in all three routine categories. Three-minute segments were identified as reasonable for two reasons. First, the very young age of the children influenced the length of the routines, especially caregiving routines that often did not last more than three minutes. Second, previous intervention research had effectively used three-minute segments to code child communication. All video clip samples were coded using the Child Communication Coding System (CCCS) to identify frequency of communication and change over time in communication across routines for each child. The CCCS was adapted from the Communication and Symbolic Behavior Scales and characterized communication acts as gestures, vocalizations, words/signs, or multiple word/sign combinations. A communicative act is directed toward another person and serves a communicative function. All communicative acts were coded as mutually exclusive events and categorized according to gestures, vocalizations, single words/signs, or multiple words/signs. Each communication act was then coded as either an initiation or response to adult communication. This procedure enabled the researcher to determine the frequency of communication acts in the three routines by initiations and responses, as well as change over time in types of communication acts.

Upon watching each video clip, the routine was identified as caregiving, pre-academic, or play. Caregiving routines included bath/hygiene related, medical/comfort related, dressing related and eating related. Pre-academic routines described activities such as reading books, song, rhymes, writing, or drawing. Play routines included play with objects, physical play, pretend play, and social games. The researcher served as the primary data coder and identified specific videos for the study.

Data Analysis
Child communication data was entered into a spreadsheet and the three
samples of each routine type at each of the four points were averaged and graphed for each child using Microsoft Excel, allowing for visual inspection of the data to answer the first and second research questions. To address the third research question, child communication data was displayed in a table indicating the frequency of communicative initiations and responses for each child, by routine category.

**Inter-rater Reliability**
An undergraduate coder and the researcher independently coded 25 percent of the video clips from the baseline, beginning, middle and end periods of intervention. Training for coding reliability occurred using video footage that was not included in the study. Both coders achieved initial reliability of at least 80% on five sample segments for coding of both routine-type and communication acts. Inter-rater reliability was conducted on 25 percent of the data. Percentage of agreement was calculated by dividing the number of agreements by the total number of opportunities, and total inter-rater reliability was 85%.

**Results**

**Frequency of Total Communication Acts**
In order to answer the primary research question and determine the frequency of each child’s communication by routine type, child communication data was graphed by intervention stage (baseline, beginning, middle, and end of the 24-session intervention period) using Microsoft Excel. Figures 1-3 display total communication across routines for all three child participants.

As displayed in Figure 1, Kelly’s average frequency of total communication ranged from zero to 5.7 communicative acts per three-minute sample in the baseline period, from zero to 18 at the beginning of intervention, from 0.3 to 18.7 in the middle of intervention, and from 1.3 to 19.3 at the end of intervention across all three routines. Kelly’s frequency of total communication was highest in play routines before the start of intervention and highest in pre-academic and caregiving at the end of intervention.

Figure 2 shows Elizabeth’s average frequency of total communication acts across routines. Elizabeth’s average total communication ranged from zero to 9.7 communicative acts per three-minute sample in the baseline period, from zero to 21 at the beginning of intervention, from zero to 24.3 in the middle of intervention, and from zero to 12.3 at the end of intervention across all three routines. Elizabeth’s frequency of total communication was
highest in play routines before the start of intervention and highest in pre-academic at the end of intervention.

Figure 3 shows Jasmine’s average frequency of total communication acts across routines. Jasmine’s average total communication ranged from zero to four communicative acts per three-minute sample in the baseline period, from zero to seven at the beginning of intervention, from zero to 5.3 in the middle of intervention, and from zero to 16 at the end of intervention across all three routines. Jasmine’s frequency of total communication was highest in play routines before the start of intervention and highest in play at the end of intervention.

Change Over Time Across Routines
Figures 1-3 were used to answer the second research question and determine any change over time in the type of communication acts (gestures, vocalizations, words/signs, and multiple words/signs) from baseline through the end of the 24-session intervention period. Figure 1 shows Kelly’s communication acts from baseline through the third intervention time point in caregiving, pre-academic and play routines, respectively. Within the caregiving routine category, there is an increase in the use of single words from baseline to the beginning, to the middle, and to the end of intervention. Multiple word utterances are seen initially in the middle of intervention in caregiving routines, then continue to increase as the child progresses from the middle of intervention to the end of intervention. Kelly demonstrated increases in single words and in multiple word utterances in pre-academic and play routines as well. For pre-academic routines, single words are not seen in baseline and are observed in the second and third intervention time points. Play routines also show increases in single words (especially from baseline to the beginning of intervention), and multiple words are first observed at the beginning of intervention and increase from the beginning to middle of intervention, demonstrating use of more complex language skills. Kelly showed gains in total communication from the baseline to the end of intervention in all routines. In caregiving routines, Kelly demonstrated increases from baseline to the beginning, then to the middle, and finally to the end of intervention. This sequence of progress was less clear in pre-academic and play routines. In pre-academic routines, Kelly demonstrated increases from baseline to the beginning, to the middle, to the end of intervention.
Figure 2 illustrates communication type from baseline through the third intervention time point for Elizabeth, in caregiving, pre-academic, and play routines, respectively. As can be seen throughout caregiving routines, there are no specific increases between intervention time points, but rather a relative plateau of total communication acts among all time points for that routine. Throughout pre-academic routines, an increase can be seen between baseline and the first intervention time point. However, again a slight plateau and an eventual decrease in total communication acts are present within intervention time points two and three. Play routines for Elizabeth also exhibit a relative plateau of communication acts across intervention time points. In correspondence to this communicative plateau however, there is an increase in the use of single words, insinuating the use of more complex communication. Elizabeth showed gains in total communication from baseline to the end of intervention in pre-academic routines, a decrease in caregiving routines, and a slight increase in play routines.

Jasmine’s communication, displayed in Figure 3, illustrates a wide variety of types of communication acts across caregiving, pre-academic, and play routines, respectively. There is a variation of communication acts within caregiving routines from baseline through the third intervention time point. Baseline for caregiving illustrates the use of gestures, vocalizations, and single words, while the first intervention time point only presents the use of gestures. Following the first intervention time point, there are increases in the use of overall communication acts during intervention time points two and three with single and multiple words used in the middle of intervention.
but not at the end. Pre-academic routines show an increase in vocalizations and words, from baseline through the middle of intervention. Jasmine's play routine intervention sessions show an increase of communication acts in the third intervention time point (end of intervention), but with variations between baseline and intervention time points one and two. Jasmine showed gains in total communication from the baseline to the end of intervention in all routines.

**Frequency of Initiations and Responses**

In the baseline period for Kelly, an average of between 4.4 and 6.4 communicative initiations were coded in each 3-minute play, caregiving
and pre-academic routine sample (see Table 1). Averages between 11.3 and 22.4 initiations were coded at the end of intervention in those same routines. Kelly’s average frequency of initiations for baseline as compared to her average initiations at the end of intervention, show increases across all three routines (play, pre-academic and caregiving). The largest increase in initiations was seen in caregiving routines in which Kelly initiated an average of over four times more at the end of intervention as compared to baseline. In correspondence, Kelly’s data represents increases in average communication responses as well. During the baseline period, Kelly presented averages between 3.4 and 4.3, and averages between 16 and 21 at the end of intervention for communication responses. The largest increase in responses was seen in caregiving routines in which Kelly responded an average of over four times more at the end of intervention as compared to baseline.

<table>
<thead>
<tr>
<th>Routine Category (Frequency of Communication Acts)</th>
<th>Communication Acts in Baseline</th>
<th>Communication Acts at End of Intervention</th>
<th>Change from Baseline to End of Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Play Initiations</td>
<td>6.4</td>
<td>15.9</td>
<td>+9.5</td>
</tr>
<tr>
<td>Play Responses</td>
<td>4.3</td>
<td>16</td>
<td>+11.7</td>
</tr>
<tr>
<td>Caregiving Initiations</td>
<td>5.3</td>
<td>22.4</td>
<td>+17.1</td>
</tr>
<tr>
<td>Caregiving Responses</td>
<td>4.3</td>
<td>21</td>
<td>+16.7</td>
</tr>
<tr>
<td>Pre-Academic Initiations</td>
<td>4.4</td>
<td>11.3</td>
<td>+6.9</td>
</tr>
<tr>
<td>Pre-Academic Responses</td>
<td>3.4</td>
<td>20</td>
<td>+16.6</td>
</tr>
</tbody>
</table>

*Communication Acts columns represent the average of 3 sessions.*

In the baseline period for Elizabeth, an average of between 5.3 and 9.3 communicative initiations were coded in each 3-minute play, caregiving and pre-academic routine sample (see Table 2). Averages between 5.3 and 12.4 initiations were coded at the end of intervention in those same routines. Elizabeth’s average frequency of initiations for baseline as compared to her average initiations at the end of intervention, show overall increase in play and pre-academic routines, while the caregiving routine remained constant throughout. The largest increase in initiations was seen in pre-academic routines in which Elizabeth initiated over two times more at the end of intervention as compared to baseline. In comparison to initiations, Elizabeth’s increases in responsive communication were not as obvious. During the baseline period,
Elizabeth presented averages between 5.3 and 10.6, and averages between 7.3 and 13.9 at the end of intervention for communication responses. The largest increase in responses was seen in pre-academic routines in which Elizabeth responded an average of nearly two times more at the end of intervention as compared to baseline.

**Table 3: Child Communication Elizabeth**

<table>
<thead>
<tr>
<th>Routine Category (Frequency of Communication Acts)</th>
<th>Communication Acts in Baseline</th>
<th>Communication Acts at End of Intervention</th>
<th>Change from Baseline to End of Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Play</td>
<td>Initiations 9.3</td>
<td>12.4</td>
<td>+3.1</td>
</tr>
<tr>
<td></td>
<td>Responses 10.6</td>
<td>9.3</td>
<td>-1.3</td>
</tr>
<tr>
<td>Caregiving</td>
<td>Initiations 5.3</td>
<td>5.3</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Responses 9.9</td>
<td>7.3</td>
<td>-2.6</td>
</tr>
<tr>
<td>Pre-Academic</td>
<td>Initiations 5.3</td>
<td>12.0</td>
<td>+6.7</td>
</tr>
<tr>
<td></td>
<td>Responses 7.3</td>
<td>13.9</td>
<td>+6.6</td>
</tr>
</tbody>
</table>

Communication Acts columns represent the average of 3 sessions.

**Table 4: Child Communication Jasmine**

<table>
<thead>
<tr>
<th>Routine Category (Frequency of Communication Acts)</th>
<th>Communication Acts in Baseline</th>
<th>Communication Acts at End of Intervention</th>
<th>Change from Baseline to End of Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Play</td>
<td>Initiations 1.7</td>
<td>16.6</td>
<td>+14.9</td>
</tr>
<tr>
<td></td>
<td>Responses 3.3</td>
<td>3.7</td>
<td>+0.4</td>
</tr>
<tr>
<td>Caregiving</td>
<td>Initiations 1.0</td>
<td>10.3</td>
<td>+9.3</td>
</tr>
<tr>
<td></td>
<td>Responses 0.6</td>
<td>5.0</td>
<td>+4.4</td>
</tr>
<tr>
<td>Pre-Academic</td>
<td>Initiations 3.4</td>
<td>9.0</td>
<td>+5.6</td>
</tr>
<tr>
<td></td>
<td>Responses 1.3</td>
<td>6.7</td>
<td>+5.4</td>
</tr>
</tbody>
</table>

Communication Acts columns represent the average of 3 sessions.

In the baseline period for Jasmine, an average of between 1 and 3.4 communicative initiations were coded in each 3-minute play, caregiving and pre-academic routine sample, respectively (see Table 3). Averages between 9 and 16.6 initiations were coded at the end of intervention in those same routines. Jasmine’s average frequency of initiations for baseline as compared to her average initiations at the end of intervention, show increases across all three routines (play, pre-academic and caregiving). The largest increase in initiations was seen in play routines in which Jasmine initiated an average of
almost ten times more at the end of intervention as compared to baseline. In correspondence, Jasmine's data illustrates increases in average communication responses as well. During the baseline period, Jasmine presented averages between 0.6 and 3.3, and averages between 3.7 and 6.7 at the end of intervention for communication responses. The largest increase in responses was seen in caregiving routines in which Jasmine responded an average of eight times more at the end of intervention as compared to baseline.

**Discussion**
The results of this study indicate changes in overall communication between baseline and the end of intervention for the three child participants. Two of the three children had increasing trends across all three routines, while the third child had increases across only two routines (pre-academic and play). In general, increases were seen in the use of single and multiple words, demonstrating a growth in the use of more complex language skills over time for each child, as would be expected developmentally.22

**Routine Categories**
Across the three child-caregiver dyads, there was no one routine category in which frequency of total communication was consistently higher than the other categories. It was interesting to note that before the start of intervention, all three children had the highest frequency of communication acts in play routines, as compared to caregiving and pre-academic. By the end of intervention, the highest frequencies of communication acts were in pre-academic routines for Kelly and Elizabeth, and in play routines for Jasmine. For each participant, overall communicative acts across routines showed distinct variance. These findings are similar to the findings of previous research, which reported that caregivers had individual preferences for types of routines rather than specific types of routines as being preferable for intervention.10

**Frequency and Type of Communication Acts in Routines**
Kelly’s communication during caregiving routines illustrated gradual increases from baseline to the third intervention time point, while pre-academic and play routines were variable in comparison. For Elizabeth, communicative increases were seen throughout pre-academic routines from baseline through the second intervention time point, while some decrease in communicative acts occurred in the third intervention time point. Even with some decrease in overall communication acts, Elizabeth showed an
increase in higher-level communication acts (i.e., increased frequency of single words) within all routine types across the four time points. Jasmine’s results represent gradual increase of communication acts throughout pre-academic intervention time points. The most gradual communication increases occurred throughout Jasmine’s pre-academic routine intervention time points, however there were also increases across all routines, only with more communicative variation within caregiving and play routines.

It is important to consider maturation and the impact of each child’s developmental and chronological age on the results. Kelly increased both in rate as well as use of single and multiple word utterances across the 24 sessions. Her increases could be related to her general developmental progression and the timing may have corresponded to the typical “vocabulary burst” seen in young children learning language.22 Similarly, since Elizabeth used signs rather than verbal words at the beginning of intervention, the changes in her responsive communication could be related to her increase in independent sign use and decreased use of imitation of her caregiver’s signs. The signs identified as words in her baseline and earliest intervention sessions could be over-representations of her symbolic language use and may have been more accurately coded as gestures or motor imitations.

**Initiations and Responses**

Each child’s communication acts varied in relation to amount of change in initiations and responses with Kelly and Jasmine showing increases overall for both. Kelly’s frequency of both initiations and responses greatly increased in all routines from baseline to the end of intervention, with greater increases in initiations in caregiving and greater increases in responses in pre-academic and play routines. Elizabeth and Jasmine’s data shows more variation in communication increases among routines. Elizabeth’s data illustrated increases in initiations in play and pre-academic routines and a decrease in responses in play and caregiving routines. Like Kelly, Jasmine’s data showed increased frequency of communicative initiations and responses across all routine types, however Jasmine demonstrated greater increases in initiations in all routines as compared to increases in responses. Each child’s data demonstrate a large variety of differences between initiations and responses for each routine type, caregiving, pre-academic and play, suggesting a need for further research in order to determine the relationship between initiations and responses.
**Limitations of the Study**

The current research analyzed three individual children with Down syndrome, using a single case design. In this manner, each child was analyzed individually. In doing so, each child was only compared to herself as opposed to comparing to other children or groups of children. There are certain limitations inherent to single case research. One in particular, is the inability to generalize results to the overall population.

The purpose of the KTTP in Tallahassee was to support caregiver-implemented intervention with coaching from an interventionist. While this project yielded a large amount of useful data, it was not designed for a child communication system specifically. In this way, data had to be extrapolated to form useful video segments to be coded for child communication, resulting in a less than perfect data analysis for this study. Having a reliable source of data to choose from is an important part of any research project. The intricate process of selection (i.e., selection of three-minute clips for data coding were limited to segments where the interventionist was not part of the interaction in order for natural caregiver-child interactions to be coded) may have impacted the results of the study. Having a larger amount of video footage to randomly select from may have allowed for a more accurate representation of each child’s communication acts and may have also allowed for use of longer video clips for coding.

Like any individual, some days are particularly good and others are not. This statement was true for the children who participated in the KTTP study as well. Some factors that may have contributed to a less than perfect communication day for these children may have included, fatigue, sickness, frustration, etc. The opposite may also be true. Some days included very productive, frequent communication, affecting the results as well. There are many factors that could have affected the communication for each child throughout the intervention sessions.

The purpose of this project was to find trends in the frequency of overall communication acts, either initiated or responded. Unfortunately, the data did not include post-intervention communication frequency. Having this information could possibly illustrate changes in communication in comparison to communication at the start of each child’s KTTP intervention process.

**Future Research**

By analyzing the presented data, there are a number of important factors that
could be expanded upon for future studies. For example, the use of longer video samples, as opposed to brief, three-minute samples may result in a difference in the number of and frequency of communication acts. Perhaps a longer sample may allow a greater understanding of communication change over time. Measures of communication opportunities provided by the caregiver would also be important to examine in various routines. It may be that caregivers simply offer more opportunities in play than in caregiving because of the nature of the routine or the role of the caregivers may be more structured in pre-academic and provide more support for providing opportunities. Responses may increase as children are directed to answer questions about pictures in storybooks. Questions that would compare children with Down syndrome to other children with communication disorders would also be of interest.

**Summary**

This study examined communication rates for toddlers with Down syndrome in their daily routines with caregivers to gain additional insight to potential differential patterns of communication in various routines. Additionally, change-over-time in the rate and types of communication as the caregiver-child dyad progressed in intervention-based treatment were examined for toddlers with Down syndrome. While communication rates and types increased over time for two of the three participants, there was variability in the communication production in the various routine types for the participants. Two of the three participants also increased both their use of initiations and responses within the routines over time as their communication types expanded. Further study to examine if there is an impact on the length of routines coded and the child’s communication rate and level would be useful.


As a symbol of wisdom, the owl is an animal surrounded by intrigue. The piercing eyes of the nocturnal owl enable it to search for prey amidst the cover of darkness. Given this quality of discernment, it is no surprise that the owl became the principle emblem for the seal of the West Florida Seminary. Founded in 1851, as the precursor of Florida State University, West Florida Seminary utilized the seal of the owl until 1901. Florida State’s only undergraduate research journal, entitled *The Owl*, unites the historical foundations and modern experiences of our university. The sparks from this exciting fusion of tradition and innovation inspired our selection for the name and image of *The Owl*. 
The Florida State Undergraduate Research Journal (FSURJ) spotlights the remarkable research and creative works being produced by passionate undergraduate students at Florida State University. Devoted to exhibiting the results of intellectual curiosity at the undergraduate level, The Owl accentuates the capacity of Florida State students from all undergraduate disciplines to acquire the finest education in the country.

Launched under the vision and direction of Dr. D. Craig Filar and Dr. Cathy Levenson in the academic year 2009-2010, the first Student Council for Undergraduate Research and Creativity consisted of ten members: Jeremy Bary, Lindsey Davis, Travis Eales, Brian Jirout, Vincent “Vinnie” LaBarbera, David Mari, Kyle Mauk, Mar- lee McCleary, Gustavo Munoz, and Patrice Williams. Hoping to inspire and motivate fellow undergraduates to pursue research, the first council laid the groundwork for an undergraduate research journal. Crafting a vision for the organization and establishing submission guidelines, the first council, then, selected new members in the spring of 2010.

Both Dr. Filar and Dr. Levenson accepted new responsibilities at Florida State University, allowing Dr. Alec Kercheval and Dr. Kristal Moore Clemons to fill the positions of director and associate director for the Office of Undergraduate Research, respectively. The second council consisted of twelve new and old members: Nowrin Alam, Aviram “Avi” Assidon, William Philip Boyce, Sean Ennis, Vincent “Vinnie” La- Barbera, David Mari, Christopher Matechik, Chelsea Morgan, Tarreq Noori, Stephen Pape, Ekaterina “Katie” Rybakova, Lauren Terpak, and Patrice C. Williams. Securing sponsorship and financial backing from FSU’s Student Government Association, under the patronage of Dustin Daniels, the council initiated the process of crafting Florida State’s only undergraduate research journal, ex nihilo.

This Student Council for Undergraduate Research and Creativity’s call for manuscripts lead to the inaugural publishing of the The OWL, then the fall of 2011 brought with it drastic changes in the editorial board, with
Katie Rybakova, Lauren Terpak, and Emeritus Patrice Williams joined by the addition of members Brian Denny, Stephen Fuller, Haley Gentile, Rebekah Landbeck, Norberto Morales, and Lindsay Ogles. Dr. Joe O’shea accepted the role of facilitator and faculty advisor of the council.

The OWL’s editorial board, now occupied by the old and new faces of Katie Rybakova, Brian Denny, Stephen Fuller, Curtis Gravenmier, Gabriel Glaun, Lindsey Shelton, Natasha Williams, Sean Freeman, and Marilyn Horta, has, since the Fall of 2012, worked to again present the Florida State University community with a cross-section of compelling works from the Humanities, Arts and Design, Social Sciences, and STEM fields (Science, Technology, Engineering, and Mathematics) through a printed and electronic journal.

Named The Owl, after the original seal employed from 1851 to 1901 by West Florida Seminary, the journal is anchored in the history of our institution, but showcases our beloved university’s brightest minds of today, with a sharp eye to the future. The Owl encompasses the research and creative works of undergraduates from all disciplines.
PAST MEMBERS OF SCURC

2011 – 2012
BRIAN DENNY
STEPHEN FULLER
HALEY GENTILE
REBEKAH LANDBECK
NORBERTO MORALES
LINDSAY OGLES
EKATERINA “KATIE” RYBAKOVA
LAUREN TERPAK

2010 – 2011
NOWRIN ALAM
AVIRAM “AVI” ASSIDON
WILLIAM PHILIP BOYCE
SEAN ENNIS
VINCENT “VINNIE” LaBARBERA
DAVID MARI
CHRISTOPHER MATECHIK
CHELSEA MORGAN
TARREQ NOORI
STEPHEN PAPE
EKATERINA “KATIE” RYBAKOVA
LAUREN TERPAK
PATRICE C. WILLIAMS

2009 – 2010
JEREMY BARY
LINDSEY DAVIS
TRAVIS EALES
BRIAN JIROUT
VINCENT “VINNIE” LaBARBERA
DAVID MARI
KYLE MAUK
MARLEE McCLEARY
GUSTAVO MUNOZ
PATRICE C. WILLIAMS
EDITORIAL BOARD & SCURC
MEMBERS 2012 – 2013

Katie Rybakova  
Brian Denny  
Sean Freeman

Stephen Fuller  
Gabriel Glaun  
Curtis Gravenmier

Marilyn Horta  
Lindsey Shelton  
Natasha Williams
ACKNOWLEDGEMENTS

FSU SPECIAL COLLECTIONS
HERITAGE PROTOCOL
FSU PHOTO LAB
GANDY PRINTERS

OFFICE OF UNDERGRADUATE RESEARCH
DR. JOE O’SHEA

THIS IS A STUDENT GOVERNMENT ASSOCIATION PUBLICATION
“Wisdom begins with wonder”
Socrates (c. 469 – 399 BCE)