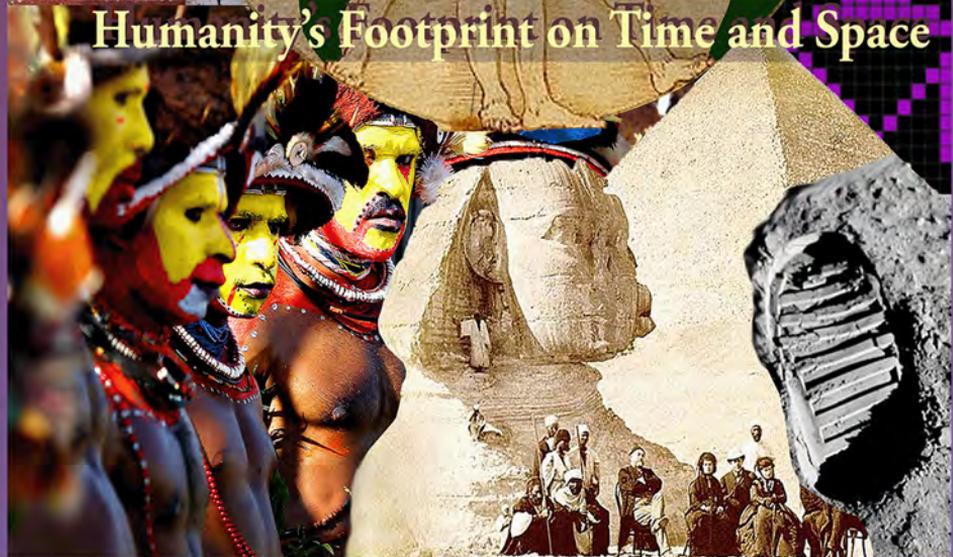


Society & Culture Undergraduate Research Forum



Imprints: Humanity's Footprint on Time and Space



Sonoma State University's
Society & Culture Undergraduate Research Forum

is dedicated to assisting students in preparing, presenting and publishing their research relating to matters of human society and culture in a professional setting, developing new skills that will be useful in professional and public careers, as well as post-graduate academia, and providing an opportunity for cross-disciplinary collaboration amongst students and faculty.

Imprints:
Humanity's Footprint on Time and Space

Picture our distant ancestors in Tanzania a few million years ago, simply walking across a field to find their next meal. Little could they imagine how their footprints would fascinate the world and reveal shocking evidence of their upright walking posture.

The theme “Imprints” invokes in one’s mind a sense of wonder, an awareness of the countless interconnections continually shaping our world. How do our actions leave imprints on the fabric of time? A historian or anthropologist may see the imprint of an ancient culture reflected in its modern counterpart. Other reflections may be seen by tracking our carbon footprint, in family relationships, or in the evolving understanding of the human mind. Whatever the approach, *Imprints* should examine how the past reflects the present.

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ON TIME AND SPACE**

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SPECIAL RECOGNITION

This year, for the first time, prizes were awarded at the SCURF conference for best oral presentation and best poster presentation. We would like to thank the esteemed judges for their time and careful attention, and would like to congratulate the winners as follows:

Lauren Russ

Best Oral Presentation

Lacinda Moore

Best Poster Presentation

FOREWORD

It is an immaculate hall, clean carpeted, spacious and organized. We see the well-dressed presenters, a touch nervous, combining anxious deliveries with well-edited discussions. These vignettes of social science research presentations at an organized conference are very familiar to post-doctoral scholars, to all of us as a cohort. Reminiscent scenes, perhaps, yet here I was and the Society and Culture Undergraduate Research Forum of 2014, a spectator watching social science university seniors present interesting and diverse research: undergraduates taking on oratory challenges usually reserved for graduate scholars and academics.

University instruction is a rewarding experience for college professors, yet by the end of the semester many of us look forward to taking pleasure in learning once again through direct “hands-on” research. So it is with great satisfaction that we can sit back and learn from our own students: to bear witness to how they came through the process of drafting their work, to see how they polished their research for the public sphere (even if it is just for classmates), to listen for new topics and themes reflected in the presentation of their research.

The research represented in the 2014 Society and Culture Undergraduate Research Forum is diverse and interdisciplinary: from the biological to the “magical;” from rock art to physarum machines. “Imprints: Humanity’s Footprint on Time and Space” was the theme for this year, a theme “meant to stir a sense of wonder at the countless interconnections that shape our world and the ways in which humans leave their marks both culturally and physically.” A very brief overview of the research and researchers presented herein includes:

- ▲ Lauren Russ who discusses the cognitive dimensions of the primate brain in *Cumulativeness in Non-Human Primates Suggests Cultural Capability*.

- ▲ Tomio Endo, introducing (to many of us) some of issues represented in Scottish language nationalism in his paper *Policy and Culture: Language Legislation and Linguistic Ideology in Scotland*.
- ▲ Hannah Lehr who contemporizes magic in the context of the U.S., everyday magic of Western life in her paper *Ritualized “Magic” in the United States, and its Use in the 21st Century*.
- ▲ Stephanie Agha, demystifying the aesthetics and practice of cranial molding in *Artificial Cranial Modifications: Cultural Practices Mark Human Skeletal Remains*.

The Society and Culture Undergraduate Research Forum begun by anthropology students has now widened its frame of view to include other social sciences, and scientists:

- ▲ In a subject close to home in the drought-ridden state of California, Ceili Chilcott documents sustainable resource “solutions” in *The Success of Farming Networks Implementing Sustainable Agricultural Practices as a Response to Insecurity*.
- ▲ Hannah Zucherman describes the topography of internationalism within the San Francisco locale in *Geographies of Consulate in the Bay Area*.
- ▲ Zachary Dahlgren reveals a futuristic bio-machine synthesis, slime molds integrated with high-technology in *Physarum Machines and Network Analysis*.
- ▲ Tania Ryan reveals something important about modern social science research methodologies in *Visions in Time: Contextual Change from Rock Art and Intaglio to Textile and Tattoo: where once we looked at “text,” now we look at “context.”*

- ▲ On the same theme, Paul Martinez provides us an easy/accessible means and methods for fostering multicultural dialogue in his paper *Fostering Multicultural Competence through Inter-Group Dialogues*.

As social scientists and ethnographers, we are always asking the question, “What is on *their* mind, what is *their* concern, what do *they* think is important now?” After watching and listening to these students reveal some emergent directions for social science research, my reaction was familiar yet out-of-place. It was familiar sensation to be at a conference and feel the inspiration to think in a new way, to ponder on topics I would not have imagined. I did feel somewhat out of place, however, because the voices I was hearing—though recognizable—had matured, had risen to meet the challenges of a new form of public communication. From the research I absorbed, I wanted to know more, to ask questions, to understand the implications of what was revealed. I did as we academics often do at conferences: engage in discussion, in post presentation “walk-alongs.” This time, however, we walked with those who were not so long ago freshman students, now young research colleagues.

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IMPRINTS: HUMANITY'S FOOTPRINT
ON TIME AND SPACE

**CUMULATIVENESS IN NON-HUMAN PRIMATES SUGGESTS CULTURAL
CAPABILITY**

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ABSTRACT

It has become increasingly popular to discuss the capability of non-human primates, such as bonobos (*Pan paniscus*) and chimpanzees (*Pan troglodytes*), to demonstrate behaviors that are similar to early human behavior. Research into culture is performed using the concept of cumulativity and social learning capabilities of non-human primate species to determine their capacity for culture. New perspectives into cultural capability and the presence of culture can be found this way. Through the study of cultural practices in non-human primates, anthropologists may gain insight into the emergence of culture in early human ancestors. It is understood that early human culture progressed through cumulativity, and cumulativity is defined as newer behaviors being built upon the old behaviors as a foundation for progression in newer generations (Graber et al. 2012:297). Cumulativity in behavior is shown through the study of behaviors displayed by non-human primates such as tool-use in the predation of army ants (Schöning et al. 2008; Möbius et al. 2008) and differences in nut cracking techniques of neighboring populations (Luncz et al. 2012). By comparing differing techniques through varying learning processes of non-human primates, culture may be attributed if there are no clear ecological causes for the variances in techniques. Neighboring populations are displaying different tool-use techniques with no real apparent ecological cause as they reside in similar habitats, which would suggest the techniques are being taught with slight variances between populations (Luncz et al. 2012).

Key Words: chimpanzee, cumulativity, social learning, culture, tool-use

Before we can delve into the concepts surrounding cultural capability within non-human primates, and its connection with the study of early human ancestors, it is necessary to first discuss the terminology in which we intend to define it. This paper will define cultural capability through the cumulatively learned behaviors of chimpanzees (*Pan troglodytes*) and bonobos (*Pan paniscus*). It is necessary to discuss the chosen definition of “culture”, as there are many variations on this topic depending on differing perspectives on the subject. In this context, culture will be used in the context of behaviors that are “transmitted across generations” (Emde, 2006) and show variation “formed in part through social learning processes” (Perry, 2006). This definition has been determined through comparing definitions found in human infant studies by Emde (2006), and in cultural primatology studies performed by Perry (2006). Social learning in this context is defined by Perry (2006) “as changes in behavior that result from attending to the behavior or behavioral products of another individual”. It is important to keep in mind that social learning can be found in many forms, and is quite difficult to document in chimpanzee societies due to their dispersement patterns in the wild (Perry, 2006).

As we have defined culture and social learning, it is also crucial to clearly define the interpretation of “cumulativeness” within the context of this subject. Cumulativeness is simply defined as the latest cultural practices being “built upon older practices both directly and indirectly” (Graber et al., 2012). To some researchers studying non-human primates, this cumulative learning practice is dependent on social transmission that would typically lead to more innovative and efficient techniques (Yamamoto et al., 2013). However, the effectiveness of learned behaviors (such as tool-use) is a debated topic and will be discussed in further detail within this discussion.

The focus here, as mentioned previously, will be surrounding the behaviors of chimpanzees and bonobos. Chimpanzees and bonobos both belong to the genus of *Pan* (Cawthon, 2006; Cawthon, 2010), which is within the taxonomic family of *Hominidae* as humans (*Homo Sapiens*). It is also important to note that both species share 98.7% of their DNA with *Homo sapiens*, and are both considered to be the closest living relatives to human beings (World Wildlife Fund, n.d.). These two species are both considered to be endangered species, with chimpanzees having a total population of between 172,000 to 299,000 individuals and bonobos having a total of 10,000 to 50,000 individuals worldwide (World Wildlife Fund, n.d.). This paper uses information gathered through observational research conducted on both captive and wild primate populations, as both display important and relevant information about the two species' culture.

The ecology of wild chimpanzees and bonobos should be considered when discussing the cumulateness of cultural capability, as most behaviors reflect cultural adaptations to environment (Emde, 2006) either past or present. The populations that live within similar environments and do not have obvious variations in ecological factors - which would imply a need for variations in behavioral practices - should logically have few such variations, yet the variations still exist. Many of these do not appear to have ecological basis (Laland & Janik, 2006), as they are not more effective for surviving within the environment in which they reside. It is possible, and likely, that these less effective techniques were adapted for prior ecological factors that are no longer present in the modern environment (Gruber et al., 2012). This is could be due to the idea of social learning being the basis for cumulateness within behaviors, and this form of learning does not always take efficiency into consideration when behaviors are transmitted (Yamamoto et al., 2013).

This particular example can be seen in studies focusing on the predation of ants by different chimpanzee populations. What is found in this research would suggest that behaviors are socially transmitted, and not necessarily adaptive, as there are differing techniques that do not coincide with ecological factors (Möbius et al., 2008; Schöning et al., 2008). The focus of the studies conducted discussed three different species of ants that chimpanzee populations would prey upon, and all three species of ants differed in speed (Möbius et al., 2008; Schöning et al., 2008). The assumed outcome would be that tool-use would reflect the best suited length in regards to hunting ants at varying speeds; however this did not seem to be outcome of the observed research (Möbius et al., 2008; Schöning et al., 2008). Different populations would use their hands or varying lengths of sticks to gather ants from their mounds, but the technique used did not have a direct correlation with the speed of the ants (Möbius et al., 2008; Schöning et al., 2008). It is easily assumed that it would be more effective for chimpanzees to use longer sticks with faster moving ants, and would be able to use shorter sticks for slower ants, but this assumption has not matched the observed results (Möbius et al., 2008; Schöning et al., 2008). Different populations would use sticks of different lengths based mostly on what technique was employed by the majority of the other members of their group, rather than what was the more effective method for gathering ants (Möbius et al., 2008; Schöning et al., 2008). In this case, it would appear that the results point to social learning in regards to tool-use instead of ecological adaptation requirements.

Chimpanzees have also exhibited variations within other aspects of tool-use, such as nut cracking techniques. In an attempt to remove as much ecological variation from comparative studies of chimpanzee populations, a study comparing the nut cracking techniques of neighboring chimpanzee groups was compared by Luncz, Mundry, and Boesch (2012). For this study, the expected

result would be that the types of “hammers” used to crack open nuts would trend with the seasonality of the hardness of the nut shells (Luncz et al., 2012). The types of hammers used by the chimpanzees were made of either wood or stone, and of varying size (Luncz et al., 2012). As nut hardness decreased during the season in all territories, it was expected that each group would show an increase in wooden tools since wooden tools are more abundant than stone (Luncz et al., 2012). However, there was differentiation between the groups with some showing the expected shift to wooden tools and others keeping with stone tools throughout the season (Luncz et al., 2012). The result of the test finding that availability of tools and nut hardness did not have a direct influence on the technique used in these groups, but that there seemed to be group-specific techniques employed by members of the different troupes (Luncz et al., 2012).

In regards to wild bonobo populations, there has not been the same level of attention given to them as there has to chimpanzees (Hohmann & Fruth, 2003). This does not mean there is a lack of cultural capability in bonobo populations, but rather a lack of information available to give conclusive answers in a comparative study between populations (Hohmann & Fruth, 2003). Significant overlap has been observed in the types of behaviors performed by different groups of bonobos, and there are certain actions that show variation between the groups that do not correlate directly to ecological factors (Hohmann & Fruth, 2003). Some of these behaviors include using leaves as “a rain hat, a toothpick, or a napkin” (Hohmann & Fruth, 2003) at only one of the two main observation sites. At the secondary site bonobos were found covering their bodies with twigs and leaves, and it is assumed this practice also serves as a form of rain protection during the rainy season (Hohmann & Fruth, 2003). However as the two locations share similar conditions in regards to rainfall, it is more likely that this differentiation in behavior is not environmentally based (Hohmann & Fruth, 2003).

Although this information alone can be quite interesting to some, there is one significant question that is raised: Why is this subject important in regards to the study of humans? As the focus of the field of anthropology is the study of humans, it may seem strange to be focusing on the cultural aspects of non-human primates. But as further research is conducted on chimpanzees and bonobos, it would seem that there are “fewer intellectual divergences between humans and certain species of apes” (Savage-Rumbaugh et al., 2007). It has been difficult for some researchers to accept the idea of cultural primatology, as in some definitions of culture it is labeled as being a human phenomenon. This has also been a similar view in regards to innovation of technology (such as tool-use) when presented with challenging tasks. In captive studies of apes, they have shown the capability to assess and overcome challenges within difficult situations that require a strategic approach (Manrique et al., 2012). In one particular instance, apes were presented with increasingly challenging tasks that required the use of tools and proper assessment of the conditions of the task at hand (Manrique et al., 2012). Although some of the apes would adapt their techniques for higher efficiency, others would tend to show a preference for a particular technique regardless of efficiency (Manrique et al., 2012).

Another shift in perspective is in regards to group conformity. It was originally believed that behavior conformity was uniquely human (van Schaik, 2012), however there is now evidence to suggest otherwise. In populations of captive chimpanzees, the employment of the dominant technique within a particular group has been observed to be acquired and used by females who transfer into the group (Luncz et al., 2012). This conformity does not correlate to efficiency, as the new female will use the popular technique even if it is less effective than another known technique (Luncz et al., 2012). It is possible that the reason for this is that certain individuals are more prone to adapt whichever behaviors they are exposed to the most (van Schaik, 2012).

There is also evidence that there is some social mechanism at play when behaviors are duplicated from “role models” (van Schaik, 2012) within the group rather than what they are exposed to the most. Van Schaik (2012) describes this as “strong informational conformity”, which was originally believed to be unique to humans. Overall, there seem to be more similarities between ape cultures and human cultures than originally believed (van Schaik, 2012).

Even though more evidence shows similarities between human and non-human culture, there are still fundamental differences between modern humans and modern non-human primates. As van Schaik (2012) describes, humans display a type of conformity that is labeled as “normative conformity”. Normative conformity is defined as a preference for conformity due to it being the locally prescribed behavior, or because they are forced to behave in a certain manner by others (van Schaik, 2012). The real purpose of comparing humans and non-humans is to assess the traits that are shared within all or most primate social structures, which would allow anthropologists to assess how early human ancestors may have developed culture.

Cultural capability has been studied in many different species of animals, not just primates, and there are some links found between cultural capability and morphology. In his studies, Sapolsky (2006) assessed that there does seem to be a parallel between brain to body ratio and cultural variation. However, what this study discusses is that there seems to be a higher capability for cultural transmission and variation in species that have a larger brain to body ratio (Sapolsky, 2006). This does not account for actual brain size in regards to cultural capability, however. In fact it is believed that cumulative technology is not inherently connected to cognitive abilities, but to social connectivity and complexity (Pradhan et al., 2012). This is supported through the study of hominin tool-use progression (Pradhan et al., 2012), not just through the current capabilities of living non-

human primates. This development is quite interesting, as it was originally believed that “true imitation” was exclusively human (Perry, 2006), but we find it in other primate species as well. It just happens to be more common in humans than in non-human primates (Perry, 2006), which is most likely due to the fact that humans actively teach others to imitate them. As previously stated, chimpanzees and bonobos will take on behaviors that they observe, but this does not mean they are actively teaching each other specific behaviors. Though it is perhaps more accurate to state that active teaching of behaviors to other members of a population has not yet been reported.

One of the main challenges with this topic is that this area of study is still relatively new. Most of the main research conducted in regards to cultural primatology has only been published within the last 20 years, which is about half the life span of a chimpanzee or bonobo. As bonobos and chimpanzees live quite a long time, even in the wild, it is difficult for many of the questions posed to be answered as of yet. Almost all of the research currently published suggests further studies to be completed on the subject of cultural primatology, as many do not feel there is enough data to give conclusive answers about cultural capability. The importance of this research should be considered for numerous topics such as how it relates to early human ancestors, or to other modern topics in regards to conservation and zoology. As both chimpanzees and bonobos are endangered with their populations declining each year, it will become increasingly difficult for researchers to study cultural capability if more effective conservation efforts are not made in the near future. Further research could also become a large issue when considering captive primates, and the ethics regarding treatment of captive individuals. For example, if bonobos and chimpanzees are capable of human-like culture, what measures should be taken to ensure they are treated with proper respect in captive environments? Unfortunately captive

environments are increasingly becoming necessary for these species, as the wild populations decline due to many factors that are mostly caused by human interference. Although new and challenging, cultural primatology may eventually be a deciding factor in the survivability of non-human primate species, as well as a rich resource for better understanding the behaviors of early human ancestors.

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LAID-BACK LEMURS: A PASSIVE APPROACH TO SOCIAL HIERARCHY

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ABSTRACT

I conducted research that highlights the intraspecies behavior in four types of lemurs at the San Francisco Zoo. This enclosure is different because the species actually occupy the same space and must interact with one another on an everyday basis. There are seven lemur species in the enclosure, but I will be studying four of these species. How these species interact on a agonistic and affiliative level will be the main focus of this project. Through the use of time sampling and spatial analysis, a greater understanding of the interactions between species will be grasped. By looking not at just the behaviors themselves, but at the proximity between different individuals, the nature of their relationships within this dynamic will be made visible. I hypothesize that more competitive behaviors will be seen between groups such as scent marking, calling, and attacking. Not unlike humans, lemurs are territorial, and therefore use dominance strategies in order to define their relationship with other individuals around them. Since most lemurs use a passive approach to competition, it is difficult for someone to observe them without prior knowledge and complete understand of the dynamics within their social systems. Through this study, I would like to obtain a greater understanding of this, as well as share this appreciation with others. The more education and awareness that is acquired about these primates, the greater chance humans have in saving them from extinction.

INTRODUCTION

There are many studies on lemur interactions, but most of them are on intraspecies relationships. However in my project, I had the unique experience of studying the agonistic and affiliative relationships among different lemur groups in the same enclosure. At the San Francisco Zoo, seven lemur species share an exhibit, but only four of them were part of my study. These species included the ring-tailed (*Lemur catta*), red-ruffed (*Varecia rubra*), black-and-white ruffed (*Varecia variegata*), and the red-bellied (*Eulemur rubriventer*).

In order to begin this study, I first had to define what was meant by affiliative and agonistic. Affiliative gestures between individuals were those that could be considered friendly or helpful to another member of the group. Agonistic, on the other hand, meant that they were competing with one another for resources. These gestures actually shape the social structure of the group and lead to understanding the species on a deeper level, which could be overlooked by those not familiar with their interactions (Roeder, Fornasieri, & Gosset, 2002, p. 62).

These groups have distinct personalities and hierarchies, which makes it interesting to learn how they could possibly respond to one another under different circumstances. However, there are also similarities between most lemur groups, such as female dominance and away from the breeding season, female competition over food sources (Wright, 1999, p. 32). Since I did not find much evidence that they, in fact, come across each other in the wild, it seems to be a rare occurrence which has not been studied in great depth (Lahann, 2008, p. 117). This could be due to their status as a highly endangered species.

A few studies have been completed on co-occurrence of lemur species. However, the ones that I found were only studying, at most, three species in one area. Typically, these lemurs were sympatric with one another, even though there were bouts of agonistic behavior between members of the same and different species.

Black-and-white ruffed and white-fronted brown lemur

In this early study on lemur competition, it was noted that these species even though sympatric, did not engage in many outwardly agonistic tendencies toward one another (Iwano, 1989, p. 247). They did mention, however, that the black-and-white ruffed lemurs were seemingly dominant and did have access to a better food supply. The white-fronted would typically choose the lower canopy to forage, while the black-and-white ruffed would choose the upper layers.

Even though this researcher did not see this as agonistic, this type of passive aggression is common in lemur species. They use passive approaches to competition, such as avoidance, in order to coexist with one another in sympatric situations.

Ring-tailed, common brown, and crowned lemur

The members of these groups seem to have a more competitive relationship than many of the other studies completed on lemur interspecies behavior. While the brown and crowned lemurs directed their competitive behavior to those outside of the group, many of the agonistic interactions in the ring-tailed lemur group were observed within their own community (Kappeler 1993, p. 140). Social hierarchy within the group is also present. The male is mostly tolerated and is given a high status for mating and defense (Kappeler, 1993, p. 139, 141). This male exhibits a high number of “scent-

marking behaviors” and typically monopolizes all the interactions with the females (Kappeler, 1993, p. 139-140).

Males of ring-tailed communities typically only attack other males of neighboring groups, if at all, while the other two species attacked males and females (Kappeler, 1993, p. 141). The ring-tailed also did not provide protection from conflicts, while the other group’s males provided this service to the females. However, the females do not help males forage during feeding competition, which may account for this lack of cooperation (Kappeler, 1993, p. 141). This differs from the members of the other species, which engage in scramble competition to reduce the amount of food eaten by their group.

Therefore, within these groups, ring-tails mostly stick to themselves and do not engage in much outside involvement when it comes to competition. They generally compete with one another instead of other lemur groups that could possibly challenge their way of life.

Red-ruffed lemur and white-fronted brown lemur

One of the studies done on red-ruffed cohabitation was with the white-fronted brown lemur (*Eulemur fulvus albifrons*). Since there is a type of *Eulemur* species in the group at the zoo, the interactions between these two types could be similar to what will be seen in my research.

The two lemurs appear sympatric, meaning that they come into contact with another on a regular basis, just as the ones in my study (Vasey, 1997, p. 250). However, they occupy different niches in the wild and therefore are able to live around each without much competition. Even though they have an overlap in their home ranges, it was found that their social organization is very different (Vasey, 1997, p. 251). Even with this difference in community size, home

range, and territoriality, both these species are highly flexible. Due to their highly variable environment, this is not just a quality that these species of lemurs possess, but is actually a trait of most lemur species. Even though resources can be limited, this variability allows them to have a “balanced coexistence” with other lemurs (Vasey, 1997, p. 254).

Red-ruffed and black-and-white ruffed lemur

The black-and-white ruffed and the red ruffed look very similar and were once considered to be subspecies of one another. (Vasey & Tattersall, 2002, p.1). They are also known to hybridize in captivity and even sometimes in the wild, which raised suspicion of relatedness between the two types. But upon closer inspection, they were deemed a separate species. This co-occurrence in some areas has not been proven, but only speculated by the researchers who have seen these “hybrids” (Vasey and Tattersall, 2002, p.14). Since only three known hybrids have ever been seen and their home ranges are separated by the Antainambalana River, there has been limited research done on this claim (Vasey and Tattersall, 2002, p. 17).

However in captivity, co-occurrence has been quite high. Because there are very few red ruffed lemurs, they have been hybridized with black-and-white lemurs to become “tri-colored ruffed lemurs” (Vasey and Tattersall, 2002, p. 14-16).

In captivity and in the wild, the different lemur species interact through “loud calls,” which vary in volume and pulse rate and duration, but are recognized by both species (Vasey and Tattersall, 2002, p. 20). These calls can be used not only to alert for predators, but in other “high arousal” contexts. They also give validity to the idea that they are in fact separate species. These calls can even vary between the sexes, which could be an interesting topic in future

research, possibly in a smaller group with more time to differentiate between individuals (Vasey and Tattersall, 2002, p. 21).

Other studies

A couple other studies have also been completed on interspecies relations in lemur species. However, they did not involve any of my study species, and therefore, I did not feel as though they would have been useful to include.

HYPOTHESIS

I predict that there will be more agonistic gestures between the groups. Even though they are more passive responses, they will still be enough to show the hierarchies within the lemur social system.

MATERIALS/METHODS

This research was approved by the Animal Care and Use Committee through an IACUC proposal form that was filled out prior to beginning the study.

Study area

The enclosure at San Francisco Zoo is one of the largest in the United States (Photo 2). It not only gives them access to climb tall trees native to Madagascar, but also cohabitate with other lemur species within the same enclosure. This unique living situation gave me the opportunity to create this project and try to understand the relationship lemurs have with one another. Even though these types of close encounters with other species may not happen in the wild on a regular basis, it did give me a chance to understand hypothetical social hierarchy and competitive behaviors experienced within and between the species.



Photo 1: Lemur Enclosure at San Francisco Zoo

Materials

In order to recreate this experiment, I first created an ethogram of animal behaviors that is seen in the different species (Table 1, p. 8). An ethogram is “a catalog of an animal’s behavioral repertoire.” It lists the particular behaviors with a common name, which is then broken down with a very specific definition of the movement that is seen (Paterson, 2001, p. 115). Through this, I narrowed down which behaviors were the most important to the lemurs as a particular group, and then across the different species. I then was able to split them into two categories: affiliative and agonistic behavior. Once this was done, I created a check sheet with the behaviors on one side and the “proximities” between individuals on the other side (which will be explained in the methods section).

Table 1: Ethogram of Lemur Behaviors

<u>Behavior</u>	<u>Definition</u>
Sun-bathe (Sun)	Laying down on back with stomach up in resting state; affiliative
Sleep	Laying down on back with eyes closed; not moving; affiliative
Consume (Cons)	Eating food or drinking water that is given to them or foraged; affiliative
Loud Vocal (Loud V)	Noisy calling that can be heard at a distance by those observing or other lemur groups; agonistic
Low Vocal (Low V)	Quiet calling that cannot be heard unless near individual and typically observing it; agonistic
Approach (Aprch)	Walking up to individual with the intention of eliciting a response; agonistic or affiliative
Swat	Using hand to swipe at another individual usually during a confrontation; agonistic
Jump-attack (Jmp-Atk)	Leaping at another individual in order to elicit response; agonistic
Mount (Mnt)	Sexual gesturing used to assert dominance over individual; agonistic
Scent Mark (Snt-Mk)	Rubbing hands, behind, stomach, etc. as an indicator of territoriality; agonistic
Glare	Looking intently at another individual in order to show acknowledgement; agonistic
Smell	Picking up scent of another individual by placing nose near certain spot and inhaling; agonistic
Groom	Using hands to clean another individual's fur; affiliative
Forage	Walking around enclosure or climbing trees in search of food or water; affiliative
Sit	Resting hind quarters on ground and staring off at nothing in particular; affiliative

I also used an interval timer to record my observations at 30 second intervals. The one I used was the “Behavioral Timer-Free” from the Android App Store. It was very easy to use and saved my settings even when the application was restarted.

Data collection

For my observations, I used a focal animal sampling with an interval time scale (Paterson, 2001, p. 144-145). Since I was not able to tell individual members apart in the groups, I am not sure if the individuals I observed were male or female. However, from my research on lemurs, I found the more dominant sampling was probably that of the females (Erhart, 2008, p. 1227).

My method for choosing a focal sample was random. I chose a lemur species that, at that point, seemed to be interacting with the others on some level. I would then start the timer and record on a behavioral check-sheet what the focal animal was engaging in at 30 second intervals over a 5 minute time period.

In order to accomplish my goal, I had to look at not only what they were doing, but how comfortable they were around the different groups. In order to do this, a proximity study was added in order to show how close they were with members of their own species, as well as others (Paterson, 2001, p. 211-212). This analyzed how close they were to others while doing certain activities. The proximity scale was from 0-2. A zero meant that the lemurs were touching one another. A one meant that they were up to a foot away from each other, but not touching. A two meant that they were in the same vicinity as the other, which was up to about three feet away.

Using these methods, I conducted twenty hours of research between March 6, 2014 and April 29, 2014.

RESULTS

Within these results, a couple different types of analysis are completed. In the activity budget analysis, the activities are broken down by species and totaled. They were then put into percent form, in order to understand how much time the lemurs spent engaging in each activity, and therefore how much time being cooperative or competitive.

In the second analysis, the proximity data was organized by species in order to show which members of the groups were present at the time the behavior was displayed. This allowed the results to show which activities should be deemed affiliative, agonistic, or neutral.

Activity budget results

The behaviors listed in Table 1 were all put into data sheets. BWR stands for black-and white ruffed, RRL stands for red ruffed, RTL stands for ring-tailed, and RBL stands for red-bellied. A miscellaneous agonistic category was added to combine different categories that did not have a significant impact on the results as a whole. Under the miscellaneous agonistic behaviors, loud vocal, low vocal, jump attack, swat, and approach, and part of “other” were made into one classification. The other category was kept for this section, in order to show the entire activity budget, including the neutral behaviors.

The results were added by taking the “auto sum” of all the times the behavior was seen for each species during the study at the given intervals. Each behavior was then totaled to create the number of times that activity was seen by all of the lemur species (Table 2).

Table 2: Sum and Total of Activity Budget
 (# of times behavior marked on sheet)

<u>Behaviors</u>	<u>BWR</u>	<u>RRL</u>	<u>RTL</u>	<u>RBL</u>	<u>Total</u>
Rest	152	219	267	213	851
Feed	134	109	143	74	460
Groom	9	12	30	13	64
Misc Agonism	30	13	7	20	70
Snt-Mk	35	11	1	113	160
Glare	63	73	45	24	205
Other	228	219	172	162	781

From these totals, the percentages of these behaviors were then calculated for each lemur species, as well as all species as a whole (seen in Table 3). This was accomplished by taking the total number and dividing by the sum of all totals. After this, that number should be multiplied by 100, yielding the percent of “time” (actually amount of occurrences at the interval) the groups spent engaging in the behavior. For the percentage graph, the “other” section was split apart. The agonistic behaviors were placed under miscellaneous agonism, while the other behaviors were deleted, in order to show a more accurate depiction of the percentages.

Table 3: Percentage of “Time” Engaged in Behaviors

<u>Behaviors</u>	<u>Percentages</u>				
	<u>BWR</u>	<u>PRRL</u>	<u>RTL</u>	<u>RBL</u>	<u>Total</u>
Rest	35.9%	50.1%	54.2%	46.6%	47.0%
Feed	31.7%	24.9%	29.0%	16.2%	25.4%
Groom	2.1%	2.7%	6.1%	2.8%	3.5%
Misc Agonism	7.1%	3.0%	1.4%	4.4%	3.9%
Snt-Mk	8.3%	2.5%	0.2%	24.7%	8.8%
Glare	14.9%	16.7%	9.1%	5.3%	11.3%
TOTAL	100%	100.0%	100.0%	100.0%	100.0%

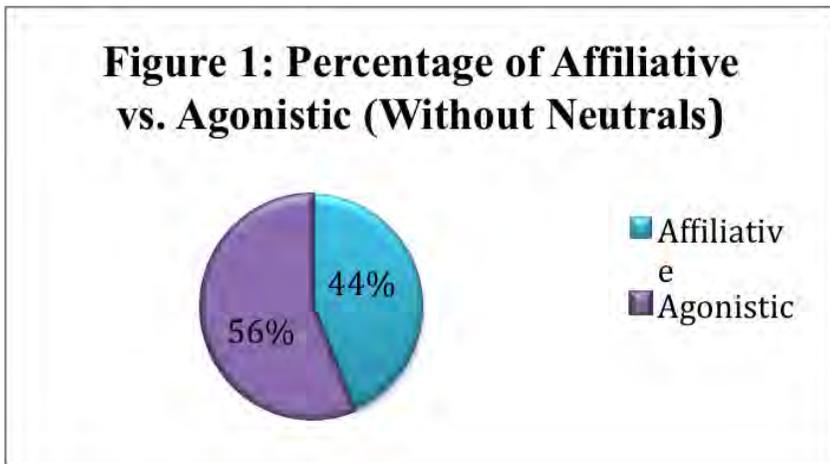
These results show that the highest amount of affiliation came from the resting (47%) and feeding (25.4%) aspects of their society.

The greatest competition came from mostly glaring (11.3%) and scent-marking (8.8%). The exception to this is the ring-tailed lemurs which mostly engaged in miscellaneous activities (1.4%) and glaring (9.1%).

For the percentage results, other categories were eliminated in order to reflect the intention of the behavior, and not the previously biased opinion on their social structure. “Other” was also split up, in order to account for activities that could be considered important to the study. Grooming was eliminated, as well as feeding (foraging and consuming). This allowed for the results to accurately portray the lemur groups as more cooperative or competitive.

By consolidating the data even further and finding the total percentages of all the affiliative gestures compared with agonistic, the amount of “time” spent engaging in these activities was calculated and represented in Figure 1. It shows that about 56% of time is spent in competitive behaviors, while only 44% are cooperative. Without the elimination of the neutral elements, this number became skewed. Competitive behaviors become 75% of the activity budget, while only 25% are cooperative. Because I took this data, I realized this was not an accurate description of their social hierarchy and extra data analysis was needed in order to come up with the correct results.

Figure 1: Percentage of Affiliative vs. Agonistic (Without Neutrals)



Proximity results

To analyze the proximity, I used the sort and filter tool in excel. This allows the user to sort the data by a single column and sort all like data together. This grouped all instances when each particular lemur was closest to the focal. This method made it very easy to show how close certain individuals were to others when engaging in different behaviors. Thus allowing me to decipher if these activities were cooperative, competitive, or neutral.

Black-and-white ruffed lemur results.

Black-and-white ruffed lemurs only come into the “0” proximity with lemurs in their species or red ruffed lemurs. The only activities they engage in at this proximity are auto-grooming, habitual dominance displays, and glaring.

In the “1” and “2” proximities, they spent the most time with other BWR engaging in auto-grooming, locomotion, and glaring. They also spent time in these proximity ranges with the red ruffed lemurs. When they were this close, all of their reactions were agonistic and included glaring, scanning, and running. The difference

between the two proximities is that some “time” was also spent with the RTL groups at the “2” proximity, but the only behavior seen was scanning.

Red ruffed lemur results.

While looking at the results for this species, it was interesting to see that the results did not match that of the BWR. In the “0” proximity, there was only one count of the BWR being that close, however when it was recorded it was an agonistic display. The rest of the “time” was spent with members of its own species, mostly auto-grooming.

In the “1” and “2” proximity, more time was spent with the BWR, but auto-grooming was the activity seen most frequently. They also spent a good amount of time with RRL at this range. The behavior seen was typically competitive and included running or walking away and glaring. Just as the BWR results concluded, more time was spent time with the RTL at proximity “1”, but auto-grooming was again the only activity seen.

Ring-tailed lemur results.

The RTL only spent time at proximity “0” with members of their own species. Affiliative and agonistic behaviors were both seen at this level. However, most of the agonism was glaring, which was directed towards members of other species, including the RRL and BWR.

At proximity “1,” they still spent the majority of the time with other RTL, but they did spend some time with the BWR and RBL, as well. The only activity that was seen between species was auto-grooming.

The “2” proximity was typically associated with interaction between RTL, but there was also a good amount of “time” spent with the BWR. The main behavior seen between these two lemurs at this distance was glaring and locomoting. They also spent a good amount of time around the brown lemurs in the enclosure, which were not part of my experiment. The only activity performed around this species was auto-grooming.

Red-bellied lemur results.

While engaging in behaviors in proximity “0”, such as glaring or auto-grooming, the RBL were typically around their own species, except in one case where they auto-groomed when a BWR was very close by.

In proximity “1” and “2,” they engaged in practically all activities with their fellow RBL by their side. This ranged from affiliative to agonistic gestures. However, there were a couple cases of auto-grooming around a BWR in both cases. Only in the “2” proximity, were there cases of the RTL in the same vicinity as the RBL. In this instance, scanning was the only behavior observed.

DISCUSSION

My results suggest that the lemur species in this enclosure engaged in more agonistic than affiliative behaviors towards members of other species. Even though I thought that many of the behaviors in the beginning of my research were affiliative, such as grooming or resting near a member of a different species, this could in fact only be toleration of these other individuals (Photo 2). This may be because they are more accustomed to these individuals due to their captive environment (Hosey, 2005, p. 108). They realize that they must deal with them on a regular basis and therefore participate in these activities around them, even though they would probably not engage

in these behaviors in the wild. Therefore, to the untrained eye, they may look like they are cooperative, while in fact they are just surrendering to the idea of sharing a space with these individuals.



Photo 2:
BWR & RRL Resting

Activity budget analysis

During this part of my research, I found that consolidating my results and eliminating the neutral aspects of my findings was necessary in order to come to accurate conclusions. While viewing the lemur species, I realized that most of their interactions with other species were agonistic rather than affiliative. The reasoning behind these interactions was probably due to territoriality or access over food. An example of this was seen in the black-and-white ruffed and the red-bellied species. They each had habitual dominance displays, which were spatial in nature.

The BWR would spend long periods of time running in circles in the enclosure. They would stop to scent-mark certain areas or even start fights with other members of their species or the RRL. The loud calls could have also been due to this interaction. Since the bouts of calling among the RRL and BWR were started from one individual invading the space of another,

territoriality and possible access to better food supplies might have been a reason for these displays.

The red-bellied would also engage in similar activities, except they would be disorganized in appearance. They would walk and scent-mark many of the structures they came into contact with. By doing this, they were delivering a message to the other species as to what part of the enclosure was their territory. Even though they were not vocally dominant, these other activities made them a more passive competitor within their social hierarchy.

However, how I designed my study was not accurate in portraying these agonistic displays and in the correct context. Many of the behaviors that I saw as affiliative in the beginning were actually neutral, causing my percentages to be inaccurate at first when I calculated them. By eliminating these neutral behaviors, I was able to come up with a percentage that was more accurate as to the true activity budget of the different species.

An aspect of my research which would have made my initial results more accurate could have been the addition of avoidance aspects to the behavioral profile. As in Iwano's (1989) research, avoidance could have been a main characteristic within their society. By leaving it out, my results may not have exactly accomplished what I would have liked them to.

Proximity analysis

By analyzing data on the proximity of the different species, I was able to describe how different activities varied between the species in relation to the proximity between individuals. In doing this, I was able to observe not just the behaviors they were participating in, but around which species.

The black-and-white ruffed lemurs (BWR) seem to be most similar to the red ruffed lemur (RRL). This does not include just outward appearance, but personality as well. They both respond to one another when loud calls are initiated. They also engage in dominance displays towards one another, which could mean that the BWR felt the most threatened by the RRL. This could be why the RRL are the only other lemurs who were seen in the “0” proximity range of the BWR and vice versa. In order for competition to be made known, they may have to be within a certain distance to initiate this type of response within their social group.

This could be why the ring-tailed lemurs (RTL) and the red-bellied lemurs (RBL) stayed away from the BWR and RRL, for the most part. Since they did not involve themselves in much of the dominance hierarchy on the larger scale, they did not want to give off that impression by getting too close. Instead, they would typically spend most of their time with their own species.

For the RTL, this is something that has not only been seen in captivity, but in the wild as well (Kappeler 1993, p. 140). The members of this group did not get involved with any fights or vocalizations that the RRL and BWR initiated. They did make their own kind of vocalizations towards other species when they got within the “2” proximity of their group. A low vocal would be initiated by one of the members, which would either be repeated by another or by the same individual. They would also huddle together in order to sleep or follow one another when looking for food or another place to sunbathe. Therefore, they were typically within one of the proximities in relation to one another at all times.

This type of behavior was also seen in RBL species, which form monogamous female dominant pair bonds (Marolf, McElligott, & Muller, 2007, p. 202). This could explain why only the other RBL was seen in the “0” proximity at

any given time. Even though I did not find out much about their interactions with other species during my research, their relationships amongst their own species seemed to be prominent. However, it is not directed toward their mate and this would explain why agonism was not seen from this species within the enclosure (Marolf, McElligott, & Muller, 2007, p. 203). The only type of evidence seen for any contact with another species, besides glaring, was an approach on a BWR, though this could have been mostly due to curiosity. This group of RBL was new to the enclosure, and therefore could have just been interested as to who they were living with, and had not yet figured out how to live within their new habitat.

CONCLUSION

In conclusion, as previously stated, agonism was seen between the groups at a higher rate than affiliation. This is due to the amount of different lemur species that cohabitate within the enclosure. Because they are in such close proximity to one another, territoriality is important in maintaining their social hierarchy. Even though my research affirmed my initial hypothesis, the experimental design could have been improved in order to show more of the interactions between these different species.

Future research

These findings might have been biased based on how passive lemurs are while engaging in competition (Wright, 1999, p. 32). They perform much less physical confrontations and more passive actions that tell another group to stay away. Since this is how they show aggression, it is more difficult to see how they are competing with one another. Therefore, my observations and results might not be complete in demonstrating the true intentions behind their actions.

I suppose this is true because even though the different groups were around each other during numerous activities, they never greeted each other (Kamilar & Ledogar, 2011, p.137). Only members of the same species would ever groom or greet another when they came into contact. This leads me to believe that the reason they perform these tasks near each other is because they have to. If they each had their own home range, these lemurs would probably not be involved in many of the behaviors they engage in while in the enclosure.

Future studies, for one, should study lemur dominance by adding the topic of avoidance. They should also break down the study to possibly just two species. This could narrow the study in order to truly capture the intention of the individuals. By studying four species, my overall competence in the specific lemur social system was compromised. I was not able to truly understand their intentions and activity because there were so many different hierarchical systems fusing into one. This made it difficult to obtain an activity budget that accustomed all four lemurs' way of life. I was not able to capture the full picture or extent of their social systems and dominance displays within captivity, but narrowing my research could have eliminated this problem.

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PHYSARUM MACHINES AND NETWORK ANALYSIS

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ABSTRACT

This paper details a two-month-long study on the characteristics of the networks formed by Physarum Polycephalum (a slime mold) and the commonality of these networks with human made networks (namely, road and social networks). The process included the growing and documenting of Physarum networks in petri dishes, and comparing the characteristics of the physical network and human networks using mathematical and computer science-related algorithms. The hypothesis of Dahlgren and Vasconcellos was that the Physarum network would share many commonalities with human networks, as the goal of Physarum is to grow in the most efficient way possible between food sources. The results indicated that these two networks do in fact share many similarities and will be detailed in this paper. The research was conducted as part of Sonoma State University's Computer Science 454 course taught by Dr. Bala Ravikumar and was influenced by work done by work done by Nathan McGaughy and Kevin Frye in a previous class.

In collaboration with and guidance from: Dr. Bala Ravikumar

PROBLEM STATEMENT

As stated above, our task was to create a physical physarum network and from there document its progress and algorithmically analyze its results. Once that was achieved, our task switched to bringing meaning to the results. Much of what has been done with the analysis of physarum networks has revolved around drawing comparisons with other types of common networks (for example, road networks and social networks) (cornell.edu, 2011 & Adamatzky, Jones, 2009). Going into this project, our hypothesis was that physarum would share many similarities with road network graphs. This hypothesis was reached after researching results of past experiments (in particular, a video that shows physarum accurately simulating Tokyo's road network and an article published concerning a study where physarum simulated Mexico's road network) (Adamatzky, Martinez, Chapa-Vergara, Asomoza-Palacio, Stephens, 2010 & "Tokyo rail network designed by Physarum plasmodium"). Another aspect we looked into was physarum's shortest path finding ability. To verify this, we hoped to run Dijkstra's algorithm on the network to look for shortest paths. However, we later found the network was not as connected as we anticipated.

LIMITATIONS AND SOLUTIONS

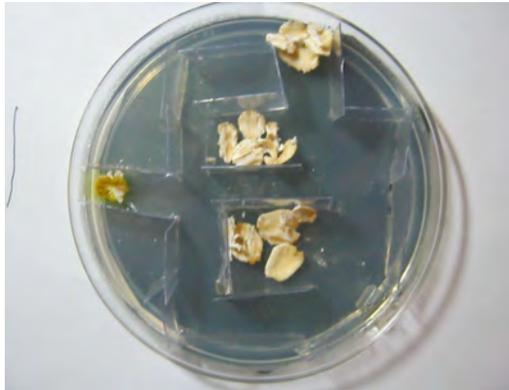
For this project, we were not able to produce as high of quality photos as we'd have liked because we did not have access to a high-speed camera. This meant that we had to do a lot more pre-processing on the images before sending them through any image processing algorithms, and also prevented us from taking pictures on a set timer, meaning we had to manually take the pictures.

PROCESS

I. Physical process

To create these networks, we set up several petri dishes with different food source/barrier configurations. By constructing barriers and multiple food sources, we were able to simulate network formation as well as shortest path finding. After the specimen had been introduced to the petri dish, we took a photograph every hour over a one-week period to document its growth. Below are a few examples of this process:

At application time:



After 6 hours:



After 18 hours (at this point, we see the physarum has found the shortest path from the first food source to the second):



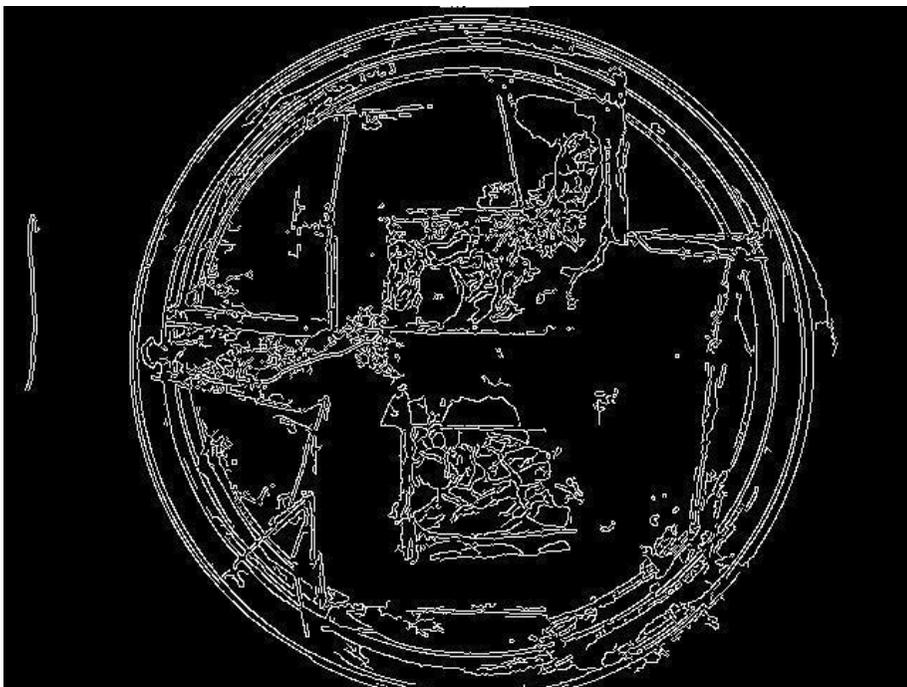
II. Analytical process

To analyze these results more thoroughly, we ran the images through some editing in programs such as Photoshop and Paint. This was done to try and remove some of the noise from the original pictures (for example, agar glare). Before we began processing the images via the algorithms, we had to process all the images using Preview and Microsoft Paint to convert the images from JPG format to grayscale BMP. The first algorithm, Canny Edge Detection, found all the edges in the images and cleaned up some of the noise (e.g. agar glare). We used an application of this algorithm found on rosettacode.org (RosettaCode, n.d) in the C programming language.

After applying Canny Edge Detection, we gained much more insight into the “decisions” physarum makes in reaching its food source. Notice in this image that you can clearly see the main stem of the physarum closer to the beginning of the maze, showing how

directly the mold grew towards the food. The image below is the result of applying Canny Edge Detection on the image of the model after 18 hours. This image was also altered using

Mathematica's "Sharpen" function, in order to more clearly bring out the lines that Canny Edge Detection found.



Here, we can clearly see the major paths the physarum takes to the food sources. The thickest line (resembling a major vein in a leaf) has created a rough approximation of the shortest path to the oats. There are many branches off of this path, with the most accurate thickening and becoming the major path. Not all of the growth is in such a direct line though, as can be seen between the first patch of oats and the smaller one above it.

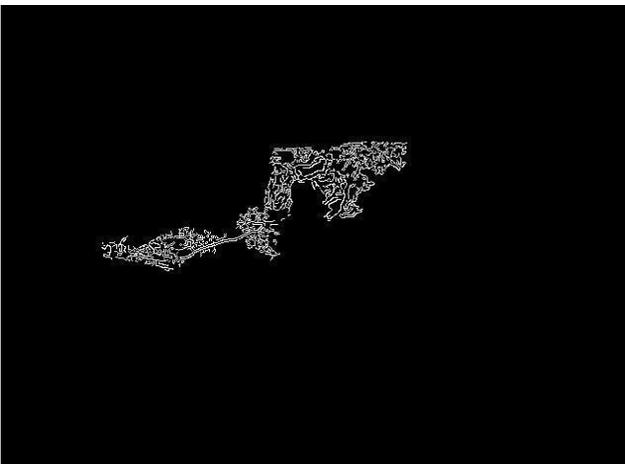
We then attempted to use some of Mathematica's built in functions to further extrapolate on our analysis. The functions we

tried were `SkeletonTransform`, `MorphologicalGraph`, and `MorphologicalGraph` with `Pruning`.

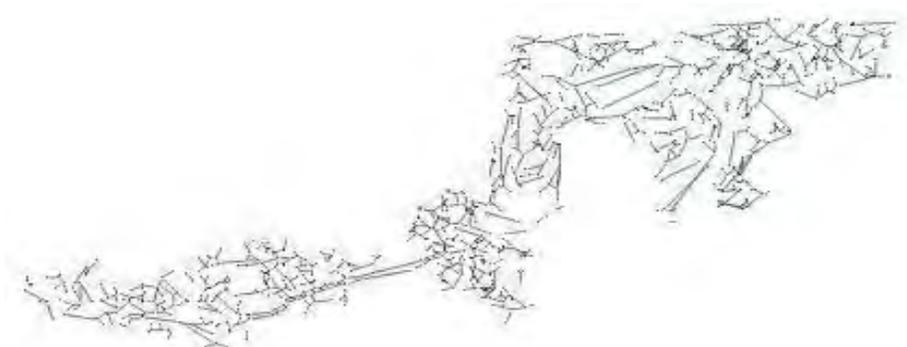
SkeletonTransform

From Mathematica Documentation: “`SkeletonTransform` gives an `Image` object in which the value of each nonzero pixel is the absolute Euclidean distance in pixels to the nearest pixel of background” (Wolfram Mathematica 9 Documentation, n.d.). This method of image processing seemed to be useful, since we wanted to isolate the thickest “most traveled” paths and remove as much noise as possible. The “`//ImageAdjust`” will automatically adjust the coloring and brightness of the picture to help with the transform.

The next approach we tried was to use Mathematica to convert a grayscale image to an image similar to the above one. To do this, we used the function `EdgeDetect`, which is very similar to Canny Edge Detection. After sending an image through `EdgeDetect` and `Sharpen`, the image was saved and edited in Paint to remove all traces of the petri dish and oats that were not eaten. The goal was to remove everything from the picture except the physarum network itself. Here is the edited image:



As you can see, this is an undirected graph that also has some seemingly random edges that aren't connected to the main network. The graph has a relatively high number of disconnected sections, but this is just due to how physarum grows toward a food source. It became less structured and seemed to generally spread outward toward the second group of oats. This image was then sent through a function called `MorphologicalGraph`, which will convert it into a graph (.gml file) that can then be used by Mathematica to analyze various graph properties. Below is the `MorphologicalGraph` of the above image:



The graph is seemingly random in some areas, but you can clearly see the longer and more distinct lines where the main veins were in the growth. The grayscale image was sharpened and sent through `EdgeDetect`. This screenshot shows the output of this, as well as the sharpened version of the edited image.

After the .gml image was created, Mathematica has several functions that are meant to analyze properties of a graph. The properties we chose to analyze were the graph's vertex count and edge count. We also tested whether it is directed, simple, weighted,

acyclic, or connected. Lastly, we checked to see how many components the graph has, and what its K-core number is, which according to Mathematica's documentation, is "a maximal weakly connected subgraph in which all vertices have degree at least k " (Wolfram Mathematica Documentation, n.d.).

Analysis of the graph

To better comprehend this network and its characteristics, we analyzed its vertex connectivity and degree distribution. Degree distribution is a probability based on the number of connections a vertex has to other vertices in the network.

Connectivity process and results

Our research into the connectivity (edge and vertex) of this graph proved to be unhelpful. After taking a closer, more zoomed-in look at the graph from the above process, there are very few sections that are completely connected for more than a few vertices. This means that both the edge connectivity and vertex connectivity of the graph are 0. The minimum number of edges or vertices you would have to remove in order to break apart a path through the graph is 0, because there is no direct path through this graph. We attempted to edit the graph into smaller pieces of it to see if it was possible to find connectivity, but this did not work. Our findings for connectivity are further backed up by Mathematica's K-Core Number function from earlier when we analyzed properties of the graph. The output shows that there are only 3 sections of this graph that are even weakly connected, meaning that the overall connectivity is very poor. This result was inconclusive; as it may have been impacted more by the quality of the image we started with rather than the actual characteristics of the graph.

Degree distribution process and results

The first step in this process was to use the adjacency matrix from the MorphologicalGraph output to analyze the degree of the physarum network. After this, we wrote a small Python program to calculate the degree of each vertex. This massive array is a list of vertex pairs that are connected by some edge. All curly braces were removed from the list because degree is not looking for specific pairs. If there was a specific vertex in any given pair that means there is one edge connecting to that vertex. This code counts the occurrences of each vertex and outputs them in a dictionary. Below is our source code: (from collections import Counter)

```
def quickSort(arr):
    less = []
    pivotList = []
    more = []
    if len(arr) <= 1:
        return arr
    else:
        pivot = arr[0]
        for i in arr:
            if i < pivot:
                less.append(i)
            elif i > pivot:
                more.append(i)
            else:
                pivotList.append(i)
        less = quickSort(less)
        more = quickSort(more)
        return less + pivotList + more
```

a = #this is where we entered the adjacency matrix. Due to the length constraints on this paper, we have left it out

```
d = {x:a.count(x) for x in a}
arr = []
for k in a:
    arr.append(a.count(k))
arr = quickSort(arr);
c = Counter(arr)
print "Here are the various keys found in this array.\n"
print c.keys()
```

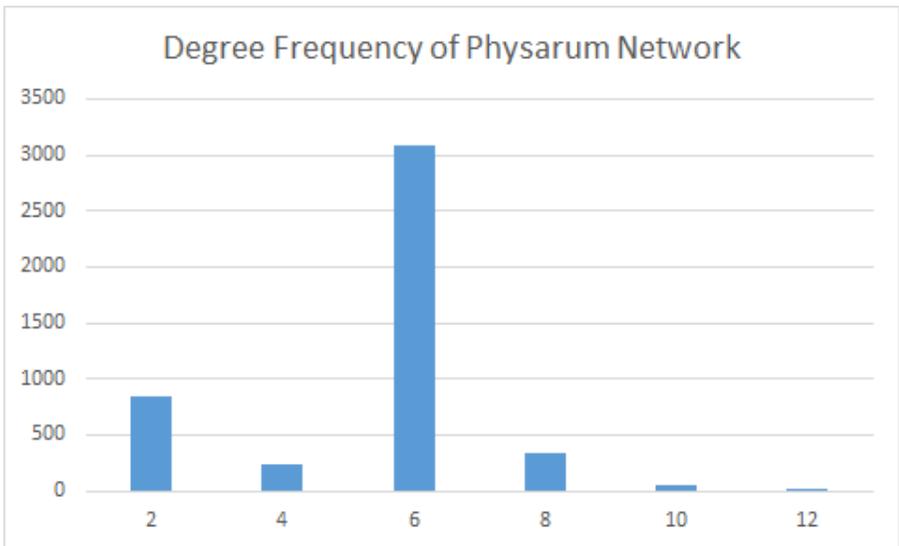
```
print "Here are the number of occurrences of each of the above keys.\n"  
print c.values()  
#print arr;  
m = 0  
for l in range(len(arr)):  
    b = sum(arr)  
print "Average degree of vertices:"  
print b/len(arr)
```

To more easily process these results, we implemented a quick sort method found on RosettaCode.org (RosettaCode, 2014) to sort the findings by degree. This code will output all degree values found in the list, the occurrences of each of them, and at the end will output the unweighted average degree. Below is the code (minus the adjacency matrix): (from collections import Counter)

```
def quickSort(arr):  
    less = []  
    pivotList = []  
    more = []  
    if len(arr) <= 1:  
        return arr  
    else:  
        pivot = arr[0]  
        for i in arr:  
            if i < pivot:  
                less.append(i)  
            elif i > pivot:  
                more.append(i)  
            else:  
                pivotList.append(i)  
        less = quickSort(less)  
        more = quickSort(more)  
        return less + pivotList + more  
#same array 'a' as above  
d = {x:a.count(x) for x in a}  
arr = []  
for k in a:  
    arr.append(a.count(k))  
arr = quickSort(arr);  
c = Counter(arr)  
print "Here are the various keys found in this array.\n"  
print c.keys() #the different frequencies of vertices found from the
```

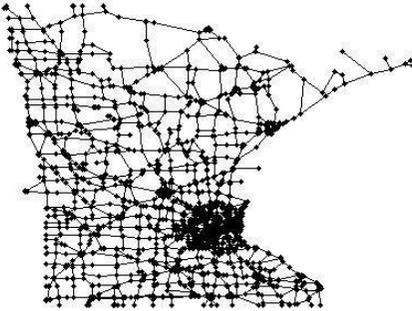
```
quicksort
print "Here are the number of occurrences of each of the above keys.\n"
print c.values() #the number of occurrences of each vertex frequency
print arr; #the entire array
for l in range(len(arr)):
    b = sum(arr)#sum all degrees
print "Average degree of vertices:"
print b/len(arr)#average degree
```

Below is a graph to more clearly illustrate these findings, made using Microsoft Excel:



As you can see, the physarum has managed to grow a complicated network with several different degrees. This does not necessarily mean that the network as a whole had high connectivity though. While there are very few vertices that have 10 or more edges connected to them, the vast majority have 2-6. It is interesting to note that the majority of the vertices have degree 6, which is only 1 above the unweighted average degree of 5. The weighted average degree is 5.4.

We then compared these results with a processed graph of Minnesota's road network. Below is the minimally processed image we started with (David G. Leich, 2009):



Using Mathematica, we processed this image in the same way we processed the images of the physarum network (namely, using edge detection algorithms, sharpening the resulting image, and finding the morphological graph). From this graph, we generated an adjacency matrix. Running it through the degree distribution program with this new adjacency matrix, we got some exciting results:

output:

Here are the various keys found in this array.

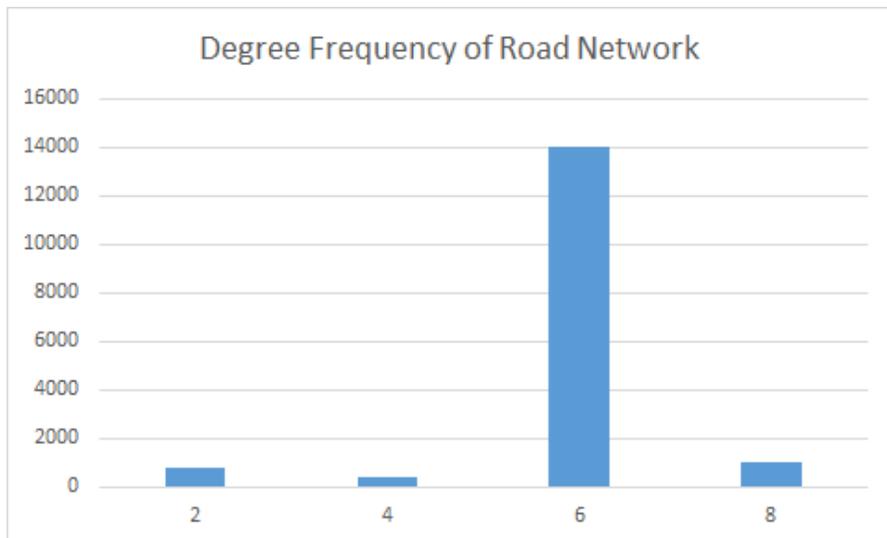
[8, 2, 4, 6]

Here are the number of occurrences of each of the above keys.

[1000, 804, 404, 14058]

Average degree of vertices: 5

Using Excel, the graph below was made to better visually represent this data:

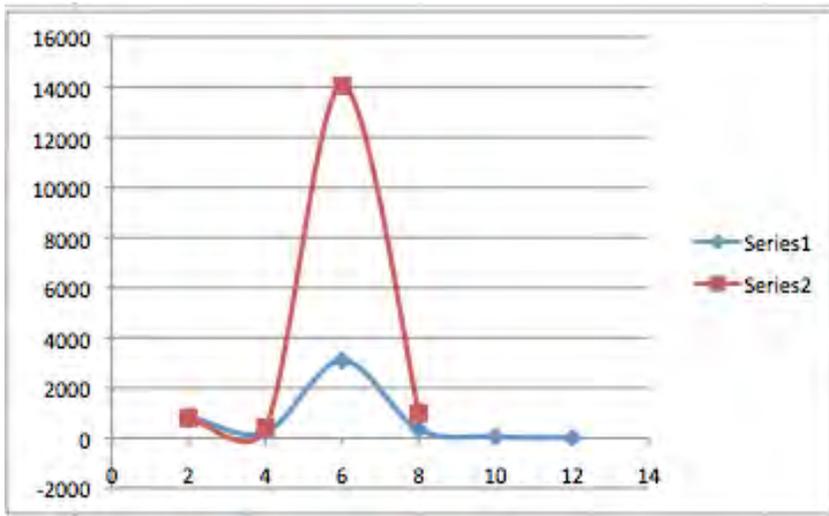


The interesting thing about this is that the average degree for the road network and the physarum network were the same, showing that their paths were created in similar ways. The weight average degree is also very similar. Weighted average degree is discussed below.

Next, we calculated the weighted average degree to be 5.9. The weighted average degree in the physarum network is similar the average degree in the road network, which sheds light on the similarity of the two networks. However, average degree is not necessarily scalable so more analysis was necessary.

The distribution for this graph shows that 92.58% of the vertices have a degree that is higher than the average degree, and 7.42% have a degree that is lower than the average degree. Physarum’s graphs shows that 76.33% of vertices have a degree that is higher than the average degree where only 23.67% have a degree that is lower than the average degree. From these results, we clearly see that a vast majority of vertices in both networks are higher than the average. Below is a graph that illustrates these findings:

(note: Series 1 relates to the road network and Series 2 relates to the physarum network)



Here we see a better representation of the similarities and differences in these two networks. Both follow similar trends, but the road network has a much larger percentage of vertices closer to the weighted average (low standard deviation). This is obvious to see even without the graph, as the variety of degrees in the road network was only 57% of that of physarum's degree variety. What we can deduce from this is that the road network has been constructed in a more uniform way than the physarum network. We can bolster this

result by looking at the heavy tail distributions of these two networks (which we will get into shortly).

Log-Log plots in Microsoft Excel

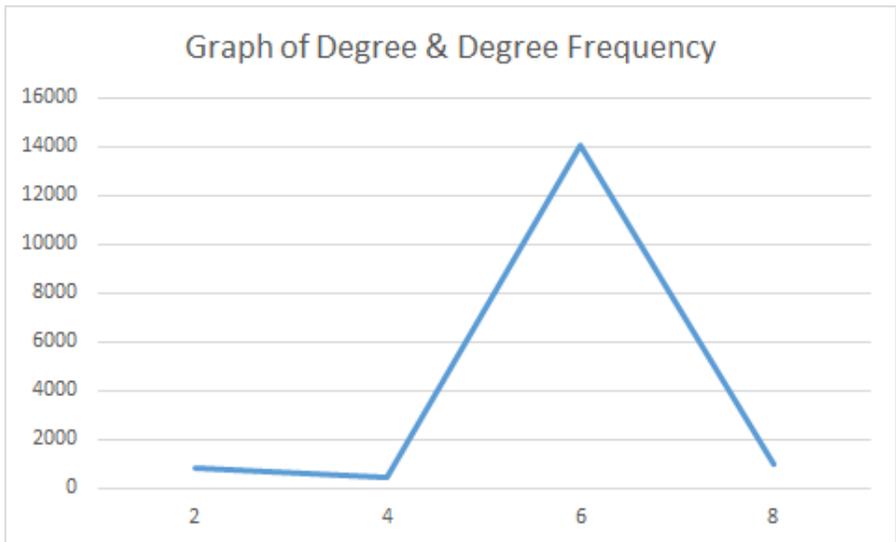
With Dr. Ravikumar's guidance, our next step was to create a log-log plot of this information. We had to result to manually creating a log-log plot using the logarithmic functionality of Microsoft Excel. In order to make a log-log graph for the degree distribution of a road

network, we first took our data of degree and degree frequency. Here is the data again in table form:

<u>Degree</u>	<u>Degree Frequency</u>
2	804
4	404
6	14058
8	1000

In order to make a log-log graph for the degree distribution of a road network, we first took our data of degree and degree frequency.

Below is the data again in table form:

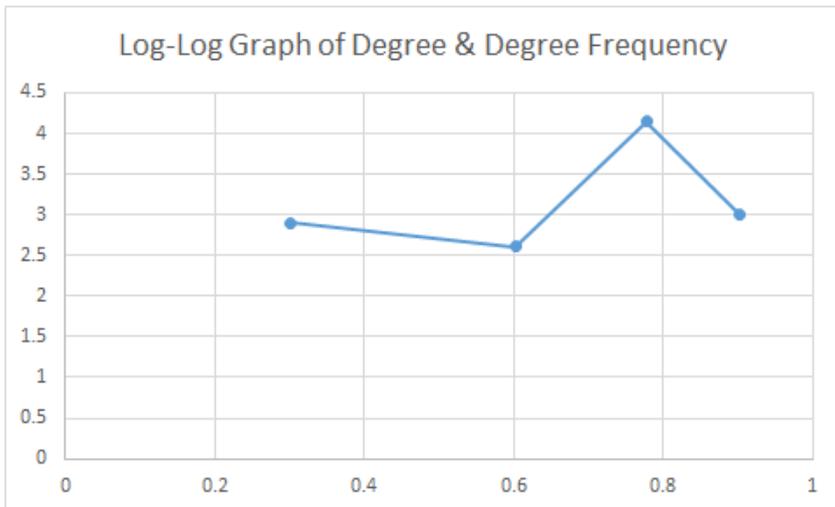


In order to get a log-log graph, we took the log of all values used to generate the above graph, and graphed the results, resulting in the x-axis becoming log (degree) and the y-axis becoming log (frequency). What the slope of the log-log graph will tell us is whether these two data points have a power-law relationship (Nave, 2000). The power-law relationship states that some number y is

equivalent to some number x , raised to some power z . The power that x is raised to is the slope of the line. When the graph of this data is viewed at a different exponential scale, it should show similar characteristics to the original graph. It might not because some data relationships will change when viewed at a different scale, so this is a good test of how related to each other the data actually is. The log-log graph is not exactly a straight line, so it is hard to say whether there is a power law relationship here (pomona.edu, 2001). However, we do suspect there is a power-law relationship because this graph is much straighter than the original one. It is unlikely to get a straight line with data that has as drastic as a peak as this data does. The distribution of our data was better for the physarum analysis.

These are the log numbers used to generate the graph:

<u>Degree</u>	<u>Degree Frequency</u>
0.30103	2.90526
0.60206	2.606381
0.778151	4.147924
0.90309	3



Next, we took two (x,y) pairs from our data and found the slope of the graph. This is the formula we used to find the slope of the log-log graph:

The points (4,404) and (2,804) were used for this equation. Using wolfram alpha, the slope (also referred to here as ‘alpha’) of the log-log graph’s line is -0.992840208. Our hypothesis here was that the slope should be negative if in fact there was a relationship between the physarum network and road networks, and these results backed our hypothesis.

Here is the same process but for the physarum data. This is the original data:

<u>Degree</u>	<u>Frequency</u>
2	852
4	232
6	3090
8	344
10	50
12	12

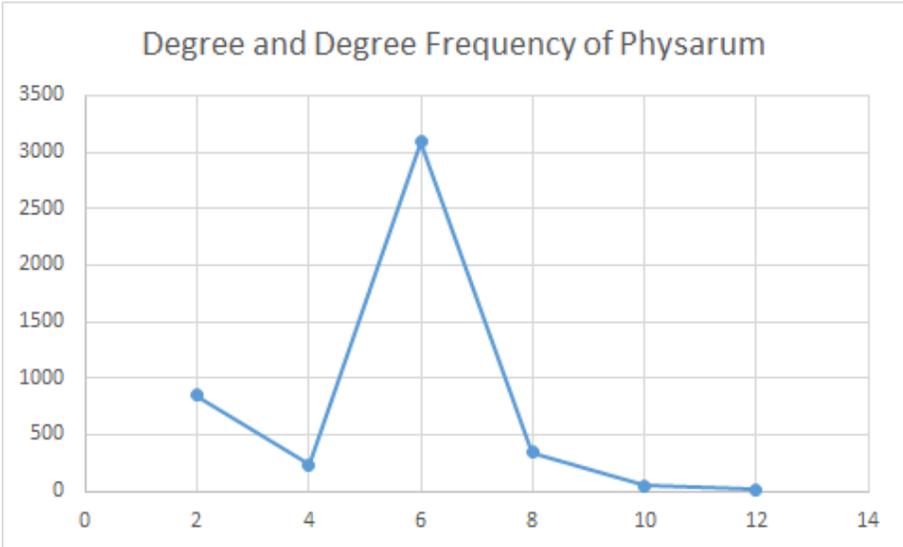
And here is the log of this data:

<u>Log (Degree)</u>	<u>Log (Frequency)</u>
0.30103	2.93044
0.60206	2.365488
0.778151	3.489958
0.90309	2.536558
1	1.69897
1.079181	1.079181

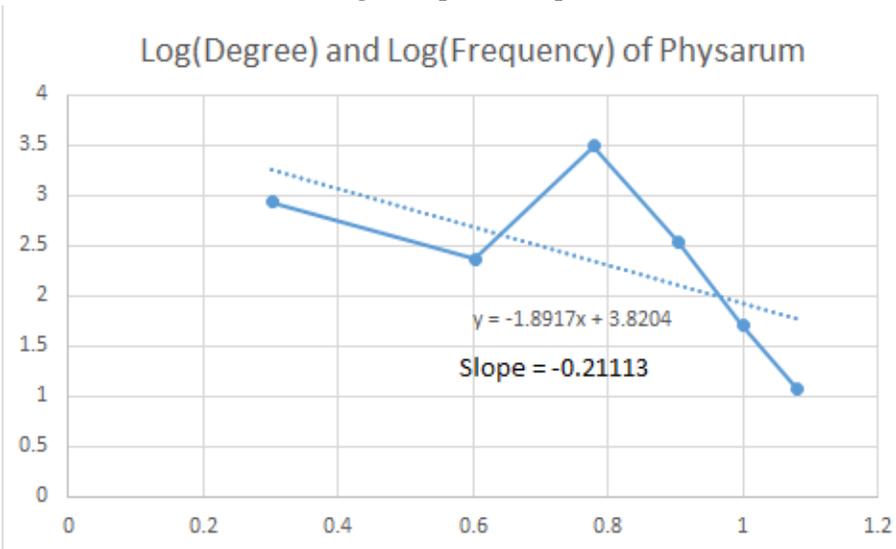
The slope of the line can find the exact power-law relationship number. In this case, in order to get the log-log graph, you would need to raise the numbers to a power of -0.992840208. It makes sense that the relationship is very small

because of the much-decreased scale of the graph.

This is the original graph of the physarum degree distribution:



Below is the log-log graph of physarum's degree distribution, including a slope line equation:



While the original graph is nowhere near a straight line, the important aspect of this graph is that it shows a straight, negative line in the heavy tail. This shows that there is a power law relationship between this data because log-log plots may only show a relationship in the tail, depending on the inputted data. We suspect this is just due to the high variance in frequency. The original data is related to this by a power of -0.21113 , which is the slope. Further, the slope here is negative.

According to past research done by Dr. Ravikumar, we knew these log-log plots along with the log-log of social networks should represent a negative slope. As you see here our graph has that characteristic, which seems to provide some tangible evidence of the similarities between these two networks. The slight differences in these graphs are most likely due to the fact that there is a greater variety of vertex degrees in the physarum network, though it could also be due to the size of the road network graph and how it has several thousand more vertices, or the quality of the images we started this process with. Nonetheless, at the time of this writing we feel that the physarum network plot shows a striking similarity to the characteristics of social and road networks, which seems to confirm our hypothesis that physarum networks share common characteristics with these two types of networks.

CONCLUSION

After completing our analysis, we were excited to find similarities between our physarum network and a real-world road network. This project challenged us in many ways, not the least of which was the variety of languages we needed to be familiar with to achieve these results. We worked with programs written in Java, Python, C++, and C, as well as code snippets we wrote in Mathematica notebooks. Also, it provided us with the rare opportunity to work with a living specimen in

a Computer Science project, which presented its own challenges. We spent a considerable amount of time researching optimal conditions to grow a physarum network and set up many failed environments before achieving success with a smaller scale maze. Once we had the mold growing, it took some photography skill and precision to make sure we were documenting the changes in the network accurately, and some knowledge of programs like Adobe Photoshop and GIMP Image Editor in order to pre-process our images so they could be sent through the rest of the algorithms.

If we were to repeat our experiments with the knowledge we now have, we would not have designed a maze for the physarum to navigate, and instead have focused on creating a larger, more intricate network. This is because after we finished the whole process of growing the mold in a maze, we ended up removing the petri dish and maze walls from our image before analyzing them. We also advise those interested in working on projects such as this to invest in a high-speed camera that can be programmed to take photographs automatically. From this experiment, we have seen that physarum-made networks closely resemble human-made networks (specifically, the road network we chose to analyze). The implications of research like ours and others we have cited and consulted could provide helpful insight to the ways road networks are planned out and constructed.

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VISIONS IN TIME:

CONTEXTUAL CHANGE FROM ROCK ART AND INTAGLIO

TO CERAMIC, TEXTILE AND TATTOO

A RESEARCH DESIGN PROPOSAL

TANIA RYAN

ANTHROPOLOGY & HISTORY MAJOR

SONOMA STATE UNIVERSITY

ABSTRACT

There is much work being done in the field of Rock Art archeology all over the world and especially in the South Pacific. Raivavae however does not appear to have had any work done upon its rich history in this aspect. There have been expeditions to Raivavae in the past, and a team was in the field in 2006 examining colonization and settlement patterns, Marae architecture, interaction zones, and human impact on the island ecosystem. By conducting a through study and analysis of the Rock Art and Intaglio on the Island of Raivavae, exploring the contextual changes from rock art of selected enduring figures through the forms of ceramic, textile, and onto skin (tattoo); while examining the potential of the question of status in contrast to power in group interaction and marriage relations as a impetus for the change. This research would help further their understanding of the Marae aspects of their expedition, while adding to the present body of the work done in the Austral Islands and French Polynesia, as well as inform and enhance the work in the South Pacific as a whole.

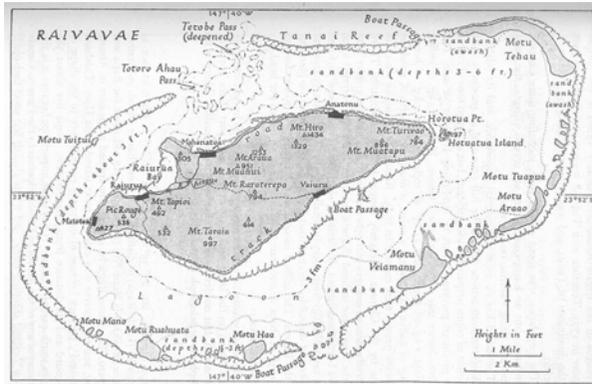
Key Words: Austral Islands, Ceramic, French Polynesia, Intaglio,
Raivavae, Rock-Art, Tattoo, Textile, Vavitu

INTRODUCTION

Raivavae Island, also known as Vavitu, is in the southeastern most archipelago of the Austral Islands in French Polynesia; part of a group of five archipelagos containing over 120 islands covering more than five million square kilometers in the southern Pacific Ocean. Raivavae is an island atoll covering sixteen square kilometers [approximately 9.94 miles] containing a sixty-four square kilometer lagoon that formed between 5.5 and 7.4 million years ago, with its highest point being Mount Hiro at four hundred and thirty-seven feet. Raivavae is the only volcanic island in French Polynesia with a large barrier reef located south of the Tropic of Capricorn. (Bonatti, 1977) The Polynesian peoples, who most likely evolved out of the Lapita Cultural Complex of Oceania, pre-historically settled these archipelagos prior to 1000 C.E. (Gifford, 1952)

There is evidence of incursions by other peoples, including the Chinese up to and continuing with European/Western contact by Spanish navigator Captain Thomas Gayangoes in 1775. The island provided sandalwood for European traders who stopped here during the early 19th Century. ("Presidency of French Polynesia - Raivavae," 2007) European contact is reported to have wiped out "*all but 120 (of a 3200 population) on Raivavae in 1826*" (Fischer, 2002) The island remained under the hegemonic protectorate of Tahiti until 1880 when France annexed the island due to the demise of the Pomare dynasty. The current population on Raivavae is nine hundred and forty as of the 2012 census, down from one thousand and forty-nine in the prior census report of 1996; the population comprises approximately 80% Polynesian, 12% European, 8% Chinese overall. To help preserve the local economy and cultural life-ways the French government imposed strict regulations on tourism and immigration in 1938. Currently the island has a well-developed transportation infrastructure, including a bus

system and an airport built in 2005.



The lagoon is much encumbered with coral patches and sandbanks, not all of which are shown. Based on: (1) Admiralty chart no. 5461; (2) French Admiralty chart no. 5246.

Map courtesy of the Perry-Castaeda Library Map Collection at the University of Texas



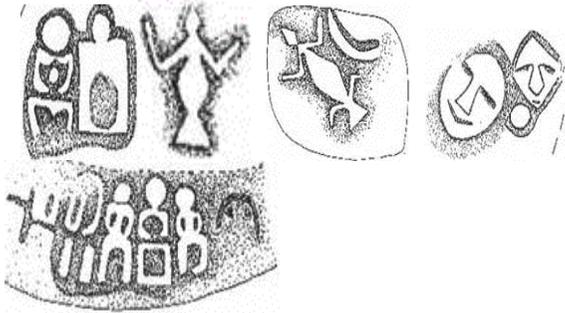
Images courtesy of The Pacific Island Research Institute

The people of Raivavae have a rich history and an acknowledged desire to know their cultural history. (Keesing, 1950; Lilley 2006) With that intention and with as little bias as it is possible to bring to the late-colonial situation that exists, the intent of this design is to conduct a thorough study of the Rock Art and Intaglio on the Island of Raivavae, and explore the contextual changes from rock art of selected enduring figures through the forms of ceramic, textile, and onto skin (tattoo); while examining the potential of the question of status in contrast to power in group interaction and marriage relations as a impetus for the contextual changes in the archeological and material culture record.



*Bas Relief & Statue
(Stokes Expedition 1921)*

H. Bodin. November 1934



Images and rubbings courtesy of the Raivavae Archeological Project

PROFESSIONAL RESEARCH CONTEXT

The work being done in the fields of Rock Art, ceramic, textiles, and tattooing in regards to anthropological studies is vast. In the South Pacific all of these are actively being studied, although not in the Austral Islands, or on Raivavae. The colonial and post-colonial aspects of the culture and its impact upon the groups involved in terms of heritage, lifestyle change, and outlook are being actively examined. (Craig, Kernot, Anderson, & Pacific Arts Association (1974-), 1999; Fage, 2005; Keesing, 1950; Lilley, 2006) The desire to re-build a complete cultural history of their own is prevalent amongst the people of the islands, and is reflected in some of the work being pursued. Shown below are the known expeditions to Raivavae, the most recent occurring in 2005-6.

KNOWN EXPEDITIONS

John Stokes Bishop Museum, Hawaii	1921	Early maps of significant historical sites and known phallic shaped stone images
Frank Stimson	1938	Linguistic studies
Skjølsvold / Heyerdahl Norwegian Archeological Expedition	1956	Examined fortified stone terraces and ceremonial plants
Donald Marshall	Late 1950's	Contemporary culture and ethnology
Edmundo Edwards Archeological Survey of Raivavae	1986-7	Extensive archaeological excavations. Published the standard work on the archeology of the island
Raivavae Archeological Project	2005-6	Colonization, architecture, interaction zones, and settlement on the island ecosystem

The Raivavae Archeological Project in 2005-6 examined colonization and settlement patterns, Marae architecture, interaction zones, and human impact on the island ecosystem. (Edwards, 2000) Prior expeditions mapped and studied the linguistic and cultural heritage of the island.

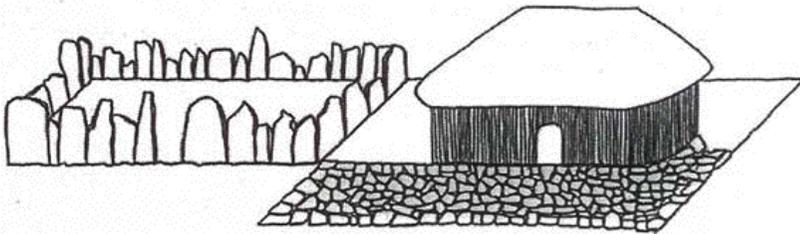


Figure 4.1 Enclosed court *marae* (Type B2)
Sketch From Edmundo Edwards Expedition 1986-7

The research proposed here would help the understanding of the Marae aspects of their expedition, while adding to the present

body of the work done in the Austral Islands and French Polynesia, as well as inform and enhance the work in the South Pacific as a whole.

The examination of Rock Art and its relation to cultural context is well researched. Extrapolating meaning from the images in context and from the contemporary and historical record, while tricky can sometimes be done depending upon the locale and cultural loci. (Connor, 1988) While it may be impossible to deconstruct the original intentions of the original creators of the art and intaglio on Raivavae, as it is with nearby island sites such as Rapa in the Austral Chain, which should not be confused with the more well known but culturally related Rapa Nui/Easter Island, and others. There is a possibility that the local oral histories, and other extant records may provide clues to interpret the images with more certainty than in other locales in the region. Even without that facet, the ability to study and add to the record in all four areas for the region and for the history of the island and its people would provide an invaluable resource for the local peoples and other researchers.

RESEARCH QUESTIONS

The research questions fall into all of the basic categories of anthropology; archeological analysis and data gathering, cultural research / ethnography, economic and kinship impacts of art and trade (biological), and linguistic analysis of the rock art and intaglio itself as a means of communication. The intent of this project it to address a gap in the archeological record that exists on the island of Raivavae and assist in documenting the body of knowledge that is growing in this region of the southern pacific. Helping the people of Raivavae rebuild their cultural history is already an established priority for one archeological team and this exploration into the islands past would assist in their work regarding Marae architecture, and potentially trade interchange, amongst other aspects.

The investigation of Rock Art and Intaglio as archeological features and within the contextual record will help place the settlement patterns and cultural transference across the Pacific in terms of “data waves”. It is likely that waves of settlement will be detected by comparison with other recorded sites in the area and fit in with the temporal and material archeological record already in place allowing for further research in the region. The different styles and types of Rock Art, petroglyphs, and intaglio should be compared to indicate interactivity within the island groups and potential transference. Extrapolation of the interstitial relationships of the social, economic, and kinship ties especially in regards to trade and power/status should be very revealing. (Nash, 2004) A study of the uses of ceramic and the advent of its use in the archeological record, as well as its continued use and meaning of the images, if still a utilized means, will provide a solidified current link between the rock art and intaglio and the textile form of expression.



Carved Paddle handle
Image courtesy of *The Austral Islands:
History, Art, and Art History*



Mother of Pearl carving on a hairclip
Image courtesy of *The Pacific Islands Research
Institute*

The source of ceramics on Raivavae should be identified, if ceramics were spontaneously “invented” or imported the archeological or historic record should display evidence of this. (Trigger, 2003) If ceramic usage has become part of the historic record, determination of its period of use, especially of its ending will help establish the shift into the textile expressive form. If the remaining three forms are all in concurrent use, (ceramic, textile, and

tattoo) it will need to be determined why, by whom, and what purpose they are used under – or if there is no delineating point of change. The same process will be used for the analysis of textile. The use of tattoos may pre-date the use of ceramics, or possibly have been used in different contexts. There is a need to examine the use of tattoos in terms of the ritual and profane on Raivavae. (Price, 2001; Gilbert, 2000) Specific research questions to be addressed are as follows:

- Are the symbols and intaglio consistent in the archeological record?
- Is there a shift in the imagery according to the location on the island?
- What are the most dominant imprints?
- What did the symbols convey (Intaglio and Rock Art)
 - Has the meaning shifted?
 - Have changed in design (if present) changed the interpretation?
 - Has the change in medium inflected these attributes?
- Are there rapid changes in the archeological record, or from one medium to another?
- Do the mediums co-exist?
 - If so why and to what purpose?
 - Are the symbols or intaglio interpreted differently due to the medium?
 - Is the medium contextually part of the interpretation?
 - Are the mediums a natural progression of some form?
- Evidence of Incursions?
- Is there detectable transference (from neighboring trade or marriage associations?)
- Are only the Rock Art symbols transferred, or the Intaglio as expression?

- Are these done together or separately?
- Under what context?
- Can former context be extrapolated from the current uses?
- Does the analysis of the carbon dating and infrared data show a match?
- Are there pigment changes in the archeological record?
- Are the pigment / paint changes reflected in the ceramic, textile, or tattoo pigments?
- Have the displays of certain symbols changed significantly over time?
- Are there new methods of expression while retaining basic form?
- Did changes in environment (such as mobility, marriage, status vs. power, etc) precipitate the change in medium of expression for these particular symbols?
- When were the changes to medium spatially and temporally fixed?
- Was portability (and reason thereof) of the symbol and determinant factor in the change of medium?
- Were the changes precipitated by marital customs or gift exchange?
- How might the inter-island (group) Trade / Exchange interaction be significant?
- Are the symbols associated with certain events or perhaps family / gender line?
- Are these particular symbols significant in terms of transmission, and if so what kind of transmission / meaning.
- What ritualistic connotations might the symbol or intaglio possess for the users

- Might these same connotations have changed or evolved over time?
- Is there evidence of ritualistic importation or religious shift due to incursion or invasion?
- Do the ancestral stories of Toeno Hine and the legend of Hotu Atua and Rua Tara have any impact upon the symbols?
- Has the advent of Western Religions changed the contextual meanings of the symbols?
- Has the advent / dominance of western religions / cultures caused the symbols to be suppressed or subsumed in other ways to preserve the contextual heritage?

METHODOLOGY / ACTIVITIES / STRATEGIES

The overall strategy for this research plan would be to examine the rock art and intaglio itself and analyze it using carbon 14, infrared dating techniques, and photography. (Bleitz, 1976; Bracke, 1979; Chalmin, 2003; Felder, 2007; Wilson, 2004) Drawing on related expeditions, research, and resultant interpretations in the region, application of similar methodologies in terms of recording and gathering data, while including the newer techniques of infrared and other pigment analyses. (Arsenault, 2004; *Easter Island Rock Art: The 1981 Field Season (El Proyecto Petroglifo de Rapa Nui)*. 1981; Edwards, 2000; *El Proyecto Petroglifo de Rapa Nui* 1981; "El Proyecto Petroglifo de Rapa Nui ", 1982; O'Connor, 2003) Study of the ceramic and textile artifacts requires a different approach and documentation, but the techniques already in analytical use are effective for research. Information gathered regarding the tattoo requires another type of approach. Insight into gathering effective data is provided in current research and in other places in the world where tattooing is a focal point of group identity(s). (Gilbert, 2000; Handy & Handy, 1971;

Kuwahara, 2005; Thomas, Cole, & Douglas, 2005) Collection of historical data and family histories might be pursued in several manners: local records, informants, and other verifiable avenues that would provide some convergent data to construct a record of a potential timeline for the changes to the mediums. While detection of the mediastic shift may not be possible, other clues and information that would round out the cultural record would be brought to light, and assist in future or concurrent research by others. (Edwards, 2000) Interviews with inhabitants as well as elders will be a vital part of this endeavor; knowledgeable informants from within and without the communities regarding the history of the island should be sought out and interviewed with as little bias as possible. Being aware of the colonial to the post-colonial stage they are currently in will provide insight into the ethnographies recorded. If sympathetic local experts on various aspects of the research design can be located, this would be beneficial to the completion of the design proposal, however even hostile inhabitants will reveal something of the daily life, if not insight. The following list is a more specific methodology plan for use in the field.

- Examine [historical] marriage customs. Also status of individuals and the relation / impact this might have upon transmission of these symbols.
- Examine the symbols themselves in terms of context and related images for contextual clues.
- Study status vs. power structure and transmission within family groups.
 - Compare and contrast with historical attitudes and actions.
- Examination of who, what, and why transmission should reveal portability events and intent of medium change

- Investigate oral histories, interview (where possible) local custom and current usage (if applicable) of these symbols to contrast with prior to extrapolate change.
 - Examine how the symbols traveled – and hopefully when, with whom, and why.
- Is there a more current method of symbol transmission now in use?
 - When did this change occur?
 - Why was it done?
- What is this new method in response to (ecological / cultural / etc) and how would this apply to historical transmission?
- Lineage tracing and associated goods, along with research of items and formerly mentioned historical and legend transmission -- Physical tracing of items temporally, spatially, and within family lines might help.
- Attempt to date from histories, records, other culturally transmitted data, and other relevant data (look for convergent verification) Cultural histories may reveal contextual or interactive guidelines
- Date pigments and analyze the type of dyes, paint, etc., to help determine locale of source and time frame. Attempt C-14 dating, infrared, or other method where applicable
- Interpretation of symbols, associated histories, geographical passage
- Discovery and method of transmission along with interpretation of symbol / symbolic meaning over time and comparing this data with data from other locations.



SUMMARY

The pursuance of this project, which covers many facets of anthropology and aspects of theoretical bases but mainly including post-modernist theory, will allow for the interchange of new information into the archeological, cultural and ethnographic record, not just for the Austral Islands, but for French Polynesia, and the neighboring interchange zones. The research that is being done in places such as Australia, Indonesia, and Micronesia will also benefit, as many of the techniques and information may directly relate to the work that is being pursued there. Elsewhere in the world the data derived from the carbon-14 and infrared photography / spectral analysis could prove beneficial, along with the pigmental analysis in terms of revealing the techniques used by early pictogram and petroglyph painters in preparing for their work. The ceramic, textile and tattoo results would also add to a worldwide fund of information that may prove useful in some aspect other than the native region at some point. Raivavae Island is a rich archeological and historical basis for study, ripe for many kinds of ecological investigation.

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ARTIFICIAL CRANIAL MODIFICATION

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ABSTRACT:

Artificial cranial modification refers to a practice that involves the reshaping of the human skull during infancy in response to imposed cultural pressures. This process ensures that the infant will grow up to fit into a specific cultural ideal and therefore provides the comfort of group membership. Cranial modification is a form of symbolic expression that is handed down from parent to infant. This takes place during infancy when the fontanelles, the cartilaginous material between cranial bones, are soft and malleable (White and Folkens 2005: 85). Bioarchaeology uses methods from physical anthropology as well as archaeology to analyze the effects that cultural practices have on human physical remains. This is important to the study of Bioarchaeology considering that this practice effects the physical remains of the decedent so visibly and has such large social implications. Cranial modification is one of the ways that cultural pressures leave their imprint on human skeletal remains and thus give us insight about how our ancestors may have lived. Artificial cranial modification is the most common type of cultural skeletal modification (White and Folkens 2005) and is practiced for varied purposes, therefore it is extremely important to understand in terms of human cultural variation. Kirsi Lorentz discusses how cranial modification denotes a world view indicating that the body is not yet complete (Lorentz.2002:7). Kirsi Lorentz discusses within the cultural context of ancient Cyprus that the body is meant to be shaped by the parents essentially meaning that your parents make you who you are (2002).

Artificial cranial modification, or ACM, refers to the practice of reshaping of the human skull during infancy in response to cultural pressures. This process ensures that the infant will grow up to fit into society and provides the comfort of group membership. ACM is important to the study of Bioarchaeology because this practice affects human physical remains so visibly and has social implications. White and Folkens (2005) discuss artificial cranial modification as the most common type of artificial skeletal modification. ACM is practiced for varied purposes cross-culturally, and is therefore important to understand in terms of human cultural variation.

There are several different aspects that go into analyzing artificial cranial modifications. I will be going over the relationship between the physical and cultural aspects. The physical portion goes over when the skull is prepared to be reshaped, the parts of the skull that are affected and the potential risk of damaging the material of the skull, and in some cases helps to understand biological ancestry (Brown, 1981, p. 1). The cultural portion, which focuses on why artificial cranial modifications take place, is important because it helps anthropologists understand cultures that use this practice, how they differ and how they are alike. Lastly there is how the physical and cultural aspects work together to demonstrate the human need for community and acceptance within the group. It is also important to look at the variation within artificial cranial modification, meaning the different modes used and the different shapes produced. This is important because it can be traced when looking at human physical remains and could potentially help anthropologists recognize shifts in political and social ideals within a specific site. This offers anthropologists the insight necessary to map out human cultural changes through the use of bioarchaeological remains (1993, p. 1). First it is important to know who has done work with the skeletal remains of those who practice artificial cranial modification up to this point. This will help to explain how this study is applicable to

bioarchaeology and anthropology and how important it is to include these remains when considering the desire for group membership within a cultural perspective.

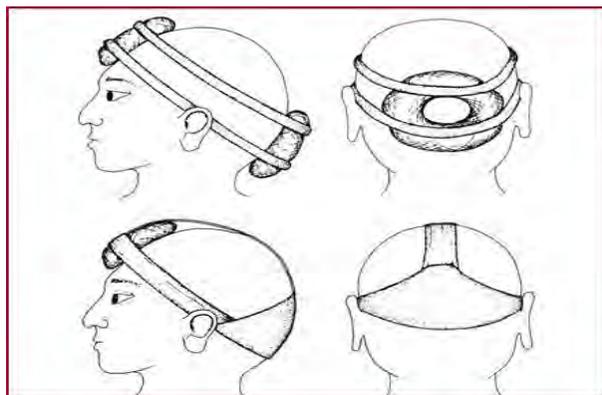
I would like to start by providing some background information on how this ancient form of human expression is possible and what is involved in obtaining the desired cranial shape. Cranial modification takes place during infancy when the fontanelles, the cartilaginous material between cranial bones, are soft and malleable (White and Folkens, 2005, p. 85). This “dense connective tissue” hardens between the ages of two and four on their own (White and Folkens, 2005, p. 85). Normally the brain grows and pushes back the bones of the cranium to naturally form the shape of the skull (Ayer et al., 2010, p. 1). Practicing cranial reshaping can potentially damage the materials of the skull a few ways. It can cause premature or irregular suture closure (Ayer et al., 2010, p.1), the development of wormian or extra-sutural bones (White and Folkens, 2005, p. 315) or in some cases occipital necrosis which is the death of the occipital bone due to a lack of blood flow to the area (Ayer et al., 2010, p. 1). Although there are these potential side effects, from my research they do not appear to be fatal or dangerous to the brain development of the individuals with artificial cranial modifications. There are numerous variations of cranial modification with emphasis on three main styles.

To start, there is circumferential or circular head shaping, which includes all types of cranial modifications that involve head wrapping or bandaging in order to create a rounded or conical shape. (Lorentz, 2009, p. 75). Next there is antero-posterior head shaping which consists of the flattening of the frontal bone, the occipital bone or both (Lorentz, 2009, p. 75). This is achieved by using a cradle board or specialized head gear (Lorentz, 2009, p. 75). A cradle board is an instrument that has several purposes, one of which is cranial modification. The infant is strapped down to constrict movement and a board folds over to apply pressure to skull (Lorentz, 2009, p. 75).

The remaining modification is called post-bregmatic and refers to the flattening of the most superior aspect of the infant calvaria which is the cranium, excluding the bones of the face (White & Folkens, 2005, p. 1), this modification results in lateral bulging of the calvaria provided by specialized head gear (Lorentz, 2009, p. 75). It is with antero-posterior head shaping that occipital necrosis is most common due to the direct pressure placed on the occipital bone (Ayer et al., 2010, p. 1). Post-bregmatic head shaping has so far only been found in Cyprus, Greece. Kirsi Lorentz has done extensive research on skeletal modifications in the Near East.



Antero-posterior shaping (Christou, 2010)



post-bregmatic (Parr, 2009)

Lorentz has written many articles and books on human skeletal modification, some of which discuss modifications of the skull. In Lorentz's 2002 article "Cultures of physical modifications: child bodies in ancient Cyprus," Lorentz discusses how the people of ancient Cyprus may have viewed the infant body. There would be a lot of planning and thought that would have gone into cranial modifications; this demonstrates a line of thought that is evident in several practices found in ancient Cyprus (Lorentz, 2002, p. 15). They viewed the body as incomplete and that the human child was raw material to be molded (Lorentz, 2002, p. 15). In this society, the emphasis was not placed on modifications that were done to oneself but on the modifications that were practiced onto one as an infant as your place within society was given to you by your parents (Lorentz, 2002, p. 15). This is a fascinating take on the cultural perspective of ancient Cyprus and offers insight as to why people feel the need to modify their appearance in general. Lorentz's work on the social aspect of human cranial deformation has been important to

understanding cranial modifications on a cultural level.

Human cranial modifications span every continent although it is not clear if it has taken place in Australia. There is a question as to where the biological ancestry comes from concerning aboriginal populations, there are skeletal remains that display extreme cranio-facial features that have been explained as a form of cranial modification. In Paul Brown's "Artificial cranial deformation: A component in the variation in Pleistocene Australian Aboriginal crania," he discusses the biological origin of Australian Aboriginals. His work there lead him to the hypothesis that Pleistocene Aboriginal populations were using cranio-facial modifications which could be misinterpreted as natural cranial variation (1981, p. 1). Granted that he compares the cranial remains of modified Melanesian populations and the cranial remains of Aboriginals whose modification is in question, Brown's work has helped to understand skull morphological traits and potentially determine ancestry due to a cultural practice.

There is an abundance of cranial modification that takes place in South, Central and North America. This has provided the unique opportunity for many scholars to study artificial cranial modifications due to the availability of human physical remains. The combined work of Cheverud, Kohn, Kongisberg, and Leigh yielded a fascinating article which pertains to how different forms of artificial cranial modification affect the bones of the face and other aspects of the skull. In "Effects of Fronto-Occipital Artificial Cranial Vault Modification on the Cranial Base and Face," the authors explain that in antero-posterior cranial modification the reshaped cranial vault is "compressed along an anterior-superior to posterior-inferior axis and expanded along a mediolateral axis." This makes the cranial base wider and shallower and the face shortened (Cheverud et al., 1992, p. 1). This first portion analyzes the cranial modifications preformed by the Acon of Peru which they compare to the Songish crania of British Columbia. Their findings

ultimately conclude that due to the differences between the two groups who performed similar cranial modifications there may be important differences in the “morphological effects of fronto-occipital reshaping from one group to another” (Cheverud et al.,1992, p. 1). There are not only varying types of cranial modifications that occur for different cultural ideals, but there are a variety of ways that these human remains can be interpreted -- both physically and culturally within the contemporary study of bioarchaeology.

I hope that I have adequately described the varying studies that can be conducted by anthropologists and archaeologists in determining different aspects of human life that are demonstrated by artificial cranial modification. Now I will stress the significance that these studies have to anthropology and bioarchaeology as a whole: their physical and cultural input to the overall record of human cultural variation as an important form of human expression whether it be for aesthetic purposes or due to political affiliation, and the many reasons in between.

Anthropology refers to the study of humans in every aspect of their physical and cultural being, and everything in between. American anthropology focuses on a holistic understanding of the human experience, specifically referring to what is called the “four field approach.” This involves the combined studies of linguistics, cultural anthropology, physical anthropology and archaeology. The study of human cranial deformation is pertinent to the American anthropology in several ways. The physical remains of those with cranial modifications have unique implications, such as premature or irregular suture closure which could potentially lead to complications involving aging the skull, depending on the condition that the bones are in. Wormian or extra-sutural bone growth and occipital necrosis may occur, which are culturally forced features due to the physical stresses imposed by the process of cranial modification. These are all important to the investigation of human physical remains as they

pertain to the study of human physical variation.

Archaeology pertains to the material culture that people have left behind this can refer to grave goods, middens or trash deposits or tools. It is my belief that cranial modification can be a form of human material culture because it is human hands or the tools made by humans that mold the bones of the skull in order to adhere to imposed cultural ideals. This goes hand in hand with cultural anthropology, which refers to verbally and physically learned behaviors which result at times in material culture. “Head shaping has been practiced on all continents over periods of prehistory to the present. It has been used to denote gender, ethnicity, high social status or other group affiliations,” so I believe that it is extremely important to human cultural variation (Lorentz, 2009,p. 75). Human cranial modification is a form of human expression that is handed down from parent to infant. It is up to the parents discretion how the crania of the infant is shaped, and it is up to the cultural ideals of the society that the parents are associated with that determines whether or not the skull will be modified. This is one of the ways that cultural pressures can become evident on the physical remains that we leave behind.

This leads us to how human cranial modifications pertain to bioarchaeology, which refers to the combined study of physical anthropology and archaeology, specifically how this combination effects the cultural context within. Essentially bioarchaeologists study “human remains from archeological contexts” and determine their importance to the culture being examined at the time (White and Folkens, 2005, p. 1). It is my belief that human artificial cranial modification is one of the most important ways to demonstrate how bioarchaeology is important to American anthropology. The combined efforts of physical anthropologists and archaeologists to analyze modified crania and their contexts is vital in understanding the people who preform artificial cranial modifications. The

development of wormian or extra-sutural bones from human cranial modification is pertinent to physical anthropology and human physical variation within skull morphology. The archaeological context that the bones are recovered from provide a framework from which to pull for the cultural climate of the time. Both help in determining the how the people who practice cranial modifications live and why their belief in this practice is significant.

Now that I have discussed how the practice of head shaping is relevant to bioarchaeology and to anthropology, I will discuss the evidence that supports these notions. The works of Kirsi Lorentz are some of the most complete studies on human body modifications that have come out of the Near East. I am particularly interested in the information that Lorentz provides about the cultural relevance of these findings. In Lorentz's work "The malleable body: Headshaping in Greece and the surrounding regions," there is much discussion of the cultural information that can be gained from examining the human remains of artificially modified crania. Lorentz hypothesizes that headshaping is strongly tied to child rearing practices that are not easily changed; thus, they must be influenced over time (Lorentz, 2009, p. 92). This concept provides a plethora of information about how cultural change is influenced and at what rate. Due to the fact that headshaping takes place during infancy and is a permanent form of body modification it would take generations for cranial shaping to change. Headshaping could not be a fleeting trend that is adopted at the first moment of influence. This is and was a modification that took significant planning by the parents who mold their children to be people that fit into specific idealized groups.

Despite the fact that cranial modifications take generations to change, stylistic shifts are evident over time in some sites, which could be indicative of cultural climate. It is through the investigation of the changes in cranial remains that we can gain perspective

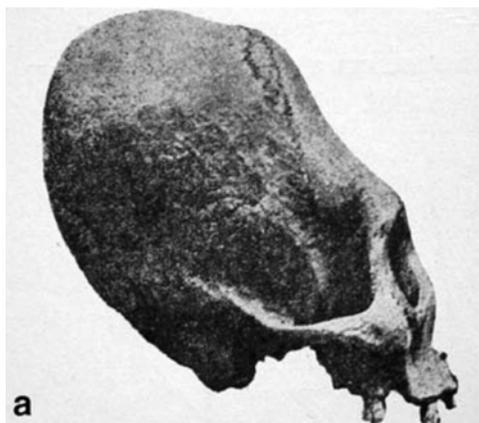
culturally. Referring to “Cultures of physical modification: Child bodies in ancient Cyprus,” by Lorentz (2002), there is a plethora of idealistic attitudes that can be found when conceptualizing artificial cranial modifications within their archaeological contexts. “Skeletal markers of activity, and certain kinds of material culture can give clues as to the way in which bodies of the past moved, and were shaped” (Lorentz, 2002, p. 1). Lorentz discusses the use of cradle boarding and swaddling and how they may have had multiple purposes for the populations of ancient Cyprus. Essentially Lorentz finds that there may be a link between the tools used for child muscle development and the presence of cranial modifications (Lorentz, 2002, p. 7).

Cradle boarding and swaddling are used in some cultures to restrict the bodily movements of infants, this is to support one of the two types of muscle development that occur (Lorentz, 2002, p. 7). “The isometric exercise develops muscle strength by pressing against a static object, by increasing effort. Thus the swaddled or cradleboarded baby can develop muscle strength precisely because the movements are restricted (*isometric physical exercise*) (Hudson 1966).” (Lorentz, 2002, p. 9). Due to this practice of swaddling and cradle boarding during the emergence of ancient Cyprus it is difficult to know if artificial cranial modifications were a residual modification that took on more meaning or if cranial modification was important to them all along (Lorentz, 2002, p. 10). It is not until the occurrence of a stylistic change in the modified cranial remains that Lorentz believes that their intention is evident.

According to Lorentz, not until post-bregmatic cranial modification occurs, were the inhabitants of ancient Cyprus intentionally modifying the skulls of their children. This is significant because once cranial modification is done intentionally and it is no longer potentially a byproduct of another cultural practice, we see a

ARTIFICIAL CRANIAL MODIFICATION

shift in the cultural perspective. According to Lorentz's work, the investigation of cranial deformation over time sheds light on the cultural views towards cranial modifications in ancient Cyprus. “Khirokitian Neolithic were headshaped, the *extent* of anterior-posterior headshaping was employed for gender differentiation” (Lorentz, 2002, p.14). “During the Philia phase and the earlier periods of the Bronze Age (EC and MC) anterior-posterior headshaping occurs in moderate forms only, and is never universal within populations” (Lorentz, 2009, p. 11). This supports the connection of how the social climate affects human physical remains over time, an important aspect to the study of bioarchaeology.



a. Artificial deformation of an Aymara Indian skull,
Humahuaca region, Jujuy, Argentina



b. Plastic head reconstruction
(University of Buenos Aires Ethnographic Museum,
Buenos Aires, Argentina (Schijman 2005).

Another example of how artificial cranial modification demonstrates our need for group affiliation is in Pre-Columbian Peru. There is an abundance of human remains with artificial cranial modifications in this region which predate the Inca by 1,000 years (Ayer et al., 2010, p. 3). Above is an example of one type of cranial modification that was employed in Ancient South America. As the authors of this article state, there are a variety of reasons as to why cranial modification took place within the region. They hypothesize that cranial modification started as an elite form of body enhancement within a developing society and as the elites became politically comfortable in their role they allowed “nobles” to mimic their tradition (Ayer et al., 2010, p. 1). This provides insight into cultural development amongst the Pre-Columbian inhabitants of Peru. As “nobles” shaped the heads of their infants so that their offspring would represent political affiliation with the rulers of the time there would be a desire for those who were below them on the political

strata to partake in this cultural shift (Ayer et al., 2010, p. 1). This need to be included within conceptualized groups in order to feel like they belonged to an upper class or elite supports my notion that skeletal remains with evidence for artificial cranial modification are important to anthropology and bioarchaeology.

Throughout my paper, I have discussed the social implications of artificial cranial modifications, the physical aspects associated with this cultural concept, and how this tradition is mechanically employed. The human desire to feel accepted into varied cultural groups demonstrates our need for identity within these groups and as individuals within the group. Today we see varied and stylized forms of body modifications employed to fit the needs of our cultural time. People get tattoos, piercings, breast implants and at times even insert botulism into their foreheads to prevent them from wrinkling. All of these serve a purpose in order to provide the individual who carries out these modifications with an identity or several identities. How is this different from those who practice artificial cranial modifications? It is not entirely different, but it is more intense, and as Lorentz discusses within the cultural context of ancient Cyprus, the body is meant to be shaped by the parents; your parents make you who you are (Lorentz, 2002, p. 15).

This concept shows how different cultural views and day-to-day lifestyles can affect the human physical remains of any individual. As mentioned before, these remains have helped to develop theories as to where Australian Aboriginals can claim their genetic material from, giving them a biological claim to ancestry. This again shows how important group identity is, specifically understanding claim to ancestry and how that affects one's personal identity and identities within a complex group. Essentially, humans are searching for how to be in this world. How should I act and according to what standards and who decides these standards for

being? Regarding artificial cranial modification, it is more relevant to us that this practice gave and still gives people a reason for being. It is this quest that drives us to do amazing things; and since all we come into this world with is our physical form, what better a place than the human body through which to start expressing ourselves. It is my hope that I have adequately explained the importance of human cranial modification within a bioarchaeological and anthropological contexts. Artificial cranial modification is the most common type of artificial skeletal modification and is practiced for varied purposes; therefore it is extremely important to understand in terms of human cultural variation (White & Folkens, 2005, p. 1).

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**LET THE STUDENTS SPEAK:
TOWARD A MORE INCLUSIVE CLIMATE FOR
AFRICAN-AMERICAN/BLACK STUDENTS AT
A PREDOMINATELY WHITE UNIVERSITY**

ROCKY W. NASH
VICTORIA BOHNETT
SELINA GONZALES
ANGELA SIERRA
DANIELLE ZIMMERMAN

SONOMA STATE UNIVERSITY

ABSTRACT

In the spring semester of 2014, we, the students in the Diversity Research Experience class, work collaboratively to (a) examine the experience African-American students with regard to micro-aggressions and racial discrimination, and how these may contribute to their eventually leaving the university; (b) identify coping mechanisms of African-American students who are more successful in their college experience; and (c) obtain the viewpoints from a range of majority and minority racial groups on how the university's lack of diversity affects the quality of education. Following an Action Research approach, we obtain qualitative data using focus groups and individual interviews. In this presentation, we report both the results of the study and recommendations about what administrators, faculty, staff, and students can do to reduce, address and prevent instances of racism. We ultimately seek to increase retention of Black students, create a more inclusive campus climate, and provide a better education for all students at Sonoma State University.

AUTHORS' NOTE

This report was created as a result of the research by students in Psychology 490, Section 7, taught by Professor Elisa Velasquez. This research was only made possible by the efforts of Professor Velasquez, Peyton Bloemker, Rachel Folmer, Cole Goetzl, Leo Ozawa, Rachel Porter, and Blake Ratto.

INTRODUCTION AND LITERATURE REVIEW

As students in Diversity Research Experience, we have found that racial minority students often experience discrimination based upon their skin color and/or appearance. Within several months we have worked diligently to define research objectives, design research methods, collect data through interviews, and lastly refine and analyze results. With a small sample for our focus groups and individual interviews, and because more coding of transcriptions must be done to improve inter-rater reliability, we view these results as preliminary. We specifically chose to examine the factors and ways African-American students at Sonoma State University [*hereafter referred to as SSU*] experience racial discrimination and acts of race-based aggression, as well as how and why these instances may lead students to consider leaving the university. We sought to identify coping mechanisms of African-American students who are more successful in their social and academic lives at SSU, despite challenges of a hostile social climate or ignorant viewpoints with regard to interracial interaction. We also gathered data from the interviews on how the disproportionately low amount of Black students at SSU (compared to California as a whole) affects the quality of education. At the end of this report, we share findings based on the literature and our study, which are intended to guide SSU students, faculty, staff, and administrators in the work of improving the inclusiveness, support, and academic success for Black students at our university.

Nationally, 37.5% of Black students complete baccalaureate education within six years, compared to 64% of the students from historically Black public four-year institutions, whose student bodies are comprised of 80% Black students (Gasman, 2012). This figure resembles the same ratio compilation found at SSU, and raises the question: What more can we do to support the Black students at our university? Nash's experiences in SSU's *Social Psychology 326* class taken in the Fall of 2012, indicated that the concept of race is largely subjective, determined in the mind of one who perceives an "other." Physical traits often vary more within any group of people, than it does between two apparently different ethnic groups. However, for our study, we choose to utilize the term Race, as well as Ethnicity, to conveniently describe not simply groups of people, but the identities we ascribe to ourselves and other so-called groups with regard to descendant heritage, as well as superficial visual characteristics in contexts of power, privilege, minority, and majority. SSU is considered a Predominately White University or PWU, (the term is interchangeable with PWIs, more common in literature, denoting Predominately White Institutions, or *Predominantly White Institutions*).

Harwood, Hunt, Mendenhall, and Lewis (2012) completed a focus group study with students who lived in residence halls at a PDI, who reported experiencing over seventy different kinds of *racial microaggressions*. Racial microaggressions are defined as "commonplace verbal or behavioral indignities, whether intentional or unintentional, which communicate hostile, derogatory, or negative racial slights and insults" (Sue, et al., 2007: 278). One reason for the disparity in attitudes and opinions among White students and those of color in this study was how the students viewed their residence hall as segregated, both with regard to the proportions of Black, Native American and Asian-American students, as well as in their perceptions of the quality of the residential facilities. Stereotype

threat is seen both in recent literature, as well as in our focus group interviews. Goff, Steele, & Davies describe this phenomenon as “the sense of threat that can arise when one knows that he or she can possibly be judged or treated negatively on the basis of a negative stereotype about one’s group” (2008:92). For example, in our study one African-American student reported that when the teacher or other students in class made comments she viewed as ignorant or offensive, she was reluctant to express opposing viewpoints. She did not want to be seen as “the angry minority” or the “angry Black woman.”

Griffrida (2004) found one factor that may lead to racial microaggressions and a less inclusive racial climate for minority students: Administrators, faculty and staff who fail to identify problems that affect Black students. If those working in higher education misunderstand or ignore the inhospitable challenges Black students face, it is likely these educational faculty and support employees will not do anything to fix or address these conditions; and may even unintentionally be a detriment to these students. The transition from high school and “home” to college “away from home” has been noted as a difficult one, especially in the first year, due to stress of being away from home and the new requirements of college life, cultural differences, and the fact that many students do not utilize professional counseling for support (Brooks, Jones, & Burt, 2012; Griffrida, 2012).

Brooks, Jones, & Burt (2012) state that much remains to be learned in studying and analyzing the factors involved in students’ retention. These authors found that African-American students who were more satisfied with the school’s racial climate were generally more academically involved, which in turn lead to higher graduation rates (2012). Velasquez-Andrade, E., Hurtado, S., Ostroff, W., Rodriguez, R., & Cronin, T. (2003) found that motivation to stay in college was affected by *institutional support*, such as campus

organizations, programs, classes, and financial aid; *personal motivators*, such as students' goals; and *family motivators*, such as parents' encouragement for their sons and daughters to succeed and graduate (Dennis, J. M., Phinney, J. S., & Ivy Chuateco, L., 2005). These correlated factors may also be coping mechanisms for students who are more successful among the many racially-based challenges they face. Lack of peer support correlated with lower GPA scores during the Spring semester for 100 ethnic minority first-generation college students (2005). It then seems likely that students who develop more support among their peers have higher GPA's (2005). Bronfenbrenner's (1992) ecological theory explains how "academic success is a function of both personal characteristics such as mental ability, academic skills, motivation, and goals, and the characteristics of the environment, which can be conceptualized as a system of nested inter-dependent structures" (as cited in Dennis et al., 2005, p. 224).

As far as the perceptions of minority students, Harwood, Browne Hunt, Mendenhall, and Lewis (2012) stated that students of color at a PDI simply perceive the campus climate to be more negative than do their White majority counterparts. Racial minority students are more likely to seek support from family, friends, and advisors who are also among the minority groups; when fewer options exist for Black students to contact friends and advisors at a PWI who are also Black, this coping mechanism becomes less available (Griffida, 2004). In addition, a less diverse campus climate often leads to increased stressful experiences for ethnic minority students from social pressures and managing time (Velasquez-Andrade et al., 2003; Griffida, 2004). Nevertheless, in the literature we have not determined exactly how the lack of ethnic diversity at a university contributes to major and minor racial aggressions toward minority students.

If faculty are not used to frequently dealing with African-American students, this lack of practice may lead to cultural insensitivity and misunderstanding (Griffida, 2004). A number of suggestions are found within the literature that may aid students, faculty, staff, and administrators in improving social relations between majority and minority groups, as well as increasing graduation rates for minority students. Mentoring programs, for example, have not shown consistent effectiveness in reducing racial discrimination and increasing graduation rates for African-American students (Brittian, Sy, & Stokes, 2009). Numerous authors draw attention to the need for increased dialogue among students and university professionals around the subjects of perceptions of race, what it means to be White (see, for example, Sue, Rivera, Capodilupo, Lin, & Torino, 2010). This dialogue, in effect, may prevent and reduce both overt and more subtle forms of racial discrimination. We first examined the student experience of White, African-American, and other ethnic minority students, as well as students' inter-group relations. This endeavor was central at guiding our ethnographic research.

METHODS

Participants

Volunteer participants were all SSU students. Of the thirty participants, the average age was 21.48, with a standard deviation of 1.96. Twenty-three females and seven males participated. Of the volunteers, three self-identified as Asian, five as Black or African-American, nine as White or Caucasian, five as Hispanic or Latino, two as other, and five as a combination of several unspecified identities, which may have included American Indian or Alaska Native, Native Hawaiian or Pacific Islander, or Middle-Eastern. The participants included one Freshman, three Sophomores, eleven Juniors, twelve Seniors, and one

grad student. Of these, five were transfer students and sixteen were not. Twelve participants were interviewed in focus groups, and eighteen were interviewed individually.

Participants were contacted using several methods. Experimenters took flyers to, and made announcements in, the other classes they were enrolled in. Larger flyers were posted around the SSU campus on the notice boards. Two clubs on campus, Black Scholars United (BSU) and Nu Beta Mu were directly contacted to draw participants, as were friends and peers of the experimenters. Some teachers gave extra credit to students enrolled in their class who volunteered for this study. Focus group interviews were compensated with snacks and drinks, whereas students who volunteered for an individual interview were not compensated.

Materials

Consent forms detailing the purpose of the study and participation requirements were created for this study. A demographic questionnaire was also used to gather information about the participant's race/ethnicity/culture, gender, age, major and minor, college level, if they were a transfer student, and how they learned about the study. All questions had checkbox answers, in addition to space to write a different answer if those provided did not apply (excepting the college level and transfer questions). In addition, on two questions participants responded on a seven-point Likert scale, from "strongly agree" to "strongly disagree." The first asked, "Before coming to SSU, I frequently interacted with people from diverse backgrounds." The second asked, "Now that I am at SSU, I frequently interact with people from diverse backgrounds." We wrote the interview script specifically for this project, and divided it into nine subcategories. A variety of recording devices were used to record the interviews. These were borrowed from the co-facilitator [Professor Elisa Velasquez], one of the

experimenters, and Information Technology at SSU. Both digital and tape recorders were used. In the event that an interview was recorded on a digital device, it was then transferred to a tape for storage. Themes were identified from the interviews and separated into sections.

Procedure

Meeting times for the interviews were set up to accommodate the experimenters and, when possible, the participants. Upon arrival, the participants filled out the consent form and the demographics survey. Participants chose a fake name to be referred to for the interview, and this was recorded on the top of their demographics sheet. Once the consent form and the demographics questionnaire were collected, recording began and participants were read a short procedure overview reaffirming confidentiality and purpose of the study. The facilitators then asked the pre-written interview questions. Participants were allowed as much time to answer fully as they needed. Interviews lasted anywhere from twenty minutes to two hours. Once the interview was completed, we transcribed the recording, and sorted the verbal material into fourteen themes, each with subsections. The interviewee comments were coded into the following themes:

- | | |
|--------------------------|----------------------------------|
| 1. "The other" | 10. Professional development and |
| 2. HUB | institutional response to |
| 3. Emotions | incidents of racism |
| 4. PWU | 11. Support services |
| 5. SSU school spirit | 12. Reasons to come |
| 6. Coping mechanisms | to/leave SSU |
| 7. Identity | 13. Other discrimination, |
| 8. Experiences of racism | not racial |
| outside of the classroom | 14. Interview experience and |
| 9. Experiences in | feedback |
| the classroom | (for the interviewers). |

RESULTS

Previous focus groups at SSU (Velasquez-Andrade et al., 2003) yielded clear correlations between experiences of racial discrimination and students desire to leave or transfer from the university. In our study, the Black students express that during their daily lives they often felt “avoided” and “alone.” “Bianca” talked about the odd situation of how people walking nearby seemed afraid of her, while “they don’t see it that... [the] student is harmless.” One African-American student brought attention to a concern of how “Professors ... don’t look like they would be able to understand” if the student shared some sensitive information. Black students tend to believe that professors are not used to talking about Black people, nor teaching history and other disciplines with a multicultural focus. Thus, they leave out much of the potential course material, history, contributions, and viewpoints centered around Blacks and other minorities. In the classroom, most of the participants with minority status shared their experiences about lack of understanding, and lack of tolerance for viewpoints expressed by and about people of color by both students and instructors. The expectation that professors will not understand a situation for the African-American student sometimes leads them to avoid speaking up, asking questions, or seeking advising outside of class, so as to avoid the possibility of again getting hurt and feeling misunderstood. At least three of the Black students we interviewed get “tired” from dealing with all the racial microaggressions, and insults. They are frustrated by the ways White students sometimes respond when a minority student speaks up and tries to confront racial intolerance or ignorance.

Conversely, White students like “Rachel Smith”, “Elizabeth”, and “Betty” (2) shared how they never were the targets of racism while here at SSU. Clearly,

experiences of racism often vary depending on the student's ethnicity. The experiences of the students who deal with microaggressions and/or overt racism may, in part, be so challenging because, as "Betty" said, "you don't want to butt into other people's business."

For some students among under-represented groups as compared to White students find college life is very challenging. How do they deal with all of this? One Black student says what she might say to a White member in her cohort, "when you hear that, you can say 'knock it off,' because people are likely to listen to you." She refers to a White student's ability to utilize their inherent privileges to stop racial discrimination and bring about more fairness. She points to the fact that those in the majority races can do "a great service to people who aren't really taken seriously on campus." More than half of the Black students in our study talk about how they help their peers survive the experiences of discomfort among mostly subtle racial microaggressions. They support fellow students by listening to them share about strife, "letting them know that they're not crazy," and validating their experience of feeling "hurt." Another coping mechanism we find occurs among students taking certain classes that emphasize different cultural, ethnic, and sexual orientation groups, rather than the more frequent "heterosexual White male" perspective. By taking SSU classes like the Psychology of Stereotyping and Prejudice [PSY 330] and Ethnic Literature [AMCS 360], students in our study realize they are not alone in their experience. "London Maple," who underwent a class interactive experiment, found she better understood the perspective of another student who was of European descent. At the same time, she saw how she had, in her mind, misrepresented another student, based on preconceptions.

As far as seeking sources of support, students who face racial discrimination talk about going to friends and family, often of a similar ethnicity, in terms of skin color or heritage. This raises the

question: if there are so few Black students at this school, how can these students find support from peers of similar ethnicities? In the next section, we will consider alternative solutions to help Black students find more support, and to raise the quality of education for all students at this university. But first, we will examine how the atmosphere of a PWU at SSU may influence the quality of education.

Multiple students in our study recognize that not only are more than half of the students here White, but also that most professors are light-skinned and of European descent as well. If “birds of a feather flock together” (which occurs to some degree, based on participants’ experiences) then these professors will generally not be well-versed in teaching students of color, especially the limited number of self-identified Black/African-American students, comprising just 3.5% of the total student body. These students are sometimes “singled out” and asked to speak for “their” entire group, as though they are all of one culture or opinion. This often leads to frustration, shyness, or embarrassment, as the student tries to recover from too much attention from the rest of the class at the teacher’s direction. This kind of experience is related to the low proportion of minority students at SSU, the lack of training and practice instructors gain in their work at a PWU, and the disparities that exist between the majority and minority students. In the words of “Polly,” a White student, “we really don’t have a lot of diversity, actually like none here. So I can see how it could make people feel like an outsider.”

Faculty at SSU are even more proportionately White than are students. The number of Black students at SSU is approximately half of the figure for those in California as a whole. This demographic situation can get in the way of our school’s providing an enriching and supportive environment, as long as students and professors are not well-versed in teaching, learning from, or socializing with others

who “don’t look like them.” We also were interested in the administration’s response to on-campus incidents of racism. “Elizabeth,” one White student in our study, expressed that she was satisfied with her education here at SSU. This recurred with several other participants who were White, as they explained that things here are basically all right, though there may be problems. The comments sometimes minimized the problems associated with racial discrimination. “Betty” (2), for example, mentioned how she got “personally offended” when others were “attacked.” Yet at another point she narrated a commentary on race-based insults in a very different tone...

... you hear all sorts of things about the little comments like off-the-cuff or off-the-shoulder comments ... regarding Mexican people or Black people... Everybody makes those remarks and its not saying that it’s okay it’s just one of those things that at a predominantly White campus can happen.

Taking a more active approach in responding to the question of what would cause her to consider leaving the university, Elizabeth goes so far as to say that “if the administration did not handle an incident appropriately, she would consider leaving”. It appears some White students have an interest in including and supporting the minority students at Sonoma State.

CAN WE TALK? RECOMMENDATIONS AND DISCUSSION

Based on the experiences that the participants share in the interviews, we have learned a great deal about some of the major differences between the experiences of majority and minority students at SSU, as well as their beliefs around how we can all make this campus more open and friendly to those who have suffered more in relation to the White students. Our collective study relies on interviews with 30 students. We decided to omit our quantitative

analysis since many of the interviews still have not been analyzed for quantitative data, due to time constraints. As we make inferences, conclusions, and recommendations from this small sample we cannot be certain that the opinions and responses expressed by participants reflect accurately the students at SSU on the whole. We are even less able to extend these findings to students at other PWU's.

As our title implies, we advocate an approach that works from the bottom up; students are the lifeblood of the university and their concerns must remain central to the understanding and change we are seeking. When policies are enacted without true concern for the social, emotional, as well as intellectual well-being of the students – all students, of all backgrounds – then the personalities of our administration and the dogmatic management systems from long ago take over today's university. Regardless of our perceptions of personal or bureaucratic power, we all can contribute toward our future. We select five general areas for recommendations: institutional response, faculty hiring and student recruiting, clubs and support services, professional development and student exposure, and personal connections.

1. Institutional response

A number of students report being offended by the way the administration responds to acts of overt racism. Minority students have expressed hesitancy or unwillingness to report and seek support around racist incidents. The institutional response is critical for allowing affected students to heal and move further in their development, as well as inform the greater campus population about what has happened, and what the consequences are for the perpetrator. If our students' input is solicited and taken into consideration as we review existing policies, and consider modifications, then the policies will better reflect the will of the students. Overall, it will be

more effective to clearly alert students about the course of action the administration takes in responding to any racially motivated act against a student. Therefore, we must revise our response policy to encourage targeted students to report and seek support more willingly.

2. Faculty and staff hiring, and student recruiting

We can refocus recruiting efforts to high schools and cities that better represent the overall ethnic diversity of California. We can hire more faculty of diverse backgrounds. We are bound by law to not fill quotas, but we must bring in more faculty who can relate to students who face frequent challenges of discrimination based on racial background. CAPS (Counseling and Psychological Services) assists numerous students facing challenges. We recommend expanding these services, with an emphasis on hiring more counselors who are Black, Latino/-a, Asian, Native, Middle-Eastern, and mixed backgrounds. Also students will be better educated if faculty and administrators support and expand offerings for SSU classes such as the Psychology of Stereotyping and Prejudice [PSY 330], Ethnic Literature [AMCS 360, and Ethnomathematics [MATH 103].

3. Clubs and support services

Several African-American students in our study share how frustrated they were by some of the interns at CAPS because they were unable to relate to and to treat the students for mental health challenges associated with racially-based experiences. Campus clubs are also key for many students as they find new structures of social support after moving away from home. Some believe clubs may detract from students' academic performance. However, the majority of experiences we hear show that clubs actually enable students active in clubs to have a more positive outlook which, in turn, often tends to lead students to more successful academic performance, as well as to decrease the chances they will want to leave the university.

Nevertheless, clubs that support racial minorities in their social and academic lives here often must fight to secure a limited amount of funds, along with the higher proportion of other student-based organizations such as sports clubs, sororities, and fraternities. Because of this financial stress, we suggest allotting a higher, fixed amount of money for a small number of clubs that support the functioning of students in traditionally underprivileged groups. Also, many students in our study were relatively unaware of the location and/or functions of the HUB. If the HUB takes more assertive action for advertising its location and functions, as well as broadcasts its events more visibly, then students will be more likely to attend events, and go there for assistance with programs.

4. Professional development and student exposure

Training both for administration and faculty, as well as for students, which entails small group discussions and exercises will greatly assist the university in realizing its diversity mission statement. For faculty and staff we recommend trainings that may be one day long, or even shorter “speed trainings” to familiarize faculty with institutional policies regarding racism and microaggressions, as well as to learn and improve strategies in making connections with minority students who may not feel comfortable initiating interactions or seeking advising, based on previous experiences. The Freshman and Sophomore orientation courses can also include small group sessions with trained moderators, in which students can openly and safely discuss issues regarding racial intolerance. These courses or one-day seminars will also inform students of the university’s policies, which are enforced upon reporting of those who make offensive comments, jokes, slurs, or who take physical action against people of color.

5. Personal connections

All of the students, faculty, staff, and administrators have daily opportunities to ask questions and to listen to other people, not only those they feel automatic affinities for, but also people that they might normally avoid or ignore. Attend events that help bridge the gaps between groups of people who hang out together, and that encourage us to become more understanding with those we are already close to. Ask people how they're doing, and listen to what they share; you may learn something about them, about yourself, or make a shift in your perspective. Consider the *platinum* rule -- "do unto others, to the best of your ability, as *they would have you do unto them.*"

WHERE TO GO FROM HERE

The biggest challenge for students, faculty, staff, and administrators in approaching the whole area of racism, microaggressions, and ethnic diversity, is to simply talk about the issues openly (Mun Wah & Hunter, 1994). Racism and differential treatment toward ethnic minorities do influence what goes on in various settings on and off campus, while open dialogue occurs so infrequently. We can celebrate this opportunity for teamwork by making new connections, which allow us to hold hands across the subjective lines of race. We can help become allies through supporting our peers, listening to the views especially of students, and by actively engaging in dialogue (Bryan, Wilson, Lewis, & Wills, 2012; & Harwood, Hunt, Mendenhall, & Lewis, 2012).

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**FAT BABES IN CROP TOPS:
REPRESENTATIONS OF GENDER IN FA(T)SHION**

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ABSTRACT

The focus of my research is race and gender in fat fashion. Fat fashion or fa(t)shion was coined in the late 90s/early 2000s to describe an upsurge of plus-sized fashion bloggers and body positivity movements. Fa(t)shion consists of fashion bloggers that are fat-identified, often reclaiming the word “fat” from being an insult to being a positive self-proclaimed identity and descriptor. I want to frame understandings of fa(t)shion through the theories of intersectionality and the matrix of domination, building off of the work of Ethnic Studies scholar Patricia Hill Collins. My data comes through the use of qualitative interviews of followers of fa(t)shion blogs. I entered my research hoping to discover the ways in which fa(t)shion answers questions of representation for fat people, particularly fat women and genderqueer people. I also hope to find the ways in which fashion can be used as a tool both to uphold and challenge dominant narratives about bodies, race and gender. Though this ground has not been too deeply broken into, fa(t)shion provides an example of subcultural subversive response and the power of creating new images.

INTRODUCTION

In a time when the fear of “epidemic obesity” is on the rise, fatphobia is rampant and many fat people are shamed for even existing. Instead of shying away from the stigma of the word fat, many plus-sized, overweight, obese and big-bodied people are reclaiming the word fat as a way of describing the self that is frank, proud, and unapologetic. A part of the reclamation of the word fat has come through the development of fat fashion blogs.

Fat fashion or fa(t)shion was coined in the late 90s/early 2000s to describe an upsurge of plus-sized fashion bloggers and body positivity movements (Faircloth, 2013). Fa(t)shion was created in response to and as a critique of mainstream fashion. These critiques include lack of size diversity and lack of images of queer people (Connell, 2013). Mainstream fashion has created a beauty ideal for women and female assigned at birth-bodied persons reliant on thinness and performance of traditional gender roles (Tylka, 2010, p. 601-602). I use the term female assigned at birth (FAAB) to identify subjects of this paper who have been raised with female socialization but may or may not identify as women and to describe the demographic of my research participants. Fa(t)shion consists of fashion bloggers that are fat-identified, often reclaiming the word “fat” from being an insult to being a positive self-proclaimed identity and neutral descriptor. Fa(t)shion blogs being driven by user-generated content have provided the space for the everyday person to react, respond to and resist dominant narratives. In my research I studied the followers of fa(t)shion to discover how fat people felt they were being represented.

I wanted to identify the gendered dynamics that exist in this virtual forum and see what followers are getting out of it. From my review of existing literature on blogging, fatness and media images, and data from interviews, I have

found fa(t)shion to be missing the mark on representation on the basis of body size, body shape, and gender expression. Fa(t)shion blogging as it presently exists does not provide adequate representation for fat people and recycles the beauty standards of heteronormative femininity from mainstream fashion. This is not meant to be a manifesto to tell fat fashion bloggers that they're not being radical "enough." Rather to examine fa(t)shion provides an example through which we can examine radical, resistive communities and tactics and understand their limits.

HETERONORMATIVE FEMININITY

With interlocking systems of fatphobia, sexism, transphobia, racism and heterosexism, people in fat FAAB people face more than interpersonal and structural discrimination and lack of representation on the basis of fatness alone. The societal discrimination faced by fat FAAB people is not merely because of their fatness alone but rather is tied to the fact that their fatness is seen as a hindrance in achieving 'true' femininity or what I will refer to in this paper is heteronormative femininity. Heteronormative femininity's standards of beauty require feminine expression and an image of flawlessness that is attained through wearing expensive clothing and styles from designers that market to the elite; having a thin body and small body size, white racial presentation and assumed heterosexuality.

Many fa(t)shion bloggers feel that they are resisting heteronormative femininity by prioritizing fat bodies and in some blogs prioritizing queer femme bodies (Connell, 2013). While the presence of these bodies is important, femme images that deviate from heteronormative feminine beauty standards are lacking. Though queer femme expression may be prioritized in some fa(t)shion blogs it is not an adequate cross section of gender expressions and images of fat transgender femmes and of fat androgyny are scarce. The majority of images within fa(t)shion are

not femme and queer, as often as they are feminine images of cisgender women inhabiting an aesthetic that replicates heteronormative beauty standards. Though fa(t)shion may have roots within queer online communities, the content being produced has entered the mainstream (Faircloth, 2013).

Though many followers of fat fashion blogs believe that the content they are consuming is resistant to dominant images of heteronormative femininity seen in mainstream fashion, some of its tenets are recycled. I would argue that other than challenging mainstream fashion on the basis of size, the majority of fat fashion images do not challenge other facets of heteronormative femininity. The dominance of these images limits the resistive possibilities of fa(t)shion.

Overall, respondents felt that fa(t)shion blogging is a good step in increasing visibility and positivity towards fat bodies. Most felt that their body image was improved and felt empowered by fa(t)shion. However, each respondent also had their own critiques of fa(t)shion and commented on how they felt represented or not. In fat fashions best moments, respondents felt it provided a space for counter narratives, body positivity and acceptance. Jacqueline said

“It’s celebratory in the way that it encourages participation. I think part of fat fashion itself is just saying that your body is beautiful and that yes you can wear that and yes you can look stylish and yes you can be stylish... Let’s just celebrate the fact that you are in this body and you are fashionable and that you look great today...”

This quote highlights the power and possibility fa(t)shion holds in being a celebratory space for all bodies. Though it is with merit, I will uncover the places of fa(t)shion that could celebrate a wider range of bodies and presentations.

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

My approach in analyzing data about fa(t)shion is grounded in the theory of intersectionality, popularized by Patricia Hill Collins. Intersectionality theory, a renaming of black feminist thought, challenges single-identity politics and explains the inner workings of oppression and privilege caused by inhabiting multiple identities. Hill Collins' analysis is primarily focused on the issues of gender, race, and class that make the experience of oppression faced by black women unique. I employ the theory of intersectionality in naming that the experience of followers of fa(t)shion is different based on the many identities that they inhabit. Representation and access can vary for fat people based on relative size, gender expression, and race. Gender expression and fatness are often placed in tandem in issues of access and representation for fat FAAB people.

Some of the motivation from my research came from the lack of academic articles and study on fa(t)shion. The few articles I have found discussing fa(t)shion are primarily focused on white women. One of the only academic articles written specifically on fa(t)shion is Catherine Connell's "Fashionable Resistance: Queer 'Fa(t)shion' Blogging as Counterdiscourse." Connell (2013) argues that fashion has the power to be a political tool (p. 1). I would agree that fashion has the power to be a political tool, but that the resistive possibilities explored by current fa(t)shion are limited. Additionally, she argues that fa(t)shion "challenges heteronormativity by emphasizing the fashion of queer people, femme women in particular," (p. 3). but with her analysis being focused on one fa(t)shion blog and missing discussion of relative size and non-femme gender expressions, I would argue that the politically resistive possibilities of fa(t)shion

identified by Connell are limited. The Fa(t)shion February blog which she studied may provide great examples of images and representation of queer fat people, however, it is not representative of fa(t)shion as a whole. Her argument builds off of previous research on fashion blogging by Asian Americans conducted by Minh-Ha T. Pham, yet Connell does not discuss the issue of race in fa(t)shion blogs.

METHODS

My research was conducted through qualitative interviews with four followers of fat fashion. Before beginning my research I analyzed the few academic articles on the subject, as well as content from fa(t)shion blogs. Interviews were conducted in person or via Skype and included questions about fa(t)shion, representation, race, gender and class identity. As a fa(t)shion blogger myself I have been able to turn to my peers in the community for research participants. By sharing fat identity with my subjects I have been able to employ an insider's perspective and shared language to gain a depth of response that may not be accessible to outsiders. All of my respondents are Americans in their twenties that were female assigned at birth and are bisexual or queer identified. Molly, Claudia and Jacqueline are cisgender women and Logan is in the process of questioning gender identity. Molly, Claudia and Logan are white and Jacqueline is African American.

RELATIVE SIZE

“It’s not that accessible to me, **I think I’m realizing the majority of the people that I follow are smaller than me...** I do not have the patience to go to thrift stores and look through straight sizes and try to fit into things because it doesn’t happen... it’s never happened. I’m sure it would if I went to enough I’d find an item, probably one that I didn’t love.... **I think I’m disappointed in the fact that the majority of the people that I follow in terms of fa(t)shion are**

smaller. Which makes a lot of sense. And if it is accessible it's still extremely expensive." -Claudia [My emphasis]

One factor of representation that came up in almost all of my interviews was relative size amongst fat people and this could be a great point for more exploration. Within fat communities some respondents felt unwelcome for being smaller and others felt that they had seen smaller fat people take up more space and not acknowledge relative privilege when compared to larger fat people. Respondents whose bodies are deemed as lying on the borders between "fat" and "not fat" struggle to understand where they fit in fashion. In the plus-size fashion industry, models can lose jobs or contracts if they lose weight similar to how mainstream models can lose jobs for gaining weight or shifting in size (Czerniawski, 2012, p. 142). Fat fashion is supposed to challenge these standards of beauty, but followers have noted that some fa(t)shion blogs have body size requirements based on dress size or weight. These requirements can be seen as either measures of safety ensuring that a fat space is welcoming to those who are the largest or as an arbitrary measure of fatness that does not address the lived experience of different fat people.

Those who are smaller fat may find themselves floating in and out of a blog's definition of "fat." Molly discussed her experience with these size minimum requirements on fa(t)shion blogs as difficult for her. She said that she is usually a size 14 but depending on the brand and cut of a garment can sometimes fit into clothes as small as size 10; these sizes were arbitrary and did not represent a measure of her body size or how she was treated. Within fa(t)shion spaces smaller bodies are privileged and more visible, but that does not erase the experience of discrimination they may face outside of fat communities. Molly spent most of her life being told she was fat and felt frustrated to encounter size minimums on a blog that were saying she wasn't quite fat *enough*.

Fa(t)shion followers that are on the border between being considered fat and non-fat find themselves in a paradox. When people that inhabit these borders go into stores designed for plus sizes many of the clothes may be too big for them and if they going to a store with straight sizes, the clothes can be too small. This puts them in a unique position within the fat community; not always knowing whether they're fully in or fully out.

On the other side of the spectrum, people with much larger body sizes feel that their experiences differ from those people that are smaller fat. People that are morbidly obese, or sometimes as defined in the fat community as “death fat,” may experience more stigma than smaller fat people. Death fat people experience issues of access to healthcare, building arrangements, ability to purchase clothes that fit their bodies regardless of fashion, employment discrimination, and day-to-day harassment (Mollow, 2013). The issues of relative size have not been resolved within fat fashion.

Many respondents who were smaller fat found more images of individuals with similar bodies to themselves in fa(t)shion, with few examples of death fat individuals in fa(t)shion. However, they still do not have access to clothing that they can fit into readily available when compared to thin people. Death fat individuals may find that smaller fat people are taking up more space in fa(t)shion and are more commonly seen in these blogs.

If a smaller fat person is able to fit into straight sizes and advertises that piece of clothing on their blog it's not an option for larger fat people. Just as in mainstream fashion, smaller bodies get more visibility and within the fat community may experience relative advantage when compared with larger bodied individuals.

“There’s a lot more access for smaller fat people in terms of clothing... or everything.... I think in general in the fat community

it's an issue ... like people that **complain about fashion that fit into straight sizes**. I understand you might have issues... but it's a different experience.... **I wish that their privilege was talked about more. Because it's hard to feel safer in those spaces**. I think that there are certain things that all fat people have in common and share but at the same time I think that we need to understand that all of our experiences are different.” -Claudia [my emphasis]

With the overwhelming presence of smaller fat bodies in fa(t)shion, size minimums is a reaction to the valuing of small bodies carried over from mainstream fashion. It will be important for fat fashion communities and fat communities in general to have discussions about the creating awareness of the unique experience of fat people based on relative size and taking space for all fat people to feel safe and represented.

BODY SHAPE

In addition to the favoring of smaller sizes in fat and mainstream fashion there is also a favoring of certain body shapes. Hourglass figures get more visibility in fat fashion blogs via body shapes, clothing cuts and styles that accentuate and create the illusion of these curves. Models in plus size fashion have also been known to wear shapewear and use artificial padding to create specific body shapes and proportions (Czerniawski, 2012, p.141). Jacqueline described the hourglass figure as “the golden ticket of being fat.” She went on to say that the majority of body shapes favored in fat fashion are replicas of the body shapes sought out in mainstream fashion, only in larger versions. The favoring of hourglass silhouettes shows that the experience of fat people can vary based on body shape and that the favoring of a shape that is ascribed to fit heteronormative femininity recycles ideals from mainstream fashion.

Many respondents said that they saw the most common style in fa(t)shion blogs to be 50s cut clothing that create an cinch waist and flow out of the hips and accentuate the bust. These cuts of clothing replicate dominant heteronormative femininity as it has been seen in images of 1950s housewives and suburban idealism. The image of a white heterosexual family with a woman at home in heels and a cinched waist dress. Though the choice to wear certain clothing is not on its own indicative of specific values that an individual has around gender, this aesthetic is not without history and the overwhelming presence of these images does not challenge the gendered expectations of beauty for fat FAAB people. While wearing an hourglass silhouette may come from personal taste, many fat people may need to inhabit this aesthetic as a form of survival. Inhabiting heteronormative femininity as a fat FAAB person can mean the difference between getting hired, facing harassment or medical discrimination. In addition to striving for hourglass shape, other elements of heteronormative feminine aesthetic were present in expressions of gender found by respondents in fa(t)shion blogs.

GENDER EXPRESSION

“[F]or awhile as a fat person I felt like I couldn’t explore non-feminine gender presentation. I felt like my worth as a fat person was kind of wrapped up in femininity.” –Logan

Logan’s words highlight the difficulty faced by fat FAAB people that seek to explore androgynous gender presentations. Contrastingly, Claudia said that she felt like it was very important to identify as a fat femme. For her it seemed harder to be seen as feminine being a fat woman. She felt that because of the dehumanization of fat people that she couldn’t be seen as a woman, let alone a person. She said she was told from a young age that she would never be pretty because she was fat.

Though Logan and Claudia's statements about how they feel treated on the basis of gender may seem to contradict each other, I would argue that they are both resistive responses to the complicated relationship between fatness and femininity. Simultaneously, fat FAAB people are seen as not fully being women or fully being feminine and yet their greatest redemption is in their 'excess' of feminine body— large hips, breasts, and butts. This makes the greatest challenge for fat FAAB people to achieve “true” femininity— for personhood— through any means necessary other than body size.

Overall, my respondents felt that gender presentation in fa(t)shion often upheld normative feminine beauty standards with the exception of fatness. Some femme-identified respondents found the valuing of femme presentation in fat and queer spaces to be a radical act of reclaiming feminine beauty for fat people. They see femme presentation as reclamation for fat women who are often desexualized, devalued, and seen as less feminine than thin women. Respondents that inhabited a more masculine, androgynous or fluid gender expression felt that the overwhelming presence of hyper-feminine images was not representative of their identity as a fat person. The majority of images respondents saw in fa(t)shion consisted of earlier mentioned hourglass shaped women with full makeup who were predominantly white, often wearing dresses. The prevalence of these images seemed to be a place of contention for most followers. Claudia described it as the need to be “pretty fat” to be visible. Jacqueline said that while she loved seeing the presence of these images that she was bombarded with feminized fashion and wanted to see more suits and tailored clothing that she finds more present in men's fashion. While androgyny may appear as a beauty ideal in queer communities, it is predicated on thinness. For a FAAB person to be seen as truly androgynous, they must be thin. And though androgyny may be valued within queer communities, it is not valued in mainstream fashion and dominant society in the same way.

Though a blogger or someone submitting a photo to these blogs is fat bodied, most respondents felt that they were more likely to be visible if they fit other standards of beauty— being white, having specific body proportions, and having a “flawless” feminine presentation.

There is no simple dichotomous privilege between people in feminine FAAB bodies and androgynous or masculine presenting FAAB bodies. Gender and presentation are complicated and fluid and adding in fatness and fashion, things get even more confusing. Fat femme followers may experience femmephobia in queer communities and fat androgynous followers may experience different challenges and lack of representative images in mainstream fashion and fa(t)shion. There is no clear-cut answer to say that femme presentation is more or less privileged than butch, androgynous or more masculine presentations in fa(t)shion. But the narrow scope of heteronormative femininity expressed in many of the images that dominate fa(t)shion are not serving as representative images for the whole of followers.

CONCLUSION

The overall findings of my research lead me to conclude that fa(t)shion as it currently exists is limited in its radical possibilities. This is not to say that it is without purpose and that it does not provide a space of resistance for some, rather a critique that fa(t)shion is recycling certain ideals around heteronormative femininity. The lack of diversity in the majority of gendered images within fa(t)shion could change to allow for more resistive possibilities. My sample size was small and not representative of a wide range of followers in the fa(t)shion community. In the future I would like to include more respondents and more people of color. It would also be interesting to explore the perspectives of bloggers that produce fa(t)shion content. The work has only begun in exploring this creative and vibrant

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community of resistance. I hope to see a future of fa(t)shion where a rainbow of fat bodies is visible, fierce and proud.

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MY ABUELA WAS A ZOOT SUITER, WE ARE MILLENNIAL CHICAN@S:
YOUTH UNREST WITH THE ZOOT SUITERS, AND THE PARALLELS
BETWEEN THE YOUTH UNREST WITH ANDY LOPEZ

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ABSTRACT

In the 1940's there was social unrest among *barrio* youth, who were Zoot Suiters or *Pachucos*. Race riots were incited in *Los Angeles* by returning World War II Naval forces with Mexican-Americans and other youths of color. My grandmother was a Zoot Suiter. They were youth who wore flashy voluminous suits that went against wartime wool rationing; they were part of a stigmatized subculture, judged for their dress, and racially profiled by police. Through primary documents (press releases, sensationalistic newspaper articles, journals) and secondary sources (scholarly articles, plays, and movies) I explore the Latin@ youth experience. Next, I compare Zoot Suiter's experiences to our own Millennial Chican@ story. I focus on a local current event about a Chicano youth, which received national attention: the death of Andy Lopez. Racial profiling occurred, and then police brutality ensued: a Sonoma County Sheriff shot Andy Lopez seven times, youth protestors were arrested and the investigation and/or possible prosecution Deputy Erick Gelhaus has been dragged on. I explore the structural similarities of these two moments pointing to a historical continuity in the treatment of Mexicans by law enforcement officials in the United States. *Pachucos* and Millennial Chican@s are similar in their regards for youth cultural expression, i.e. the origins of the Zoot Suits and the functions of the hoodies; sumptuary judgment, by outsiders; violence, by *Los Angeles* police, U.S. Navy and Sonoma County Sheriff; and the Andy Lopez case and social reactions.

INTRODUCTION AND ESSAY BACKGROUND

In 1940's barrios, predominately-Mexican communities, minority youth expressed pangs of social unrest. Anglo World War II Naval forces' attacks on Mexican-American youth and people of color incited race riots in Los Angeles (F. Vázquez, personal communication, April 20, 2014). In a journal chronicling her youth, my grandmother stated she dressed in Zoot Suit fashion. Mexican-American youth, called Pachucos, wore flashy voluminous Zoot Suits of the 1940's, "a self-conscious fashioning of difference," which went against wartime wool rationing (Obregón Pagán, 2003, p. 145). Abuela and her siblings were part of a stigmatized culture, judged by how they dressed, and racially profiled by police. By exploring Latino youth experience during the mid-1940's; I compare the Zoot Suit culture and viewpoint to our own Millennial Chican@ story in the mid 2010's. Application of "@" or "at" sign in Spanish titles denotes both genders: male and female, as "nonsexist language" (Grosfoguel, Maldonado-Torres, & Saldivar, 2005, p. 31). Below, I will explain my utilization of names and the "@" in my essay. In particular, I focus on the fatal shooting of young Andy Lopez by a Sonoma County Sheriff Deputy on October 22, 2013, the Santa Rosa Police Department's (SRPD) subsequent arrests of youth protestors, and the protracted investigation and/or possible prosecution of Deputy Erick Gelhaus (F. Vázquez, personal communication, April 20, 2014). Growing up in Santa Rosa, California, I feel a personal connection to Andy Lopez, his protestors, to my late Abuela and her Zoot Suiters. Because of this, I will employ these two significant moments, seventy years apart, for exploring structural similarities pointing to a historical continuity in the treatment of Mexicans by law enforcement officials in California (F. Vázquez, personal communication, April 20, 2014). Pachucos and Millennial Chican@s are similar in their cultural expression through clothing, i.e. Zoot Suits and functions of hoodies; its attendant sumptuary judgment by outsiders; leading to violence, by

Los Angeles police, U.S. Navy and Sonoma County Sheriff; marches arising out of the Andy Lopez case; and social reactions.

Relying upon historiography to analyze Zoot Suit Riots and the Andy Lopez case, I will demonstrate parallels and impacts these historical and current events have had on historical disdain, marginalization, and violence against Mexicans in these two instances. Primary sources from each period include The Los Angeles Times (LAT), and The Santa Rosa Press Democrat (PD), containing firsthand accounts showing profiling tactics in both newspapers. Secondary sources include scholarly articles, plays, movies, and current movie reviews. While primarily comparing Mexican-American Zoot Suiters to Chicano Andy Lopez case, some attention will be paid to the African-American experiences and influences during the Zoot Suit Riots and the shootings of minority adolescents wearing hoodies with both fashions originating out of African-American neighborhoods in New York. I will highlight my grandmother's experience of her youth in Los Angeles in the 1940's. I will demonstrate the imprint of these histories through experiences with violence, disdain and sumptuary judgment against minorities after the new millennium.

As a personal writing style, I find myself capitalizing words frequently. Immanuel Wallerstein poses a question about whether names and identity need to be capitalized in his essay, "Latin@s: What's in a Name?" (Grosfoguel, Maldonado-Torres, & Saldívar, 2005, p. 31). He chooses to capitalize Latinos. In my research, I will capitalize Latinos, Zoot Suiters, Millennial Chican@s, and Abuela, (Spanish for Grandmother). Abuela is a lower case noun as much as it was her upper case name, Abuela. I place emphasis on these terms as identities, and proper names. In my application of Spanish names, descriptive words, and capital letters, I will go against conventional writing standards with this choice of capitalization, as well as with

italicization. I will use traditional Spanish spellings, with exceptions where the individual or entity does not identify with Spanish orthography. I will write the city's name as Los Ángeles, Spanish for "The Angels" to connote the name's origin in Spanish, and its continuation as an identity and as a city, even through its Anglicization. Los Ángeles is the most populated city of Mexicans in the world, second only to México's capital, Distrito Federal. I utilize bold headings to evoke appearances of newspaper headlines, because most of my argument is based on the presumptiveness of these newspaper headlines. Here I will explain the neologism "Chican@." As a writer and researcher, I highlight "Chican@s" in my title to note changing landscape of Latin@ identity with employment of this iconographic sign. As cited by L. Alvarez, Chicana Scholar C. Sandoval utilizes 'Chicana@' "meant to politicize the term 'Chicano' or 'Chicana/o'" (2007, p. 53). The "@" sign is a modern derivative of "Chicano/a" identity. Uses of "o/a" infer an "or." Use of "Chicano," a Spanish plural pronoun, even though there might be women included, "Chicano" regardless, ends in a masculine "o" denoting both genders; whereas "@" connotes both simultaneously and is non-exclusionary. Sandoval declares "@" embodies "'re-gendering,' 'matrixing, trans-ing, and de-compartmentalizing' of the knowledge we call Chicano Studies... [cultivating] 'a politics [seeking] to understand race, colonial, and social powers in the Americas, [and] represents a transdisciplinary recognition of gender and sexual difference'" (Alvarez, 2007, p. 53). Utilization of "@" in Latin@, Chican@ or Mexican@ is a "relatively recent invention" (Grosfoguel, Maldonado-Torres, & Saldivar, 2005, p. 31). Wallerstein writes, "fifty years ago, there were no Latin@s in the United States (Grosfoguel, Maldonado-Torres, & Saldivar, 2005, p. 33).

PACHUCOS, THE ZOOT SUITERS

In the 1940's, Zoot Suits described Latino youths as a group. The term was “one of attribution, for Mexican-American youth preferred other descriptions” (Mazón, 1995, p. 2). Aside from prescribed identity descriptions, and distinct clothing, another way Mexican-American youth emphasized their identity as a whole was through their speech. Youth spoke Caló “a barrio creation...credited to [their] neologisms” (Mazón, 1995, p. 3). Caló identified by some Chicano scholars as the “privileged language of the Mexican-American barrio” (Mazón, 1995, p. 3). Utilization of Caló highlights the barrios' insularity; another example, showing commonality, were African-Americans' own “argot –a secret...vocabulary or slang...Jive, a Harlesemese speech...embraced by African-Americans, partly to put the white man off, partly to put him down” (Alford, 2004, p. 227). Rhyming slang and jive evolved into the African American Vernacular English (AAVE) we know today. As in numerous cultures, youth create their own subset language for a collective understanding while excluding others from their discourse (J. Reeder, personal communication, May 1, 2014 and F.Vázquez, personal communication, April 20, 2014).

HARLEM AND ZOOT SUIT OUTFITS

Although its exact origin is unknown, “‘Zoot Suit’ [came] from rhyming slang, or jive, spoken in the African-American community” (Unger, 2011). Derived from Harlem in the mid to late 1930's Zoot Suits became iconic representations of young men. Cosgrove illustrates a Zoot Suiter in his article, *The Zoot Suit and Style Warfare*, with a photograph of an African-American Zoot Suiter from *The New York Times*, printed in 1943 (1984). “Initially an African American youth fashion, closely connected to jazz culture, the zoot suit was co-opted by a generation of Mexican-American kids, who made it their own”

“American Experience: Zoot Suit,” 2002). E. Obregón Pagán also uses photos of African-American boys standing next to Mexican American boys as a representation of Zoot Suiters, in his book; this draws a relationship between these two populations (2003). Clearly recognized for its distinctive features of “jacket arms that reached the fingertips and pants worn tight at the waist, bulging at the knees and choked at the ankles...accessorized with a key chain that extended to the knees and a fedora-like hat with a feather attached” (Unger, 2011). Harlem tailors created “suits out of wool or colorful varieties of rayon” (Unger, 2011). Some disdained this flashy style of oversized dress as they made young people wearing it pointedly stand out in their resistance to wartime wool rationing of World War II. Women equally dressed up; they would wear their hair in the fashion of a pompadour, a hairstyle of a teased pouf combed on the top of the head. Reft quotes Alvarez in another work he wrote on Zoot Suiters, who “practiced their own cultural politics,” which “if examined carefully can teach us a great deal about how seemingly powerless populations craft their own identities and claim dignity” (2013).

LOS BARRIOS

The Spanish word “barrio” is the equivalent of “neighborhood.” Because of high proportions of minorities, barrios are known as Mexican areas and as slums (McWilliams, 1948/2001, p. 193). Prominent Chicano scholar A. Camarillo describes, “residentially and socially segregated Chicano barrios... [involving]...social, economic, familial and demographic factors” (1979, p. 53). Camarillo put forward that “barrioization” of Chicano communities in Southern California dates back to the mid 1800’s and was “well under way” by the late 1800’s (1979, p. 54). Before the riots, Los Ángeles “city planners complicated the social geography of the low-income, mostly Mexican-American neighborhoods ... [by] ... erecting a million-dollar training school for the all-white navy” in

Chavez Ravine, a barrio, north of downtown Los Angeles (Obregón Pagán, 2003, p. 146). Planners and Anglo city residents showed disdain by disrupting neighborhoods, and ignoring Mexicans as if they did not exist.

MID-1940'S NEWSPAPER PRINTINGS

Several newspapers, including the LAT moved war-time coverage off the front pages to sensationalize their distorted coverage of Zoot Suit “baby gangsters,” and the supposed “crime waves” tearing through Los Angeles (A. Martinez-Morrison, personal communication, April 2, 2014; “American Experience: Zoot Suit,” 2002; McWilliams, 1948/2001, p. 194). Printings became a contributing factor to tensions rising and riots breaking out in the streets of Los Angeles. Anglos attacked youth based on their dress. Presumptuous headlines from 1943 betray anti-minority orientations of the LAT, such as one titled Zoot Suiters Learn Lesson in Fights with Servicemen: Gangs Stay off Streets after Dark (1943). McWilliams cites an editorial in the LAT, “Sheriff’s men should be given every encouragement to go after these young gangsters” (author’s emphasis) (McWilliams, 1948/2001, p. 201). Newspapers, “depicting zoots only from the perspectives of fearful middle-class social reformers, paranoid law enforcement, and hostile servicemen unfairly obscures the politics and meaning of the zoot culture” (Reft, 2013). I argue acts by naval servicemen were no in longer disdain; Zoot Suiters were now part of the Anglo’s awareness, and felt their hate.

RIOTS AND 1946 SHOOTING

According to Mazón, Zoot Suit Riots were more significant as a ritual than as a reality (1995). Zoot-Suiters “attacked by servicemen and civilians in June 1943, were symbolically annihilated, castrated, transformed and otherwise rendered...subjects of effigial rites”

(Mazón, 1995, p. 1). Beaten alongside Mexicans, were African-Americans, as rioting spread across the United States. Los Angeles residents viewed the riots as a “larger pattern of lawlessness and rebellion against Mexican-American youth,” ergo they joined or supported Navy men “rioting to restore...social order” (Obregón Pagán, 2003, p. 145). Military stationed in Chavez Ravine were some rioters who went into Mexican Barrios; they left “four ‘gangsters’ [aged seventeen-twenty three] ... lying on the pavement for ... ambulances to pick up” (McWilliams, 1948/2001, p. 194). In 1948, McWilliams wrote about a shooting case from July 21st, 1946, foreshadowing the Andy Lopez shooting. A Los Angeles County deputy sheriff shot and killed a “thirteen year-old Mexican boy” in the back, mistaking him for a man who “failed to halt on order” (1948/2001, p. 194). “[I]ncidents of this kind have been common occurrences in Los Angeles for twenty years” (1948/2001, p. 194). This event in some of its details mirrors the shooting of Andy Lopez. Both boys were the same age, both shot in the back, and both “failed to halt on order” and were killed (McWilliams, 1948/2001, p. 194; Henry & Santa Rosa Police Department, 2013). Cosgrove said Zoot Suiters were a “reminder that the social order had failed to contain their energy and difference” (1984).

MY ABUELA WAS A ZOOT SUITER

Abuela and her siblings were Zoot Suiters. In the late 1980’s, *Abuela* wrote in a journal answering preprinted questions, retelling her life stories. One question was “what was your favorite fad?” Her misspelled reply: “my hair comb in a pumpadoor” (sic) (Moore, 1988, p. 28). She stated she lived in Echo Park, a neighborhood in Los Angeles, in the mid 1940’s from age eighteen to twenty (Moore, 1988, p. 21). As I studied Chicano history in college and read this journal regularly, I comprehended social implications of my grandmother’s choices in the 1940’s. I found photographs of my *tío-*

abuelos, (great uncles) who were wearing the Suits. I connect to Zoot Suits via Abuela and my tíos and through learning about it in secondary education. In several classes, we watched the famous film adaptation (1981) of Luis Valdez’s play *Zoot Suit* (1979). “Utilizing court records and reports from the LAT, Valdez constructed a narrative sympathetic to the defendants” (Reft, 2013). Connecting to Zoot Suits at the university level through my interest in history, I found numerous secondary academic sources, such as those by Cosgrove and Williams. Their works led me to their cited primary sources. One might expect my interest in history of Zoot Suits to lead me to research these topics in-depth. However, knowing I am a descendant of Zoot Suiters, *la sangre siempre llama* (blood is thicker than ink). Family was still a more compelling call.

Everyone from my *tío-abuelos*’ generation have passed, and I can no longer ask them about the intensity of their involvement in Pachuco subculture. They dressed in the same style as Zoot-Suit youth. They wore distinctive oversize clothes styles, and by using yards of extra fabric, repudiated World War II wool rationing (A Martinez-Morrison, personal communication, March 3, 2014). Just as my *tío-abuelos* were, youths in history books pictures felt angry. Excluded from mainstream society because of the color of their skin, they rebelled with anger in their faces by doing what their parents, government, and police told them not to do.

In addition to my own personal connection to the Zoot Suit’s rebellion through school and family, there are personal parallels with struggles of Millennial Chican@s today through media and my communities. According to Reft, the “1943 unrest...demonstrates how youth cultural movements can be demonized and scapegoated by officials in the process distorting its politics, meaning, and importance, leaving us with an anemic grasp of our history and culture” (Reft, 2013). Seventy years since the Zoot Suit violence,

shootings and subsequent actions of officials and youth occurring in the new millennium echoes the historical. Our Millennial Chican@s are angry too. Anger and violence are reverberated by media today. Headlines remind us daily of how much violence there is. Are our youth cultural movements still being distorted in their politics, meaning, and importance?

WHO ARE MILLENNIAL CHICAN@S?

There is a multitude of identities for Mexicans, Hispanics, and Latinos. One identity is Chicano. “During the late 1950’s... ‘Chicano’...transformed from a negative signifier of [a] ‘Mexican immigrant’ into a positive self-identifier of ‘U.S. natives of mexicano descent’” (Cuellar, n.d.). Wallerstein states, since the 60’s... “Latin@” evolved as an identity term to incorporate Hispanics from countries other than just México (Grosfoguel, Maldonado-Torres, & Saldívar, 2005, p. 34). Wallerstein writes that Latinos in the United States are descended from “those who come from and identify” with Latin-American countries (Grosfoguel, Maldonado-Torres, & Saldívar, 2005, p. 31). As ‘Chicano’ is mostly limited as a Mexican-American identity, I agree with Wallerstein. Currently, “Latino/a” is a prevalent and accepted term for Pan-Latinidad (Spanish for “All Latinity” as an identity); however, in this work, I focus on Chicanos, as both Zoot Suiters and Andy Lopez were of Mexican descent. Andy Lopez born June, 2000, was part of the Millennial Generation. According to Howe and Strauss, this spans approximately from early 1980’s to early 2000’s (1992, p. 31). Chicanos of the Millennial Generation changed definition of Latino and Chicano to be accessible and inclusive, incorporating neologisms like “Latin@.”

THE ‘HOOD

The “hood” means neighborhoods in urban vernacular and is similar to Barrio or ghetto. Historical treatment of Barrio and ‘hood youth wearing their chosen symbolic clothing signifies not only a racial/ethnic issue; but a social/class issue, as illustrated by the leather jackets of the “rebels without a cause” of the 1950’s, an example of those who lived on the wrong side of the tracks (F. Vázquez, personal communication, April 20, 2014). Roseland, the county island where Andy Lopez was shot, is likewise on the wrong side of the tracks; the illegitimate stepchild of Santa Rosa City, fully surrounded by the city, nevertheless, not annexed, and remains a county jurisdiction. Santa Rosa, since its creation, incorporated selected key properties with new projects that would not add existing county blight to the incorporated city, and it left un-adopted some 50 unincorporated county islands the city did not want. Of these, Roseland is the largest (J. Combs, personal communication May 5, 2014).

SHARED EXPERIENCE

In his article on bi-racial elements and minorities, Lao-Montes describes how public discourse sets “Latin@s” against Blacks, and their representations “compare and confront” each other (Grosfoguel, Maldonado-Torres, & Saldívar, 2005, p. 75). Alvarez’s writings support Lao-Montes’ arguments, he suggests framing a narrative on how “Chicanos share moments of cultural exchange, conflict, and a myriad of social relationships with African-Americans, Asian-Americans, and other Latinos” (2007, p. 54). Trayvon Martin’s cultural experience can be shared with Andy Lopez’s experience. According to Alvarez, Chicano identity can be “deeply shaped by how [they] relate to other racialized groups...[it] is not just their shared experiences of racialization or cultural style, but a...profound connection between their efforts to reclaim dignity amidst difficult life conditions,

including...discrimination, and poverty (2007, p. 55). From the 1970's African-Americans started to share hip-hop with Chicanos and other minorities, which became part of the Chicano identity (2007, p. 66).

HIP HOP AND HOODIES

Our youth, today, are judged by the color of their skin and their appearance. They sport hoodies, long t-shirts, and oversized baggy pants (A. Martinez-Morrison, personal communication, March 3, 2014). “Hip-hop fashion is the distinctive style of dress, originating primarily with African-American and Latino young people in New York City” (Young, 2010, p. 286). “[Hoodies] are a popular form of attire for Americans of all ethnicities and ages, [a style becoming]...popular for black and Latino youth” (Grinberg 2012). Their outfits often elicit a quick judgment based on size or color of their clothes. Hoodies youths wear “[lead] a dual life” (Grinberg 2012). Ubiquitous, “[utilitarian] and homogenous in form...hooded garments have been wardrobe staples of monks and hip-hop stars, Silicon Valley programmers and tycoons alike” (Grinberg 2012). Mark Zuckerberg may acceptably wear a hoodie, however, when minorities wear them, they look ‘suspicious.’ This sweater, in England is “banned from shopping centres, schools and colleges, and generally condemned as both a badge and a tool of antisocial behavior” which shows the dislike overseas for the hoodie (Hancox, 2005, p. 14). Hoodies include “pervasive and trenchant racial stereotypes associated with black young people, especially males, their styles are often singled out for criticism, as signs of criminality and misdeeds” (Grinberg 2012). Stereotyping hoodie wearers is “*simply another form of stigmatization against the person underneath the clothing*, and only superficially has anything to do with...clothing” (my emphasis) (Grinberg 2012). Grinberg mentioned a debate started by Geraldo Rivera, a former talk-show

host discussing how Martin's hoodie might have played a role in his death, stating, "his hoodie killed Trayvon Martin as surely as George Zimmerman did." Rivera...stopped short of retracting his claim that parents of black and Latino youngsters in particular should "not let their young children go out wearing hoodies" (2012). Andy Lopez wearing a hoodie, was shot, according to the initial police report, walking down the street to return a toy gun to his friend (Henry & Santa Rosa Police Department, 2013). In the empty lot where he was shot, children are commonly seen playing with toy guns. Commentators inadvertently echoed Rivera, by stating children should not be going out and playing with toy guns.

2013 SHOOTING

On October 22, 2013, Sonoma County Sheriff Deputy Erick Gelhaus, within ten seconds of calling dispatch, fired seven deadly shots at Andy Lopez; one bullet went through his back to his heart and then proceeded to put him in handcuffs before administering CPR (Scully, 2014). The police shooting of Andy Lopez is structurally similar to the 1946 shooting, Zoot Suit Riots, and ensuing brutality. A Press Release from SRPD published the day after the shooting, pointedly demonstrates how profiling was employed: the "subject was wearing a blue "hoodie" style sweatshirt and shorts" (Henry & Santa Rosa Police Department, 2013). The LAT wrote similarly about youth clothing in the 1940's. Andy Lopez was considered, as were Zoot Suiters, threatening for wearing a hoodie and carrying a replica toy gun. Since the Lopez shooting, numerous news outlets, including the PD printed information, opinions and speculation about this case, similar to the LAT articles of the 1940's. Since the shooting, angry youths protested and have been arrested, while marching through city streets carrying signs and wearing t-shirts emblazoned with Andy Lopez's face protesting unfair police treatment of youth (A. Martinez-Morrison, personal communication, March 3, 2014). From the public

space of the Santa Rosa Mall, Security detained and evicted protestors and Lopez's family for wearing those shirts, while they sat down for dinner. This event called into question the first amendment rights of demonstrators (Espinoza, 2014b).

POLICE INVESTIGATION AND POSSIBLE PROSECUTION

When an officer-involved shooting occurs, local law enforcements inter-investigate, instead of a third impartial party conducting the initial inquiry (Carter, 2014). Currently, SRPD is investigating the Sonoma County Sheriffs while SRPD is likewise under investigation by the Sonoma County Sheriff. Quid pro quo; there is no outside accountability, transparency, or public input into the agency and the shooting investigation process. Because of repeated public outcry, a 21-member citizen's police oversight task force formed. "Sonoma County Board of Supervisors' Community and Local Law Enforcement Task Force" consists of appointees from diverse backgrounds, according to Wilkison, and includes "at least six ... Latino(s)." According to Vázquez of the task force, "actually at least eight [Latinos]" (2013; personal communication, April 20, 2014).

MID 2010'S NEWSPAPER HEADLINES

The PD headlines mirror the LAT, supporting the saying 'if it bleeds it reads.' One headline reads *Lopez attorney: Sheriff's office 'encourages' use of deadly force* (Espinoza, 2013). It is as appalling as the titles in the LAT from the 1940's. In a recent article, the LAT published: Sheriff's officials revisit use-of-force policy after lawsuit ruling (Sewell, 2014). Los Ángeles parallels Sonoma County with imprints of codified policies of institutional disdain for minority youth. After 70 years, institutional approaches of these news media companies and of law enforcement have not yet changed.

As of May 2014, the PD has had a permanent The Andy Lopez Case hyperlink on its homepage, frequently updated with articles on the cases' socio-political aspects. This hyperlink demonstrates how high of a profile this case is, giving us a hint of just how much of a stake the PD has in disseminating information. Akin to the LAT moving Zoot Suit coverage to the front page, the PD accomplished this in millennial digital format.

MID 2010'S REACTIONS AND EFFECTS

Among some of Santa Rosa City Council, secrecy is evident, stemming from the fear of Andy Lopez marchers. In addition, the City of Santa Rosa in addition started a task force, "The Open Government Task Force." From this task force, via K. McCallum of the PD, the public learned that before the marches city hall closed its doors, days after Andy Lopez's shooting due to a caricature of some of Santa Rosa City Councilmembers drawn with blood in the background reading, "End the Silence" (2014). A "gag order" left Santa Rosa City Council unable to lead the city during this tragedy (J. Combs, personal communication, May 5th, 2014). Through the family lawyer, A. Casillas, "Lopez's mother...hopes those who support her family will remain peaceful when a decision [of whether Deputy Gelhaus will be charged] is announced" (Carter, 2014). (Author's note: From the day of essay submission, new information comes out daily regarding this case; everything presented here is current as of May 5th, 2014).

WE ARE MILLENNIAL CHICAN@S

Professor M. Purser spoke at a Sonoma State University forum on Andy Lopez, stating "the incident hit her close to home since her residence is relatively close to Andy Lopez's family ... Lopez was part of all of our community" (Cordero & Sonoma State University: School of Education, 2013). However, not everyone agrees he was

part of our community. A former editor and columnist in the PD, Pete Golis recently wrote *Honoring our Latino History* about California's beginnings, Californios, and legal government documents written in Spanish. Golis mentioned how angry his first editorial made some of his readers; those "who wanted to arrest millions of undocumented immigrants and ban languages other than English, eagerly shared their disapproval" (2013; Frank Vázquez, personal communication, April 20, 2014). Golis argued he based his editorials on fact. His readers wanted to pretend this part of history never happened. Some of his readers do not want to acknowledge California was part of México, an "inconvenient fact, a piece of local history that got in the way of their belief that people of Mexican descent were outsiders" (2013). Golis used this background to write about demographics in our local city schools (2013). He stated more than half of elementary students are Latino and a third of public school students in Sonoma County are Latino; he wrote the local tide is turning. Latinos are once again California's majority population (Golis, 2013).

CONCLUSION: A TURNING TIDE

Will this turning tide of demographics change the future of our historical disdain, marginalization, and violence against Mexicans? The impact these two similar historical and current events have had in both their time-periods is to bring the issues to the forefront of newspapers and away from the marginalization and disdain of others; both moments are highlighted in the news, disdain and violence were visible on the streets and on the headlines. Violence on Zoot Suiters is now part of our historical memory; Andy Lopez's shooting is here and now. We can change the narrative. Two county and city tasks forces are handling distrust, disdain and violence, they are trying to repair the damage done in the new millennium. Roseland, a Sonoma County island in Santa Rosa is tired of being marginalized by local police forces and governments; annexation is a first step towards

solving this issue, district elections are the second step (J. Combs, personal communication May 5, 2014). Restorative Justice Movements are growing in schools; this allows alternative punitive measures for schools and students, from former zero tolerance policies including expulsion from school. There will be a memorial park built in the empty lot where Andy Lopez died, this community development stagnated for 20 years (Espinoza, 2014a). Are these the solutions to change this narrative? Will efforts to change this historical continuity of unfair treatment under the Law and, according to Golis, the changing demographics of Latinos in California, change our historically violent narrative?

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