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The Ronald E. McNair Postbaccalaureate Achievement Program is one of several TRiO Programs, funded by the U.S. Department of Education. TRiO Programs, funded by Title IV of the Higher Education Act of 1965, and implemented by Congress, provide equal educational opportunities for first-generation college students from low-income families and students underrepresented in graduate school. The WSU McNair Achievement Program is 100% federally funded at $225,000 annually.

The McNair Program

The Ronald E. McNair Postbaccalaureate Achievement Program provides enriching scholastic experiences to prepare eligible undergraduates for the challenge of graduate education. The program mission is to increase the number of low-income, first-generation college students and underrepresented minority students in doctoral programs. Its long-range mission is to help increase the diversity of college and university faculties. This program is named in memory of astronaut, physicist, and Challenger crewmember, Dr. Ronald E. McNair.

Born on October 21, 1950 in Lake City, South Carolina, Ronald E. McNair achieved early success in the segregated public schools he attended as both a student and an athlete. He attended North Carolina A&T State University where in 1971 he received a B.S. degree in physics. He went on to study physics at MIT, specializing in quantum electronics and laser technology. He completed his Ph.D. in 1977. As a student, he performed some of the earliest work on chemical lasers, publishing groundbreaking scientific papers on the subject. After earning his Ph.D., he began working as a physicist at Hughes Research Laboratories in Malibu, California, and conducted research on electro-optic laser modulation for satellite-to-satellite space communications. This research led to Dr. McNair's work with NASA.

In January 1978, NASA selected him to enter the astronaut cadre, one of the first three African Americans selected. McNair became the second African American in space. During this mission, McNair operated a maneuverable arm used to move payloads in space. The 1986 mission on which his life ended was his second Shuttle flight.

The McNair Program is one of several TRiO programs funded by the United States Department of Education. There are currently 187 colleges and universities participating in McNair programs across the nation. The Washington State University McNair program is funded through, and administered by, the Graduate School.

Portions of the above text are from *The Crew of the Challenger Shuttle Mission in 1986*, NASA.

From the McNair Program Director

The McNair Program at Washington State is pleased to present this third volume of the WSU McNair Journal. For the authors it represents the culmination of a year and in some cases two years, of work in preparation for and anticipation of eventual graduate study. For each, in her or his own way, the task of beginning a research project that ultimately would end as their first publication brought home the meaning behind the name of the spaceship Challenger in which Ronald McNair's life ended. The process of having an idea for research, formulating a statement of the problem, designing the research, gathering data, analyzing the results and putting all of this on paper and presenting it at an end of the summer symposium was a ongoing series of challenges.

As noted in the first edition of the McNair Journal, perhaps the most important lesson learned in this process is that the papers in this volume represent the beginning of future challenges. These students, like their McNair counterparts at other institutions, are the "challengers" of tomorrow.

As the reader will find, these students have focused on a variety of issues and concerns, and have approached them from a wide range of perspectives and methodologies. Despite these differences all came to appreciate the common thread—the challenge of ideas and the search for understanding.

Steven R. Burkett, Ph.D.
Associate Dean and Director

Journal Disclaimer

The WSU McNair Achievement Program staff has made every effort to assure a high caliber of research. However, the results and conclusions reached by each author are their own. Any errors or omissions are strictly the responsibility of each author.

ANALYSIS OF THE DIET REPORTED BY THE JAPANESE STUDENTS ON THE WASHINGTON STATE UNIVERSITY CAMPUS COMPARED TO THEIR REPORTED DIET IN JAPAN

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ABSTRACT

During spring semester 2005, 179 Japanese[1] students (25 graduate and 154 undergraduate students)[2] enrolled at Washington State University (WSU). This study examines the differences between the diets of these students while attending WSU and their diets in Japan. A primary goal of the investigation is to determine whether the foods the Japanese students claim to eat in the Unites States are more Japanese or American in nature, and whether the students themselves viewed their diet as more Japanese or more American. This research also examined how these students feel about the foods available to them in the university area; whether they are satisfied with the foods they can buy at local stores; and what specific types of foods they would like to see available to them. We examined whether their views were affected by the amount of time they had spent living in the U.S.

INTRODUCTION

According to current literature the people of Japan are changing from a traditional to a newer, more "modern," way of approaching eating and diet. Some of the changes, especially in meat consumption, indicate there are changes toward more Westernized/Americanized styles of eating. Much of this change has been the direct result of the influence of Western countries, especially the U.S., has had on Japan since the end of the 19th century and especially since after World War II. Other changes in the diet point to what some would consider being unhealthy practices. These are, in part, due to changes taking place within the Japanese household and society in general.

ORIGINS OF WESTERN INFLUENCE IN JAPAN

The beginning of Western influence on the Japanese diet can be said to have been in the mid-16th century with the arrival of the Spanish, Portuguese, Dutch, and English. Evidence of the early European influence can be seen in one of Japan's most famous dishes: tempura. Tempura is a dish composed of breaded deep fried vegetables and/or some kinds of seafood. It was originally "introduced by the Portuguese Jesuits" (Kazuko, 2002:12). Today, however, tempura is considered, or perhaps just thought, by most people to be of Japanese origin. This is just one example of early Western influence in Japan.

[1]Throughout this report "Japanese" will refer to persons born and raised in Japan, who consider themselves Japanese, and are considered Japanese citizens.
[2] Data provided by the Office of Institutional Research, Washington State University.

In the early 17th century, Shogun Tokugawa Ieyasu closed Japan from foreigners, especially Europeans. The main reason for this was fear that the Europeans would have too much influence in the political arena in Japan. The only Europeans allowed to do any trade with the Japanese were the Dutch, and they were limited to the port of Nagasaki. Because of this Western influence in Japan was practically nonexistent until the late 19th century, when Commodore Matthew Perry forced Japan to open up to trade with the United States. With Commodore Perry's arrival in Japan the country rapidly modernized, due in large part to its adoption of many Western practices. The opening of Japan influenced the Japanese diet, and this has increased even more since the end of World War II.

CHARACTERISTICS OF THE JAPANESE DIET

Rice is a staple food in the Japanese diet and is usually cooked by boiling, steaming, grilling (broiling), and roasting, although steaming is the most common method. It is the main Japanese carbohydrate and is consumed at every meal. However, according to Fallon and Enig (2005), "the real basis of the Japanese diet is not rice but fish, consumed at more than 154 pounds per person per year –almost one-half pound per day." Many soups are made of fish organs and bones, and they are considered strengthening (Fallon and Enig, 2005). Another staple food includes soy and soy based products such as soy sauce tofu, *natto* (fermented soy beans), *miso* (ferment soybean-based paste), and others.

According to Kazuko (2002:11), "[traditional] Japanese cooking is largely fish-and-vegetable based and if meat is included it is used sparingly and often cooked with vegetables." Furthermore, traditional Japanese food is cooked to preserve its natural flavor. This is why spices are used sparingly and fish and vegetables are often served raw or only slightly cooked (Kazuko, 2002). Japanese diet is also highly influenced by the seasons and local availability. Figure 1 shows an example of a traditional Japanese meal. The meal is composed of tempura (deep-fried vegetables or fish), soy sauce, sashimi (raw fish), *tsukemono* (pickled vegetables), boiled white rice, dipping sauce for the tempura, and *miso* soup.

Figure 1. Example of a Traditional Japanese Meal including: 1) Tempura (deep fried vegetables or fish) 2) Soy sauce 3) Sashimi (raw fish) 4) *Tsukemono* (pickled vegetables) 5)

Boiled white rice 6) Dipping sauce for Tempura 7) *Miso* (fermented soybean-based paste) soup.

CURRENT TRENDS IN JAPANESE DIET

As already noted, the diet of the Japanese people is becoming more westernized. Because there is no literature relating to the diet of Japanese peoples living in the U.S., including those in college settings, an analysis of the current trends of diet in Japan undertaken and was compared to claimed diet of the Japanese students at WSU.

One piece of evidence supporting the notion that the diet in Japan has become increasingly westernized is the increased consumption of protein from meat rather than from cereals such as rice. This corresponds with a dramatic increase in the income of Japanese people. This pattern is in accordance with Bennett's Law, which states that as overall diet changes with an increase in income, reliance on grains and starches are replaced by a higher consumption of proteins (see Cook, 1994). The increase in protein consumption from meats has the other effect of an increased intake of fat. Yasuhiro Matsumura (2001) claims that by 1996, the percent of fat consumption in the Japanese diet had risen to 26.5 percent compared to ten percent in the late 1940s. However, according to Clive Barnett (1998) Japanese people still eat twice as much fish as they do meat. According to Barnett, "Westerners, by contrast, have on average 47 times more meat than fish!"

Other changes in the Japanese diet are related to modern situations arising in the home. According to Nobuko Iwamura's (2004) results, Japanese mothers are putting less effort into cooking when they prepare meals at home. Many rely on precooked meals that they can easily obtain at local convenience stores.

Cooking in general is seen as a hassle that takes too much time out of the mother's day (Iwamura, 2004). Interestingly, many of these mothers think that they are "health-conscious." However, "the data suggests that the women who talk the most about eating plenty of vegetables [in fact] serve the fewest, and those who claim to follow a long list of rules for healthy eating prepare the least nutritious meals" (Iwamura, 2004: 3). Some findings show that women are encouraging children to drink more vegetable juice because it is "healthy," when in truth this is simply a convenient way of not cooking vegetables. Many of the vegetables that are cooked are those that require very little or virtually no preparation such sunflower seeds (Iwamura, 2004).

The fact that the number of young mothers is increasing in the labor force (O'Rourke, 1994) could be the reason cooking is beginning to be seen by many as a hassle. However, according to O'Rourke (1994) the number of women in the labor force tends to drop significantly when they have children. It would seem that the women with children in the workplace would be the minority. Therefore some other reason or explanation must exist to explain why homemakers are cooking less often. According to Iwamura (2004), one possible reason that mothers are changing their dietary lifestyles because they believe that meals should be enjoyable. Many of the children however do not want to eat what would be considered healthy foods. If a child does not want to eat a certain kind of food and is reprimanded for it, the mother feels that the "fun" mood of the table is lost so instead, she prefers to let the child have his/her own way.

Iwamura (1994) provides an example the changes taking place by looking at the preparation of breakfast. Many young mothers claim that they are too busy in the morning to prepare a healthy breakfast. However, Iwamura's findings suggest that most do not get up early enough to have breakfast prepared by the time the family needs it. Others claim that they cannot get up so early. Whatever the reason, there is now a reliance on foods from outside sources instead of the traditional Japanese-style of breakfast based on rice, *miso* soup, a salad, eggs, *natto*, green tea, and/or others. Many Japanese parents now give their children Western-style food cakes, Japanese-style sweets, rice cakes, meat-filled buns and similar foods in part because the children like them, but also because they are easily prepared (Iwamura, 2004).

It must be kept in mind that Iwamura's (2004) results were based on observations and questionnaires. To this point, I have discussed only the results from the questionnaires. Nobuko Iwamura (2004) noted, however, that within the group of Japanese people born after 1960, there is a difference between what people claim to eat and what they actually eat. Furthermore, the younger the people questioned were, the larger the gap between what they say and do.

Another source of change in the Japanese diet can be seen in the increase meals consumed outside the home, especially of Western style foods (Fujita and Chern, 1994)[3]. Japanese people have what appears to be the longest lifespan in the world for healthy individuals with the average person living to about age 75 (Kamei, et al., 2001). Many believe this is a function of the traditional Japanese diet, which is considered to have "relatively superior nutritional content" (Kamei, et al., 2002). However, because of recent adoptions of Western style foods[4], many of the foods now available at restaurants closely resemble those of a Western diet, and are related to concerns about potential health risks.

After analyzing different kinds of foods obtained at locations outside the home Kamei, et al. (2002) determined that Western style foods, especially ones such as cheeseburgers and pizza, are very high in saturated fat and therefore unhealthy. Japanese style take out lunches, on the other hand, "appeared to be the most favorable diets to avoid several kinds of lifestyle disorders" (Kamei, et al., 2002). However, if Fujita and Chern's (1994) belief that people are eating out more often is true, and that when they do they are eating more Western style foods, there is good reason to expect future health problems in the population. This is especially true because household income continues to grow and as a result the number of people eating away from home will also continue to increase.

Although the information presented above may give the impression that the Japanese diet is on a downhill trajectory, the truth is that "the average Japanese intake of nutrients is generally satisfactory" (Matsumara, 2001:S44). However this may be due to the fact that in Japan older people more likely to keep traditional diet, while young adults are the most likely to accept different consumption patterns. The number of people 40 years old and over is increasing significantly, while the number of people 13 years and younger is dropping. Therefore, the subjects focused on here[5], although not necessarily the minority, represent a segment of the population that is decreasing.

HYPOTHESIS

Initially it was thought that students from Japan would prefer and follow a diet that is similar to the one they followed in Japan because they consider an American diet to be more oily/greasy and thus less healthy. Because there are few Japanese food products available in Pullman, many Japanese students request that family members and friends in Japan send food products by mail. In other cases they may ask that specific items be brought to the U.S. when a friend (perhaps another WSU Japanese student) returns from a short trip to Japan. It was also expected that many of the Japanese students would take advantage of trips to larger cities such as Spokane or Seattle where there is greater availability and variety of the Japanese foods wanted.

The possibility that some of the students decide to adopt an American style diet was recognized, but it was believed these would be in the minority, and in some situations may only be the case because the desired food products are not available. However, the amount of time a student has lived in the U.S. is also expected to influence his/her diet. It is expected, then, that

[3]Although eating outside can be interpreted to mean eating lunch at school, the office, and other places, here it will refer to eating at restaurants of any kind.

[4]Western style food refers to meals made of steak, pizza, hamburgers, french-fries, and/or other foods of this nature.

[5] From approximately 18 to 30 years old.

the longer the student is in the U.S., the more acculturated he/she will be to an American lifestyle and thus adopt an American style diet. (Declan, 2001).

METHODOLOGY

According to WSU's Office of Institutional Research, during spring semester 2005 there were 179 Japanese students[6] enrolled at the Pullman. Surveys were collected from 22[7] subjects
Data collection consisted of asking some of the Japanese students on the WSU campus in Pullman to complete a survey[8]. The survey included two sections. The first included lists of different kinds of foods in several categories, e.g. beef in the meat category. Students were asked to write down, for Japan and the U.S., how often they ate a certain kind of food, how much they ate in one sitting, and, for certain foods, how the food item is usually prepared, e.g. fried, baked, etc., when they eat it. The lists included foods that would be more common in Japan, foods that would be more common in the U.S., and foods that would be common in both countries. Appendix A shows an example regarding the student's consumption of chicken.

Unfortunately there are some limitations to the first section of the survey. For example, dairy products were not included. Similarly, reference to alcoholic beverages was not included even though they play a very large role in Japanese culture. It is consumed in both formal and informal social gathering and is often considered to be a sacred drink.

The second section of the survey asked the students' views on such things as how their diet in the U.S., that is, is it more American or Japanese in nature? They were also asked their opinions on American food, how they get the Japanese food products they cannot find in Pullman, and what kind of restaurants they eat at most often and why. This section was designed to determine how the students feel about the foods they have available in Pullman and what, if anything, they would want to be made available.

RESULTS

Looking first at the averages of the types of foods the students eported eating, we find some very interesting results. For example, when looking at general types, the diet of the students when they are in Japan and in the U.S. are almost the same except, perhaps, for some small differences in the consumption of fruits and vegetables (2 percent and 3 percent less in the U.S., respectively). However, there is a 5 percent increase in the consumption of meat in the U.S. When the foods are looked at in detail large differences in actual diet are obvious.

Looking at the average of the students' reports of fruit consumption (Figure 2), we find a decrease in the U.S in the amount[9] of fruit consumed in every fruit category, except the other (fresh) fruit category. Especially significant is the large drop in the consumption of citrus fruits, which decreased by 75% in the U.S. Pickled plums, which were always low, disappeared almost completely in the U.S.

Figure 3 shows that the Japanese students claim that there is a large decrease in the amount of vegetables they eat in the U.S. compared what they eat in Japan. The only exception to this is with regard to potatoes, which they claim has tripled in the amount consumed.

When asked about their intake of meat, the students reported that overall, they were eating more chicken and beef in the U.S. than they normally did in Japan. Pork, eggs, and canned fish

[6]This number included154 undergraduate and 25 graduate students
[7]This included 20 undergraduates and 2 graduate students (or 12% of the total Japanese student population at WSU's Pullman campus).
[8]The survey instrument was created with advice from Dr. Miriam Edlefsen, Department of Food Science and Human Nutrition, Washington State University.
[9]Unless otherwise specified, all amounts refer to weight in grams.

intake dropped a little in the U.S., but there was a decrease of about 98% in the consumption of fresh fish in the U.S. (see Figure 4).

Grains, like meats, showed a very large decrease. In this case the greatest change was in the consumption of rice, which decreased by almost 75 percent. The amount of rice consumed was so large however that it significantly overshadowed the other grains (see Figure 5).

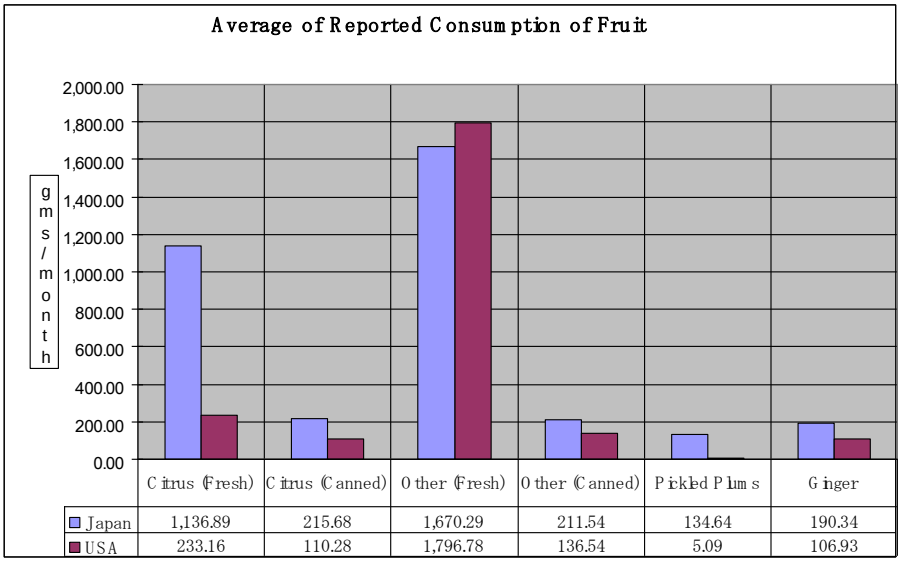


Figure 2. Average of Reported Consumption of Fruits in Grams per Month

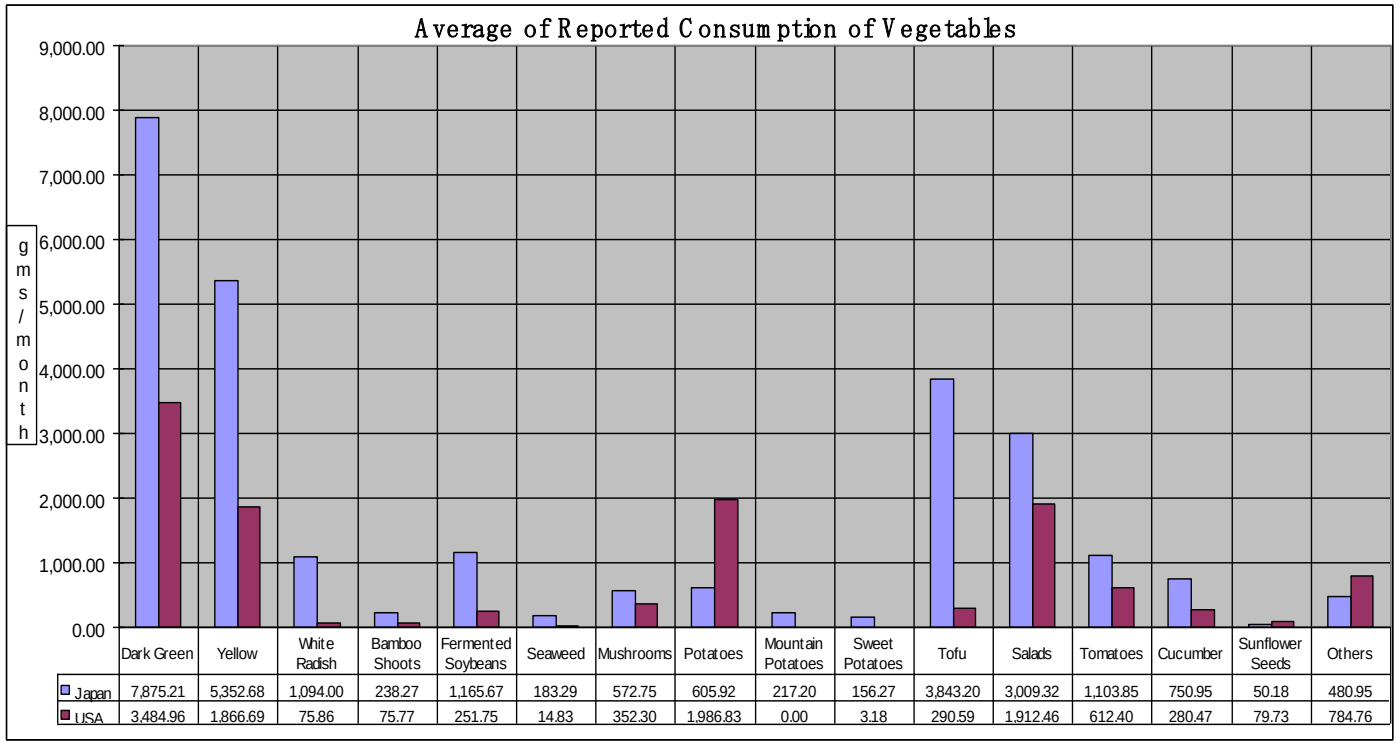
To better be able to illustrate the difference in the other grains Figure 6 shows the grains reported by the Japanese students minus rice. This figure allows us to see a decrease in the consumption of all grains, most significantly in ramen noodles, but a small increase in the intake of pasta.

The last food category the students were was asked about referred to different kinds of beverages consumed. Because water, like rice in the previous section, overshadowed all other beverages (Figure 7)

Finally, Figure 8 was created to better analyze the remaining beverages. The responses revealed that for most cases in the U.S. beverage intake for the Japanese students increased, especially when looking at juices. This may occur to replace the lower intake of actual fruits, and soda pops. However, tea drinking amounts decrease very sharply in the U.S.

OVERALL SATISFACTION

The students' reported "low" overall satisfaction with the foods available to them in the Pullman area. Of the 22 surveyed, 15 disagreed or strongly disagreed with the statement that they were satisfied with the foods available. Moreover, 17 of the 22 strongly agreed or somewhat agreed with the statement that they could get more Japanese food products outside of the Pullman area, mostly in Seattle.



	Dark Green	Yellow	White Radish	Bamboo Shoots	Fermented Soybeans	Seaweed	Mushrooms	Potatoes	Mountain Potatoes	Sweet Potatoes	Tofu	Salads	Tomatoes	Cucumber	Sunflower Seeds	Others
Japan	7,875.21	5,352.68	1,094.00	238.27	1,165.67	183.29	572.75	605.92	217.20	156.27	3,843.20	3,009.32	1,103.85	750.95	50.18	480.95
USA	3,484.96	1,866.69	75.86	75.77	251.75	14.83	352.30	1,986.83	0.00	3.18	290.59	1,912.46	612.40	280.47	79.73	784.76

Figure 3. Average of Reported Consumption of Vegetables in Grams per Month

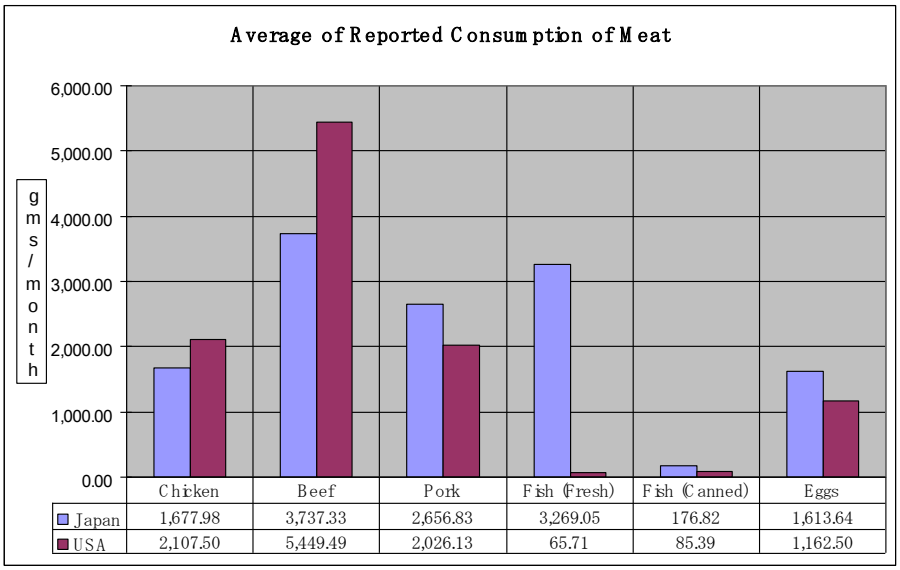


Figure 4. Average of Reported Consumption of Meats in Grams per Month here

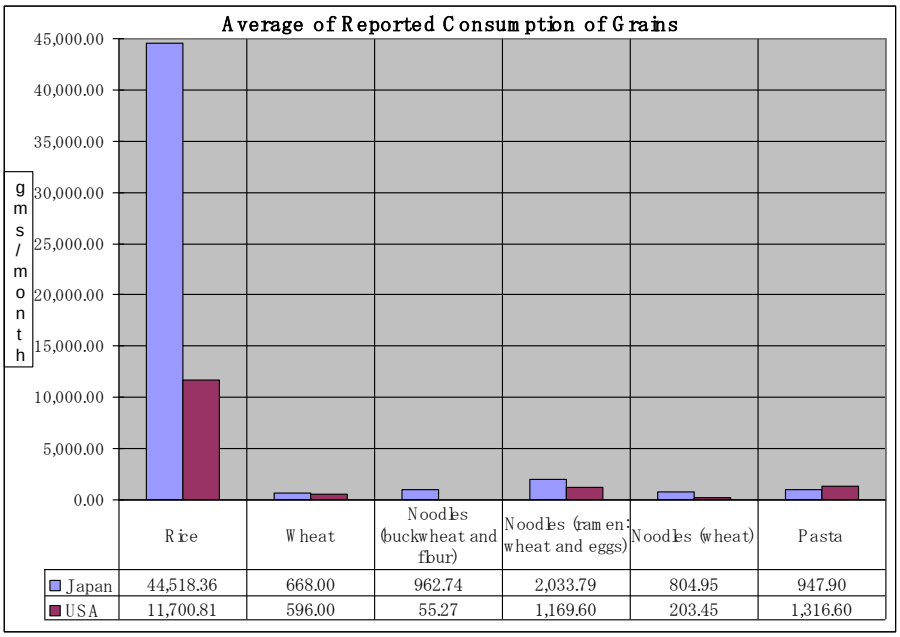


Figure 5. Average of Reported Consumption of Grains in Grams per Month here

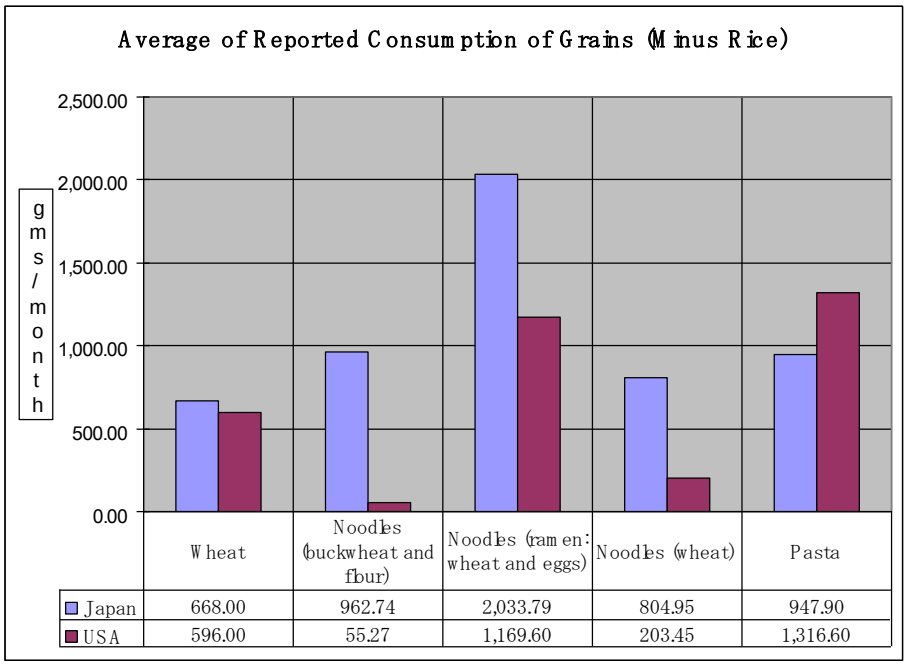


Figure 6. Average of Reported Consumption of Grains, Minus Rice, in Grams per Month

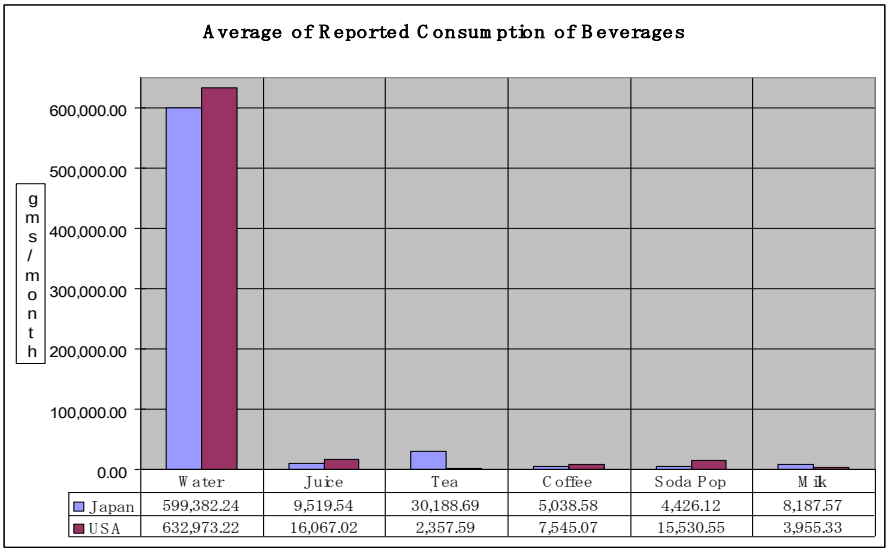


Figure 7. Average of Reported Consumption of Beverages in Grams per Month here

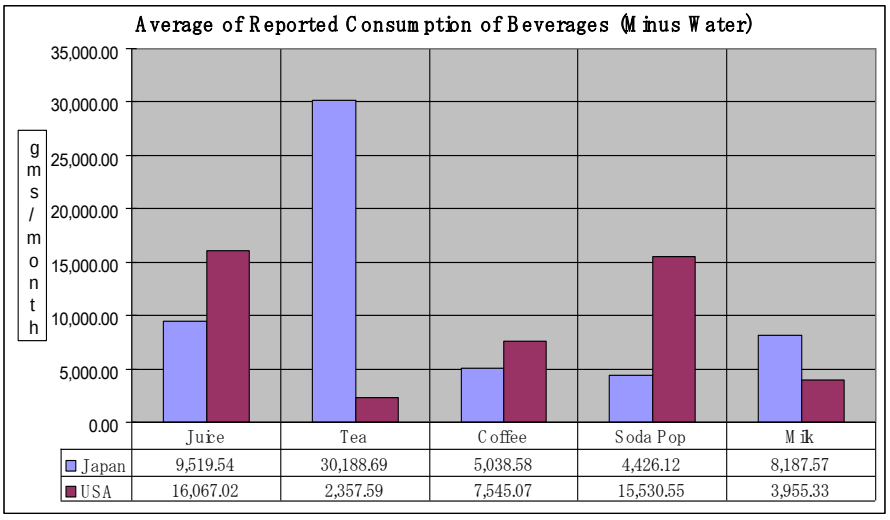


Figure 8. Average of Reported Consumption of Beverages, Minus Water, in Grams per Month here

When questioned further about the kind of foods they have when eating out, 19 of the 22 said they eat at Chinese restaurants. Although this was expected because of the similarities to Japanese foods, this was the second most common answer. Most of the students said that it was because they enjoyed the food for its taste. The next two most common types of food consumed were Mexican and American, receiving 6 votes each.

With regard to which diet the students believe they are following, Japanese or American, the responses were relatively close for such a small sample. Eight students said their diet was more American, while 12 said that it was more Japanese, and two said it was somewhere in the middle. However, 17 of the students claimed to be trying to maintain a Japanese diet. Perhaps this is because, as the survey showed, most students believe an American diet to be very oily/greasy and/or unhealthy.

DISCUSSION AND CONCLUSION

Our findings suggest that the diet of the Japanese students at WSU's Pullman campus is not Japanese in style, but that it is not completely American either. The best description of the diet is somewhere in between. However, from the literature reviewed and the evidence showing an increase in the consumption of meat and a decrease in the eating of fish and vegetables, it could be argued that the diet is, at the very least, becoming more American.

The possible reasons for the above are numerous. First, the subjects are in a group of people in Japanese society most likely to adopt different diets. Also, because they are living in a foreign country, they may wish to explore and experience as closely as possible the lifestyle of those around them including the adoption of American eating habits. However, their responses to some of the questions in the survey suggest that the most important reason for adopting an "American diet" is that they do not have access to the foods they want/need.

FUTURE RESEARCH

Clearly the above is not a complete analysis of the diet of the Japanese students on the WSU campus in Pullman. Future research should include consideration of dairy products and alcoholic beverages. Although some data on the method of preparation of the foods e.g. frying, baking, and boiling, was collected, it was not very thorough, and time constraints did not permit and extended analysis.

A second consideration for future research is the diet of individual Japanese students. The amount of time spent in the U.S. surely has an effect on their diet. We can expect that the longer they are in the U.S. the more acculturated to its customs students will become.

Finally, a larger sample and data beyond that obtained through a survey should be collected and examined. In this research the students claimed, perhaps unknowingly, to be eating very large quantities of food. This was especially true with regard to the foods they reported eating when in Japan. When looking at differences in specific foods, and finding their caloric value using the USDA National Nutrient Database for Standard Reference, Release 17, the results for just a portion of the foods they would have consumed daily were too high to be accurate (see Table 3). Although the research did not give us accurate numbers, it did give us a good idea of the students' perceptions of their diet. However, for accurate numbers perhaps a food diary of the students on the WSU campus and perhaps some students in Japan could be distributed, collected, and analyzed.

Table 3. Total Claimed Kilocalories of Selected Foods

Food Type	Japan kilocalories/ month	USA kilocalories/ month
Citrus (Fresh)	468.95	96.18
Other (Fresh)	806.38	867.44
Dark Green	2,010.14	889.53
Yellow	3,979.75	1,387.90
potatoes	563.93	1,849.13
Chicken	3,970.75	4,987.17
Beef	11,058.11	16,124.07
Pork	7,383.82	5,630.99
Fish (Fresh)	4,753.67	95.56
Rice	57,761.16	15,181.43
Noodles (buckwheat/flour)	1,270.81	72.96
Noodles (ramen: wheat/eggs)	9,200.47	5,291.04
Pasta	1,333.83	1,852.64
Juice	4,395.11	7,418.04
Tea	339.20	26.49
Coffee	70.29	105.26
Soda Pop	1,917.33	6,727.62
Milk	4,899.12	2,366.71
Total kilocalories per month	116,182.83	70,970.16
Total kilocalories per day	3,872.76	2,365.67

Although our findings suggest that the diet of Japanese students at WSU is more American in nature, further investigation is required. It is hoped that this project will inspire others to pursue the answers needed to help international students become more satisfied with their food availability. It should be one of the university's priorities to ensure, or at least attempt to ensure, the satisfaction and comfort of not just the Japanese students at WSU, but of all the students. However, before changes can be made the diet of the students must be understood as thoroughly as possible.

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VALIDATION OF THE MULTIFUNCTION DIFFERENTIAL OPTICAL ABSORPTION SPECTROSCOPY (MFDOAS) INSTRUMENT FOR MEASUREMENT OF ATMOSPHERIC TRACE GASES

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ABSTRACT

Atmospheric nitrogen dioxide (NO_2) is a concern because it affects human health and the environment by impairing visibility and it reacts to form ozone (O_3) in the troposphere and destroys stratospheric O_3. Tropospheric O_3 is highly reactive and causes damage to respiratory systems of animals and to crops while stratospheric O_3 helps shield the planet from harmful ultraviolet radiation from the sun. By understanding the trends and concentrations of NO_2 in the atmosphere, we can work towards reducing NO_2 pollution. The Aura satellite with the Ozone Monitoring Instrument (OMI) was launched in July of 2004 to study the daily global concentrations of NO_2 and O_3 in the stratosphere and troposphere. Data obtained from OMI will be used to better analyze the effects of air quality pollution on regional and global scales. Since instruments degrade in space, ground-based calibration is critical to understanding the satellite data. The Washington State University (WSU) Multifunction Differential Optical Absorption Spectroscopy (MFDOAS) instrument was built to ground-validate the OMI measurements. This paper discusses a validation experiment of the MFDOAS instrument. Time coincident NO_2 measurements were made with the MFDOAS instrument and a traditional DOAS instrument (S11), which is the world standard for measuring stratospheric NO_2. Results show that deduced NO_2 from MFDOAS and S11 agree within about ±10%. However, there is more noise in the MFDOAS data, which can be improved. Additionally, the study provides information for the further development of MFDOAS in order to make it a more accurate instrument.

INTRODUCTION

Atmospheric nitrogen dioxide (NO_2) is a concern because it affects human health and the environment by impairing visibility and it reacts to form tropospheric and destroys stratospheric ozone (O_3). In the troposphere, NO_2 is a reddish-brown and reactive gas which reacts in the presence of heat, sunlight, and volatile organic compounds (VOCs) to form O_3. Long term exposure to emissions of NO_2 and O_3 can cause lung irritation, bronchitis and pneumonia, and lower resistance to respiratory infections (EPA, www.epa.gov). In terms of environmental effects, NO_2 can react with hydroxyl radical (OH) in the atmosphere to form nitric acid (HNO_3), which can corrode metals and contributes to lake acidification when deposited. O_3 damages plants and trees and reduces vegetation yields. NO_2 and ground-level O_3 are regulated by the US EPA at 53 parts per billion (ppb) and 80 ppb, respectively, for environmental and human health reasons (EPA, www.epa.gov).

Nitrogen dioxide forms from the oxidation of nitric oxide (NO). Major sources of NO are fuel combustion in power plants and automobiles. Sources of VOCs are motor vehicles, chemical

plants, refineries, factories, consumer and commercial products, and other industrial sources. Tropospheric O_3 is formed when molecular oxygen (O_2) is broken apart by solar UV-radiation and the resulting oxygen atoms then react with other O_2 molecules to form O_3. A free O molecule will react with NO_2 to form NO, but does not react with O_2 to form O_3. According to the EPA website, national emissions of nitrogen oxides (NO, NO_2, and other oxides of nitrogen) have increased over the past 20 years by 9 percent (EPA, www.epa.gov).

In the stratosphere (located 6 to 30 miles above the earth), NO_2 contributes to the diminishing of the protective O_3 layer against ultraviolet (UV)-radiation coming from the sun. The release of chemicals, such as chlorofluorocarbons (CFCs), halons, carbon tetrachloride, methyl bromide, and methyl chloroform from commercial air conditioners, refrigerators, insulating foam, and some industrial processes diffuse into the stratosphere and result in O_3 depletion (EPA, www.epa.gov). In addition, NO_2 reacts with chlorine species from CFCs to form chlorine nitrate, which attack protective ozone molecules. Scientists estimate that one chlorine atom can destroy 100,000 O_3 molecules.

Excessive exposure to UV radiation causes melanoma, which the most fatal type of skin cancer, as well as other types of skin cancer. UV radiation also causes cataracts, and damages the immune system. As for environmental concerns, UV radiation slows the growth of phytoplankton and certain food plants (EPA, www.epa.gov).

By understanding the trends and concentrations of NO_2 in the atmosphere, we can work towards reducing the problem of tropospheric O_3 formation and stratospheric O_3 depletion. Ground-based and satellite measurements of NO_2 and O_3 have been made for about 25 years. The Aura satellite with the Ozone Monitoring Instrument (OMI) was launched in July of 2004 to study the daily global concentrations of NO_2 and O_3 in the stratosphere and troposphere. Data obtained from OMI will be used to better analyze the effects of air quality pollution on regional and global scales. So far, the data obtained from OMI have not been validated by using an instrument that measures from the ground. Since instruments degrade in space, ground-based calibration is critical to understanding the satellite data. The MFDOAS instrument will be the first ground-based instrument to ground-validate the OMI data. A first step in the development of the new MFDOAS system is to validate the new instrument's data sets. This will be done using the "S11" world NO_2 standard instrument. The S11 instrument was built for the Network for the Detection of Stratospheric Change (NDSC) in 1993 and is a traditional DOAS instrument. The purpose of this research is to deduce and separate stratospheric concentrations of NO_2 from that of the troposphere and to then compare the stratospheric data with time and spatially-coincident data sets obtained from using the S11 instrument thus, hopefully, validating the MFDOAS data sets.

METHODOLOGY

Review of Related Literature

In the early 1970s, Brewer et al pioneered the technique of Differential Optical Absorption Spectroscopy (DOAS). Brewer used a Dobson O_3 spectrophotometer & measured total daytime NO_2 in the atmosphere. In the mid-1970s, John Noxon used an Ebert spectrometer in the spectral range 437 nm to 447 nm at the Fritz Peak Observatory in Colorado. As a control spectrum, Noxon held a cell filled with pure NO_2 in a light beam in front of a spectrograph. From this, he was able to obtain the specific spectral pattern for NO_2.

Figures 1a and 1b show the cross-section spectra of NO_2 and O_3 in the blue spectral region centered on about 400 nm wavelength. The figures show the ability of NO_2 and O_3 to absorb light as a function of wavelength. It is obvious that the cross-section spectra is different and unique for different molecules due to differences in molecular structures, and so the spectral pattern of NO_2 can be used to determine its concentration in a spectrum of the atmosphere.

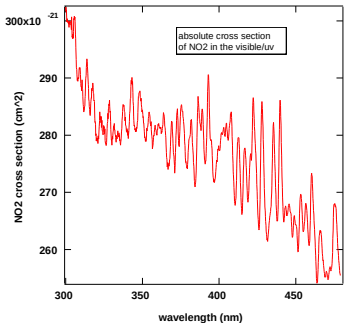

Figure 1a: NO_2 Cross-Section Spectra

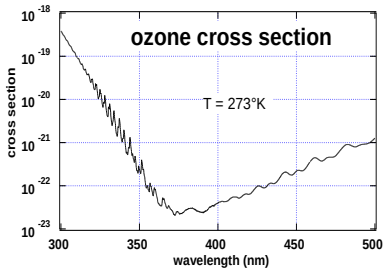

Figure 1b: O_3 Cross-Section Spectra

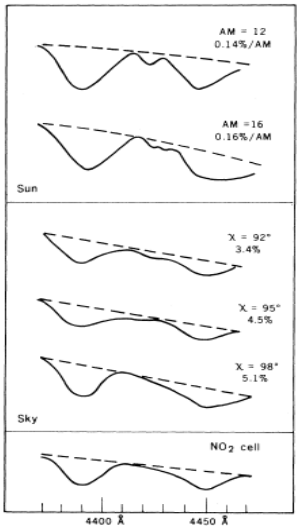

Figure 2: Spectra of sun and twilight zenith sky vs. lab spectrum of NO_2

Figure 2 shows the spectra of the sun and twilight zenith sky compared with a lab spectrum of NO_2 obtained by Noxon (Noxon, 1975). As seen on the figure, the sun and sky spectra patterns are very similar to the lab spectrum of pure NO_2, which implies that NO_2 was, in fact, what Noxon was measuring. Since Noxon's work, many groups around the world (Mount et al, 1986) have used his method of viewing the zenith sky. The technique has resulted in a much better understanding of both stratospheric and tropospheric NO_2 chemistry.

Differential Optical Absorption Spectroscopy (DOAS)

DOAS is one method used to determine concentrations of atmospheric species. Spectroscopy is the study of the interactions of radiation and matter, and absorption spectroscopy relates the amount of radiation absorbed to the concentration of a species. DOAS uses the Beer-Lambert Absorption Law (Beer's Law), which relates the amount of radiation absorbed to the number of gas molecules in the measurement path length

Beer's Law can be applied to spectroscopic measurements to determine the concentration of atmospheric gases. Beer's Law describes the decrease of radiation as a function of wavelength as the light (from the sun, moon, or artificial light source like a laser) goes through the atmosphere. The spectrum of radiation before and after the absorption of the gas is measured and the gas' concentration is calculated using the equation: $I(\lambda) = I_o(\lambda)\exp[(-\sum\sigma_i(\lambda)N_iL]$ where,

λ = wavelength (nm),
$I(\lambda)$ = radiation intensity in the presence of absorbers,
$I_o(\lambda)$ = radiation intensity without absorbers,
$\sigma_i(\lambda)$ = light absorption cross-sectional area of the absorber (cm^2),
N_i = concentration of absorber (molecules/cm^3),
L = length of the optical path (cm).

Beer's Law can be converted to the equation: $\ln (I(\lambda) / I(\lambda_o)) = -L \Sigma \sigma_i(\lambda)N_i$. There are many atmospheric species that absorb radiation. The subscript "i" in the summation refers to any particular atmospheric specie that absorbs at that wavelength and the sum occurs over all species that can absorb at wavelength λ. As a result, it is important to know all of the other atmospheric species that might absorb over the wavelength region measured to be able to account for them.

Since the sun, which is used as a light source, changes position throughout the day, the measurement path is always changing. A slant column abundance of NO_2 (the abundance of the molecule between the observer and the source), expressed in units of molecules per square centimeter, is calculated from Beer's law using a complicated mathematical algorithm. The actual vertical column abundance is computed from the slant column by dividing by an air mass factor (AMF). The AMF can be calculated from basic geometry for direct sun measurements and from a radiative transfer code for sky measurements (Mount, pers. comm.). Figure 3 shows the sun at various times of the day and how the measurement path and the AMF changes. The amount of absorption depends on the solar zenith angle (how far the sun is above the horizon), where the instrument is pointed in the sky, and the altitude of the NO_2 absorbing layer in the atmosphere.

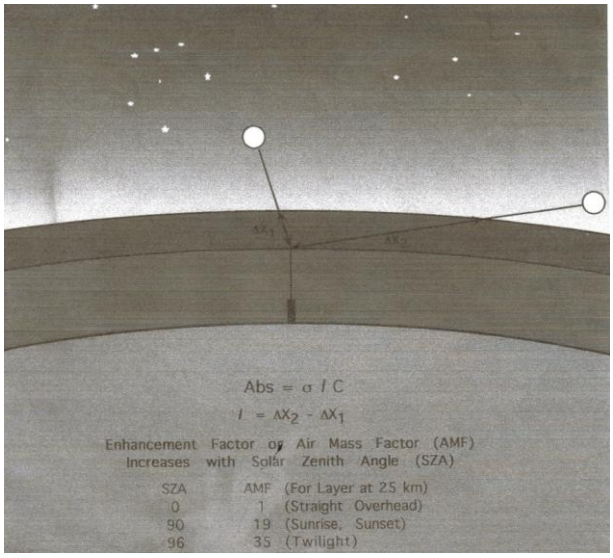

Figure 3: The changing positions of the sun causes the measurement paths to change throughout the day.

DESCRIPTION OF INSTRUMENTS

The New MFDOAS Instrument

The MFDOAS uses skylight and direct sunlight as light sources viewing at various vertical angles and horizontal angles (azimuth). The instrument consists of a telescope to focus the source light into a standard Czerny-Turner spectrograph. Inside the spectrograph, the light hits a collimating mirror to make the rays parallel before it is reflected to a diffraction grating which breaks the light up into its constituent colors. From the grating, the colored light travels to a focusing mirror. From the focusing mirror, the spectrum is detected by a charge coupled device

(CCD) detector system with thousands of small pixels (400 pixels x 1340 pixels rectangular array) each of which independently detect the amount of light incident on them. This new type of DOAS instrument is designed to measure the concentration of air pollutants O_3, NO_2, sulfur dioxide (SO_2), and formaldehyde (CH_2O) in clean and urban air sheds. The MFDOAS instrument is able to look at various horizontal and vertical viewing angles in the sky to allow mapping of the different concentrations of pollutants all over the atmosphere, which older/traditional DOAS instruments cannot do.

The S11 NO_2 World Standard Instrument

The S11 world standard instrument for NO_2 is an automated DOAS instrument that looks only at the zenith sky. Light passes through a quartz window down to a parabolic telescope and enters a double-crossed Czerny-Turner spectrograph that is connected to a diode array detector as shown in Figure 4b. The spectrograph in S11 is similar to the one in MFDOAS except that it is, basically, two spectrographs combined. Thus, after the light goes to the first focusing mirror, it enters another entrance aperture. Once again, the light passes through a second set of collimating mirror, grating, and focusing mirror. Using two spectrographs reduces the effects of scattered light. The spectrographs were crossed for optimal baffling (Mount, private communication). The S11 instrument was built for the Network for the Detection of Stratospheric Change (NDSC) in 1993 to make ground based measurements of NO_2 and other species of interest in the stratosphere. Figures 4a and 4b show the diagram of the MFDOAS and S11 Instruments, respectively.

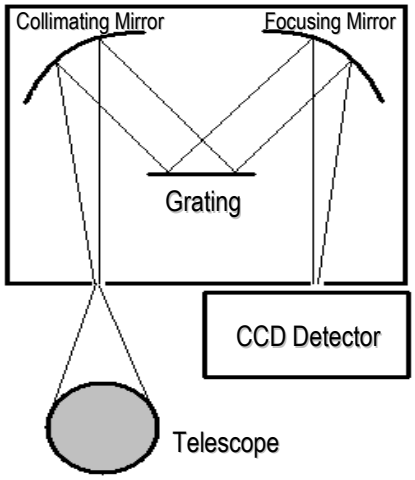

Figure 4a. MFDOAS Instrument

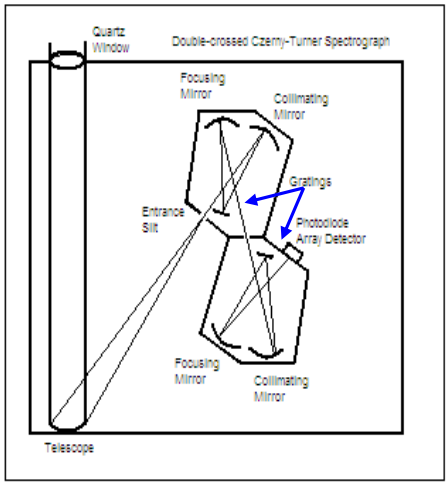

Figure 4b. S11 Instrument

Collection of Data

Data was collected at the top of Dana Hall in the WSU campus from July 5, 6, and 7 of 2006. The S11 and MFDOAS were placed side by side to run simultaneously. For the comparison, both instruments looked only at the zenith sky. For S11, one data point is the average of the measurements taken every minute. For MFDOAS, one data point is one measurement.

Before taking actual measurements a dark current, which is the electronic noise in the instrument, is measured by placing a black slide in front of the entrance slit of the spectrograph. This dark current is subtracted from actual spectra measured when the slide is removed.

Limitations on Data Collection and Data Quality

During this research, our major limitations were discovered. First and foremost, meteorological conditions such as rain and clouds prevented us from taking data because you cannot see the atmosphere. Second, time was a constraint since measurements had to be taken from sunrise to sunset for every day data was taken. Third, malfunctioning of the instruments, such as crashing of the software, was experienced once. Finally, lack of experience operating the instruments resulted in operator mistakes.

Data Analysis

The data are analyzed using a nonlinear least squares algorithm which accounts for the spectral pattern of known molecular species in the region of 400nm to 450nm (e.g. NO_2 and O_3) and other processes in the atmosphere (Hofmann et al, 1995). There are many physical processes in the atmosphere that contribute to the measured raw sky spectrum that must be removed. First, there is Rayleigh scattering, which is wavelength dependent and describes scattering of sunlight by small molecules like N_2 and O_2 which make up about 98%of the atmosphere. Rayleigh scattering occurs in the atmosphere when the wavelengths of radiation are greater than the particles in contact with them. As the wavelength decreases, the amount of scattering increases. Also, there is Mie scattering (clouds and aerosols), which occurs when the particles causing the scattering are larger than the wavelengths of radiation in contact with them. All of these and other processes must be accounted for along with the shift and stretch of the spectra.

The spectra can shift as a result of displacement of the grating and detector as well as temperature changes experienced by the spectrograph. Stretching of the spectra occurs due to illumination differences in the measurements. The shifting and stretching of the spectra by translating intensity values and changing adjusting the spacing of points, respectively, must be performed to increase accuracy of the residual spectra (G. Mount, pers. comm.).

RESULTS

Figures 5 to 7 are plots of analyzed data obtained during the 3 days of measurement for both the MFDOAS and S11 instruments. Nitrogen dioxide slant column abundance has been plotted against time to show the trend of NO_2 throughout the day. The MFDOAS data is represented by red and the S11 data in blue for all of the graphs. For all of the graphs, the MFDOAS data has an error of ±10% off of the S11 data, which signifies that the accuracy of the MFDOAS is good but can still be improved. The MFDOAS data follows the shape of the S11 data quite well, but has more noise.

The figures illustrate how temperature effects the measurements. Neither instrument is temperature-controlled which resulted in wavelength drift. As a result, manual adjustment of the gratings was required for both instruments, which was not always done correctly or periodically, producing erroneous data.

Gaps of no data in the graphs are a result of 1) the instrument being shut down due to rain and/or 2) instrument malfunctioning. In figure 6, the MFDOAS data point that stands out from the rest is a result of inputting the wrong time for that measurement during data collection.

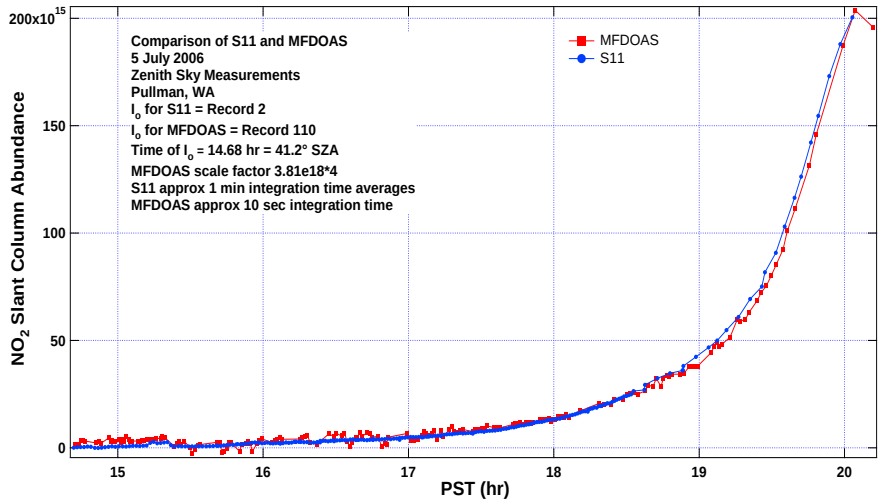

Figure 5. Comparison of S11 and MFDOAS for July 5, 2006

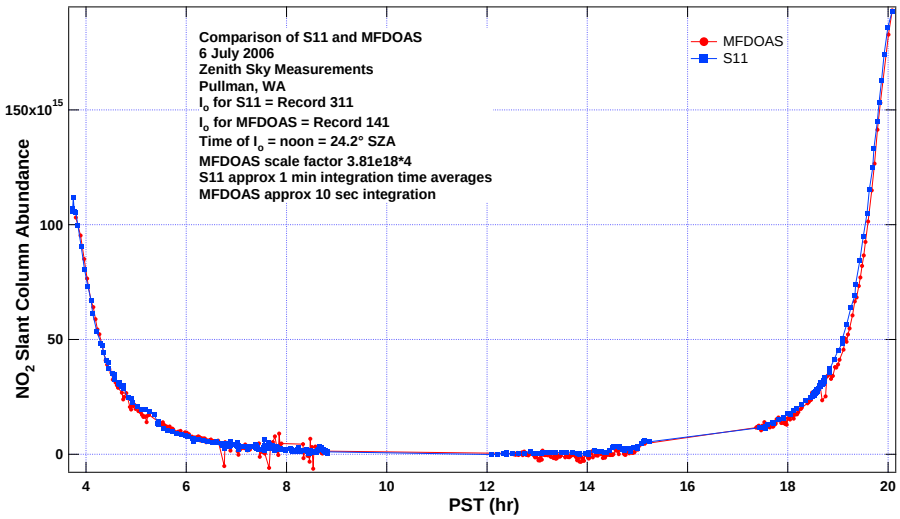

Figure 6. Comparison of S11 and MFDOAS for July 6, 2006

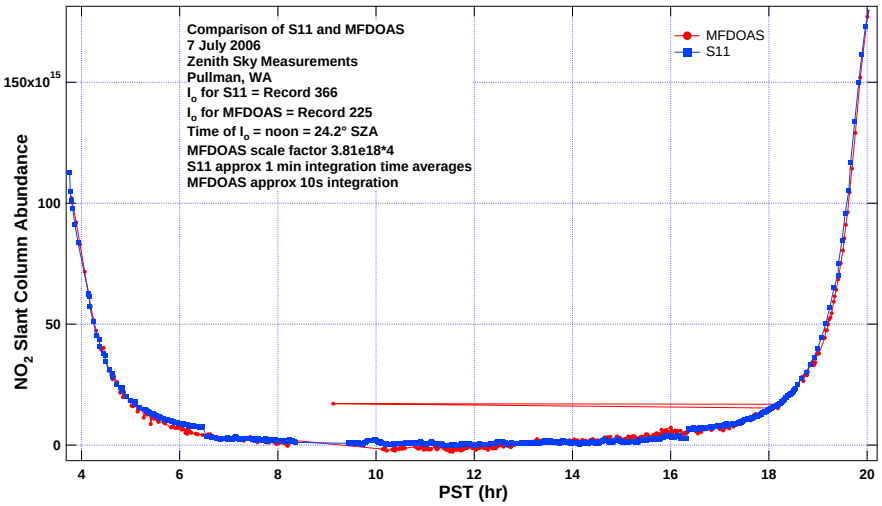

Figure 7. Comparison of S11 and MFDOAS for July 7, 2006

Figure 8 shows NO_2 slant column abundance vs. time for the 3 days of measurement for both the MFDOAS and S11 instruments. The figure only shows data from hour 8 to 16 (PST). Again, it is clear that for all of the three days, MFDOAS data is noisy unlike S11 data, which is quite uniform.

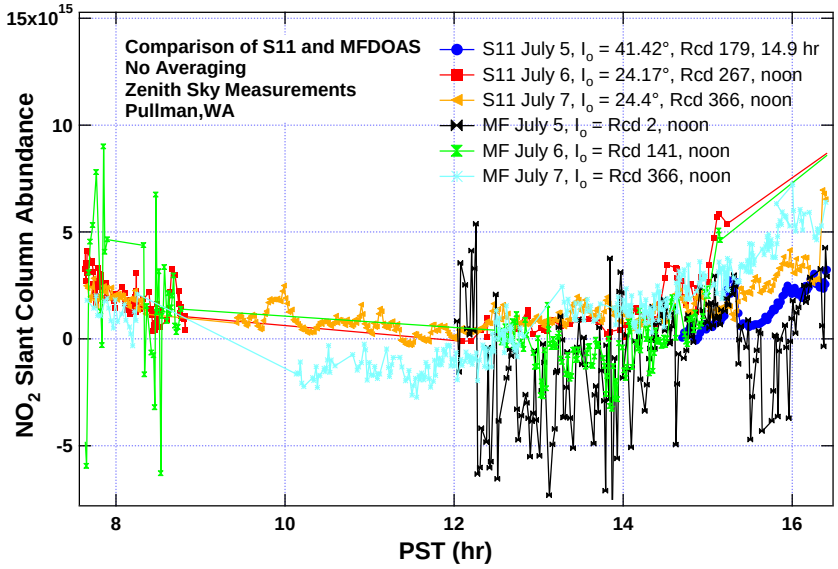

Figure 8. Direct Comparison in Region of Slowly Varying Path Lengths

CONCLUSION AND FUTURE DIRECTIONS

There is more noise in the MFDOAS data sets when compared to the S11 data sets. There are two main reasons for this result. First, the MFDOAS data was not averaged unlike the S11 data. Second, the CCD detector in the MFDOAS instrument is not yet completely understood since the MFDOAS is a new development. S11 has been developed and improved for several years now and, as a result, the photodiode array detector in S11 is well-understood. The solution for reducing noise in the MFDOAS data is simple: put forth more effort and time into understanding the photodiode detector so that the errors it contributes to the raw data can be accounted for.

With more time and work on the MFDOAS, it can be developed into a precise and accurate instrument. Since the S11 only looks at the zenith sky while the MFDOAS is able to map out the concentrations of air pollutants throughout the atmosphere by looking at various horizontal and vertical angles, the MFDOAS will be improved to make it a reference standard for other DOAS instruments. First, full automation of the instrument is ideal in order to reduce human operational error. Second, determination of the system's sampling time to produce constant counts so that the data is linear regardless of variations in sky brightness (i.e. clouds) will be solved by incorporation of a photodiode and shutter. A photodiode, which will convert light intensity to a voltage or current, will be placed in the spectral dispersion direction next to the CCD detector. The photodiode will integrate counts to a specified limit until the shutter stops measurement. Also, increasing understanding of the CCD detector on the MFDOAS to reduce error and noise in the data could be implemented.

ACKNOWLEDGEMENTS

I want to thank the McNair Achievement Program and Dr. George Mount for supporting and funding this research experience.

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CHICANO PRISONER ACTIVISM IN WASHINGTON STATE: 1968-1980

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ABSTRACT

This study examined the contributions of Chicano Prisoner Clubs (Pintos) to the Chicano Movement in Washington State from 1968 to 1980. The study focused on two Chicano Prisoner organizations: United Chicanos and Mexican-Americans for Self-Help. This qualitative study used primary and secondary sources including personal interviews, newsletters, correspondences and other archival materials. The study found that Pinto clubs made significant contributions and worked closely with Chicano organizations to advance the goals of the Chicano Movement. The findings show that it is important to consider the contributions of Chicano prisoner organizations in the Chicano/a Civil Rights and Prison Reform movements in the United States.

INTRODUCTION

Latinos are the largest minority in the United States, yet they continue to be marginalized and cast into roles that are outdated and oppressive. In the Pacific Northwest, and specifically in the state of Washington, peoples understanding of Mexicans, Mexican- Americans and Chicanas/os are at times clouded with bigotry and fear. This is due to many influences from which scholars are not immune. When looking to research the history of Chicana/o prisoners many scholars have focused on negative sub-cultures and/or street gangs. This topic, which is important to understand, has been overemphasized and exaggerated thus providing the general population ammunition to support negative stereotypes and racist ideologies about the Chicano community (Finnegan, 1996).

The media is also to blame in reinforcing racist ideologies. Newspapers and news television coverage have been found to disproportionately report mostly negative stories of Latina/o people (Ramirez Berg, 1998). Even films such as" *American Me*," and "*Blood in Blood Out"* reinforce negative images about the life of Chicanos/as (Baugh, 2003). These types of films may try to combat the negative subculture, yet in the end, they continue the tradition of heightening stereotypes and intolerance. They try to expose many for the first time to the history of Mexican/Chicano people. However they fail because to the uneducated and unexposed they cast Mexicans and Chicanos as violent street thugs and ignorant foreigners.

Films such as *American Me* and associated advertising campaigns have further muddied popular understandings of the term "Chicano." For example, an *American Me* plot synopsis states that it is an "epic depiction of thirty years of Chicano gang life in Los Angeles." However, the term "Chicano gang" is very misleading and gives a false understanding of the term. Chicano is not an ethnicity, anyone no matter their race, gender, ethnicity can be Chicano. According to

Ernesto Chavez "Chicano" is someone who is down for activism and for the betterment of La Raza (the people), (Chavez, 2002). This positive definition has nothing to do with gang life.

In the Pacific Northwest, Chicanos/as are commonly viewed as recent arrivals to the region despite the fact that Mexicans have been in the region since the middle of the 19th century. Since then they have migrated here for various reasons beginning with the Porfiriato Era to the recent NAFTA period. Perhaps one of the most important programs responsible for the migrations of Mexicans to Washington State was the Bracero program. This program was initiated as a result of World War II and helped cement the importance of Chicanas/os to the state (Gamboa, 2000). Washington's thriving agriculture industry helped facilitate the migration of people and ideas from the American Southwest including California. This happening, coupled with the marginalization Chicanos/as felt, set the stage for the Chicano Movement in Washington State (Estrada & Santillán, 1997)

To some, the Chicano Movement is a relic of the past, but too many others the Chicano Movement was and still is relevant and a symbol of hope, freedom, acceptance, and integration. The Chicano Civil Rights Movement was a national movement that brought the nation to a major turning point. The Pacific Northwest was no exception. The Chicano movement not only emerged, but thrived in the Pacific Northwest (Garcia & Maldonado, 2001).

The Chicano movement consisted of many different emphases ranging from the farm workers movement led by Cesar Chavez and Dolores Huerta to the political movements of La Raza Unida Party. In Washington State, more attention has been paid to the student movement (Rosales Castañeda, 2006) and the United Farm Workers struggle (Cuevas, 2005).

Less understood is the role of Chicanos/as in the Prison reform movement during the 1960s and 1970s. According to Delone, Spohn, and Walker (2000) during the civil rights era a prison reform movement was occurring in prisons throughout the United States. Some of the reforms were initiated by the institutions. However, many others were led by the prisoners themselves. In many instances the institutions and their staff worked with prisoners by giving them the tools necessary to truly become rehabilitated. These reforms allowed Chicano Prisoners (Pintos) to create their own clubs and take Chicano Studies classes so they could strive for change and post release acceptance.

My research focuses on Chicano prisoner club activism in Washington State from 1968 to 1980. The purpose of my research is to expand our understanding of Chicano/a history and the Chicano Movement in the Pacific Northwest. I argue that Chicano Pintos played an important role in the development of the Chicano Movement in Washington State. My research looks at two Chicano prisoner clubs, United Chicanos and Mexican-American for Self-Help (M.A.S.H.) and their contributions to the Chicano movement and prison reform movements.

LITERATURE REVIEW

The Chicano Movement has been a favorite research topic among academic scholars and activists. The four-part Public Broadcasting Service documentary series, *Chicano! History of the Mexican American Civil Rights Movement* (1996) introduced viewers to four main aspects of the Chicano Movement: (1) restoration of land grants (2) farm workers rights (3) students fighting for a better education (4) struggle for voting and political rights. A book published by the same title echoed the same themes in the documentary (Rosales, 1996).

The early research studies were written by former participants in the Chicano Movement (Muñoz Jr., 1989; Gutierrez, 1998). For example, *Youth, Identity, Power*, by Carlos Muñoz Jr., (1989) does an excellent job of covering the militancy of urban Chicano youth. Muñoz wrote "…it marked the first time that youth as youth played a central role in the shaping of oppositional movements aimed at those in power. Student activism is an area of that is covered extremely well

especially the high school blowouts, the Brown Berets and the founding of the Movimiento Estudiantil Chicana/o de Azltán (M.E.Ch.A).

The Chicano Movement meant and means different things to different people. Ernesto Chavez's *"Mi Raza Primero!" Nationalism, Identity, and the Insurgency in the Chicano Movement in Los Angeles, 1966-1978*, was the first book to cover the movement in one large urban city. The most important aspect of Chavez's book is that he debunks the myth that the movement was a "revolution." Rather Chavez casts it as a "reformist" struggle. The reformist label is important in my research because the Chicano Prisoner organizations examined here were many times using reformist ideology in relation to the Chicano community and the prison system.

Another recent book on the Chicano Movement is Ian Haney-Lopez's (2003) *Racism on Trial, the Chicano Fight for Justice.* Lopez focuses on the criminal justice during the Chicano Movement. He examines the police brutality, racial profiling, and the overall nature of the criminal justice system towards Chicanas/os. His book echoed the calls of the Pinto prisoners who experienced firsthand the negative effects of a corrupt system.

In *Fugitive Thought: Prison Movements, Race, and the Meaning of Justice*, Michael Hames-Garcia (2004) touches on many different aspects of prison intellectuals, organizations, and writings. Hames-Garcia writes about the way that prison intellectuals shift the focus of their energy away from their personal legal cases to a critical theory of society and the criminal justice system. He quotes the Statesville Prisoners Organization in reference to prisoners being an oppressed nation within a nation. Hames-Garcia also writes about prisoner activists such as Raúl Salinas, Ricardo Sánchez, Pancho Águila, and Piri Thomas.

Useem and Kimball (1989) highlight that during the late sixties advocacy groups fighting for prisoners rights were sprouting up throughout the nation. They wrote "… some of the leftist political groups of this period argued that prisoners and ex-prisoners should not be shunned but instead should be recruited for the revolutionary cause" (p.18). The authors also made a connection between incarcerated "black and Latino urban radicals," and the prisoner clubs they joined or founded. Alan Eladio Gomez (2006) argues that ethnic studies courses may have been developed by prison inmates and their supporters before they were created in colleges and universities. He briefly mentions the role of M.A.S.H. in developing the course, "Mexican American History and Culture Class," taught by Cenobio Macias, a University of Washington professor.

One book that focuses on Walla Walla State Penitentiary is John McCoy's *Concrete Mama: Prison Profiles from Walla Walla* (1981). This book provides important information about the prison reform movement in Washington State. McCoy describes how in the late 1960's, Governor Daniel J. Evans initiated prison reform in the state by naming a psychiatrist named Dr. William Conte as director of prison institutions. Conte believed that prisoners should build relationships within prison staff and with the outside community, and most importantly give prisoners more rights. The book profiles how these reform initiatives affected Washington's State Penitentiary in Walla Walla, Washington. The most important aspect of the book was the profiles of prisoner clubs including the United Chicanos. McCoy lived with the prisoners during the day, leaving only at night. The only downfall of the book is that its author wasn't involved with the prison until 1978 which was towards the latter years of the United Chicanos club, near its demise.

Despite the books mentioned above there are still gaps in the Chicano movement literature. For example the criminal justice system has been covered, but mostly through the eyes of individual youth's experiences on the outside and before they went to prison. If experiences in prison are written about they are usually about individuals such as Brown Berets leader David Sanchez (Chavez, 2002). What scholars have not written extensively about is Chicano Prisoner Organizations that both mirrored and transformed aspects of the Chicano Movement and the prison reform movement. The literature on prison and prison organizations is, at best, very limited. The literature that does exist is mainly about the prison system injustices, individual cases, prison rebellions or riots, and political prisoners.

In this essay I try not to focus on specific individual political activists but rather on Chicano organizations behind prison walls. Connections between individual prisoners and the Chicano Movement and the greater overall Civil Rights movement have been accomplished though extensive writings about Raul Salinas and David Sanchez. However, Chicano prisoner organizations and their impact on the Chicano Movement and prison reform need to be examined in greater depth.

HISTORICAL BACKGROUND

The United States Penitentiary on McNeil Island opened on May 28, 1875 as a territorial prison. Later, it became a Federal Prison that housed some very famous individuals. Most notable among them was Robert Stroud, the "Birdman of Alcatraz," the Flores-Magon brothers who were among the intellectuals behind the Mexican Revolution, and the infamous serial killer Charles Manson. In the late 1970's, when the United States government decided to close the prison, the state of Washington stepped in and took over operations. Since 1981, it has been known as the McNeil Island Corrections Center (McClary, 2003).

In February 1969, the organization Mexican Americans for Self Help (M.A.S.H.) was founded at McNeil Island Penitentiary. It was founded in a way that emulated the social justice organizations sprouting up and booming outside penitentiary walls. Nonetheless, its roots were in the tradition of the Junta of the Partido Liberal Mexicano (PLM) (La Palabra, 1969). According to M.A.S.H., the PLM "included the most important and influential anarchists in the Mexican revolution" (MASH, 1969) .They noted that the political prisoners who set the example for future McNeil Island Chicano activists were Ricardo and Enrique Flores Magon, Librado Rivera and Anselmo Figueroa. Thus, M.A.S.H. may have continued in tradition of the Liberal Mexican Party. Its purpose was broad yet focused when it came to striving for true rehabilitation, social change and justice both inside and outside prison walls. When referring to the founding of the organization, the M.A.S.H. organizational booklet, states the following: "It arose out of the need of the Chicano Pinto to become aware of and understand the great social and cultural changes taking place in our society today; particularly, that of the great awakening of our people, La Raza" (see, M.A.S.H. Program, February 26, 1972).

We must try to make sense of this brief mission statement and contextualize it at the same time, so as not to overlook some vivid details. These details connect and place M.A.S.H. as a part of Chicano/Mexican history and the status of the organization as part of the greater Chicano Movement. They later claim in a historical overview of their organization that "a direct line of communication with the Chicano activism outside of the walls was maintained by an outside steering committee" (Thomas Ybarra Frausto Papers Accession # 4339 Box 13 Folder 7).

At first glance M.A.S.H. has the ethnic identifier Mexican-American in its name, which to some may portray a vivid adoption of the term. During that era many adopted the term Mexican-American, the term had an assimilationist agenda. However, why did the founders choose to include the term Chicano in their mission statement and supplemental information? Chicano is a very complex term, yet the one thing that many Chicanos agreed upon at the time was that a Chicano like Ernesto Chavez stated was a person striving for the betterment of La Raza. Therefore the founders may have included the term Chicano because they wanted to show the evolution and fluidity of Mexican or Mexican-American identities. This is important because at the time, many individuals were misinformed about what the term Chicano truly entailed. Thus it allowed a gradual integration of Mexicans to adopt the identifier Chicano and ideology while retaining their relative identity.

The second way the founders of M.A.S.H. identified themselves was by using the term Pinto. In its simplest form, Pinto means convict. Yet M.A.S.H. traced the term back to the Pachuco culture the of the 40's (Silva-Sloss, 1971). Although the Pachuco is known throughout popular

culture as the Zoot Suitor, there is a lot more to the Pachuco than a flashy style of dress or distinct dialect of speech.

The Pachuco subculture was started by early Mexican and Mexican-American youth dissenters most notably those of second generation residents in the 1930's American Southwest (Silva-Sloss, 1971). By dissenters, I am referring to those who were tired of striving towards assimilation into the so called "melting pot" of American society. These Mexican youths coupled a rejection from mainstream culture with the ancestral tradition of Rasquachismo and came up a distinct subculture (Duran, 2002). The Rasquachismo tradition aided the adoption of the Zoot Suit. Because of this dress Mexican Zoot suitors became easy targets. When coupled with the criminal injustice that they faced, the vicious cycle of massive Mexican youth incarceration increased.

Because McNeil Island was a federal prison, it held many out of state prisoners. Many Pintos hailed from the American Southwest and wore their hometown distinction as a badge of honor and they repeatedly noted this in their newsletters and writings. Once again, the Northwest benefited not only from the migration of ideas for implementation during the Chicano Movement, but also the migration of individuals who helped ignite the movement. Just as it happened in the fields, it happened in prison. With these dynamics in mind it is easier to comprehend the significance of the word Pinto and to sympathize with the M.A.S.H members as they strived towards acceptance in the Chicano Movement and society as a whole and specifically in the Pacific Northwest. When referring to the Pinto/Pachuco foundation of Chicanos and actions they knowingly or unknowingly set in motion Pete Silva-Sloss (1971) wrote that "all who are Chicanos are indebted to El Pachuco."

Figure 1. M.A.S.H. Cabinet Members (*M.A.S.H. Presenta*, 1972)

Club Foundation

M.A.S.H. was just like any organization including those that were flourishing on college and university campuses then and now, such as M.E.Ch.A. They had their governing constitution and by-laws, which set the foundation for the club. The club structure was composed of an executive board made up of inmates, followed by the general members, and an outside steering committee.

Membership was open first and foremost to all Latinos, but mostly incoming Mexican Pintos since that is for whom the club was started. Other ethnicities and races had their own clubs and were part of the prison culture. According to an organizational booklet, M.A.S.H. started as a handful of Chicanos, and as inmates realized they were for real new members were added to the point that: "To date, we have approximately 130 members out of McNeil's 140 inmates of Latin descent" (M.A.S.H. Organizational Booklet).

In relationship to the Chicano movement, the outside steering committee was one of the most important aspects. According to M.A.S.H. documents, this board was composed of professionals from the fields of law, education, and sociology and para-professionals employed in the services that would assist them in meeting their social and health needs. This committee acted as a life line to M.A.S.H. by allowing them to stay informed about happenings within the outside movimiento. Among the notable members of the outside steering committee were professors Tomas Ybarra-Frausto, Esperanza Gurza, Cenobio Macias, Dr. Owen Kennedy, and Dr. Sergio Elizondo. An example of these partnerships was the creation of Chicano culture classes partnering with a "Chicano Educational group" (M.A.S.H. Organizational Booklet).

M.A.S.H. held several different types of meetings each month. The general membership held bi monthly meetings. According to M.A.SH., an outside panel of guests was invited to "keep us informed on contemporary affairs, and the various opportunities available to the ex-convict in education and employment" (M.A.S.H. Organizational Booklet). M.A.S.H. welcomed any potential outside guests to these meetings because they knew the importance of two-way communication with the free world.

The executive committee met once a week in order to insure that all M.A.S.H. business was being handled and to plan future endeavors. The executive committee also met once a month with the outside steering committee to plan activities and conduct other business. These meetings were crucial because, as stated in the organizational booklet, "the purpose of this group shall be to help get Chicanos a job upon their release from prisons and to keep them from returning to any penal institution" (M.A.S.H. Organizational Booklet).

While their origins may have been humble and very simplistic, the group became a very ambitious reflection of what was going outside the walls. The organization's activism and contributions encompassed different aspects of the Chicano Movement. This included the Pinto Trust fund and the more visible newsletter, La Palabra: Alambre de M.A.S.H.

Perhaps the most important forms of activism and humanization of the M.A.S.H. organization were accomplished through their newsletter La Palabra: Alambre de M.A.S.H. It was distributed monthly to prisoners and the general public alike. M.A.S.H. enjoyed the newsletter because it allowed them "to communicate our ideas, opinions, and thoughts to the outside and inside communities" (M.A.S.H. Organizational booklet).

The coverage in the newsletters was broad, well written, and informed. Usually the editor would write a short piece, followed by a variety of other articles ranging from cultural, to historical, to political, to satirical. If one didn't know the difference, we might assume some of the authors were in academia. In one interesting case, I found an article written by current University of California Davis professor Jack Forbes in which he referenced M.A.S.H. member newsletter article by Pete Silva-Sloss entitled, "The Mestizo Concept: A Product of European Imperialism." For the general public the idea of a professor citing an inmate may seem farfetched and therefore a great achievement.

The newsletter also included art ranging from poetry to drawings in addition to pictures of many different prison events. An example of the latter was the McNeil Island intramural sports champions being photographed with their hard earned trophies (Super Chicanos, 1972). La Palabra was distributed across the state, and may have been distributed throughout the nation.

Annual Seminars

Perhaps the most powerful display of activism, responsibility, and freedom behind McNeil's walls was the group's annual seminar. The seminar was open to prisoners and the general public. It is also important to note that certain individuals who had the ability to make changes from outside of McNeil Island seemed to have been strategically sought out and invited to attend. The seminars were to discuss national happenings like those at San Quentin and Attica. According to M.A.S.H., they discussed McNeil Island first and foremost (M.A.S.H. 3rd Annual, 1971).

The seminars allowed prisoners to interact with guests and to discuss issues that affected both parties. In the seminars, a group moderator facilitated discussion while a reporter recorded history in the making. According to M.A.S.H., the annual seminars did not necessarily provide solutions, but they did provoke more thought and discussion on the Chicano Pinto, the criminal justice system and other subjects. In 1971, in their 3rd annual seminar report on prison reform, the author does a great job of illustrating the relationships between the criminal justice system, the media and the general public. They illustrate that the media's hunger for stories heightens fear, and the criminal justices discriminatory practices only confounds the situation by pushing for punishment instead of rehabilitation. Their words sound almost prophetic when it comes to describing the unjust nature of the criminal justice system specifically when you see the powerful prison industrial complex we see today.

Life of the party

Cultural empowerment and awareness was a major part of many of the cultural events that were going on during this era of change and enlightenment. Chicanos were collectively learning and basking in their identities while trying to bring awareness to other lost Raza and society. Cultural events and fiestas were an easy way to reach the masses.

Just as M.E.Ch.A. was organizing on America's college campuses, and using entertainment and cultural events as a tool, M.A.S.H. was holding cultural events from behind the walls of McNeil Island. These events were more than a celebration of culture. They served increased members awareness of and pride in their unique history, culture, and identity. The most prominent events M.A.S.H. held were a Cinco de Mayo celebration and an annual 16 de Septiembre event, which is the real Mexican day of independence. M.A.S.H. used the event to educate those about the true meaning of Cinco de Mayo by appointing a member to speak about its real meaning (M.A.S.H. Presents Fiesta).

Another purpose of such events was to increase awareness of the Chicano to the general population. One of the most striking outcomes of these events was that the attendance did not consist of only fellow Pintos, prisoners or prison staff. The audiences included college students, government officials, and other distinguished individuals (M.A.S.H. Presents Fiesta).

The festivities and program for these events were elaborate. When one takes a look at the program for the event it looks no different than any event someone has attended be it a fundraiser or and awards ceremony. Over the years he programs did not change much and they seemed always to be well planned and executed (M.A.S.H. Presents Fiesta).

The opening of events usually featured an executive staff member who served as master of ceremonies. In retrospect this designation may have meant a lot to prisoners because the attention of the entire audience was on this individual an honor most would not grant to an inmate. The opening ceremony was usually followed by performances and speakers. The performances included plays, music, and dances. Collectively one can assume that M.A.S.H. achieved all of its goals during these events. They empowered themselves not only through culture, but also through the skills they developed when putting on such extravagant events. All required a lot of planning, organizing, and leading. They also effectively let the outside world know they existed by reiterating that they were human beings and integral parts of American society. The fact that non-

prisoners experienced such events helped keep the two way communication with the outside world in full effect thus allowing networking and future possibilities for M.A.S.H. and its released members.

Art Movement

During the Chicano movement Chicano art was beautiful, elaborate, and unique. These factors would later aid the Chicano art movement in garnering more recognition and respect. Art was used as a catalyst to appeal to the masses, including the illiterate and lesser educated that did not have the time or ability to read a book or attend meetings. As stated previously, the art movement consisted of many areas ranging from paintings and drawings to poetry and theater. Being confined by behind bars did not stop M.A.S.H. members from putting their creativity on full display. The members were not only talented, but they also had the time to develop, if not hone, their artistic sides.

The La Palabra Newsletter cover illustrated below (see Figure 2) depicts an eye catching array of historical figures and drawings allowing the reader to gaze the talent of some of M.A.S.H. members. The rest of the newsletter is littered with member art that can be considered educational, controversial, and eye opening yet aesthetically pleasing (see Figure 3)

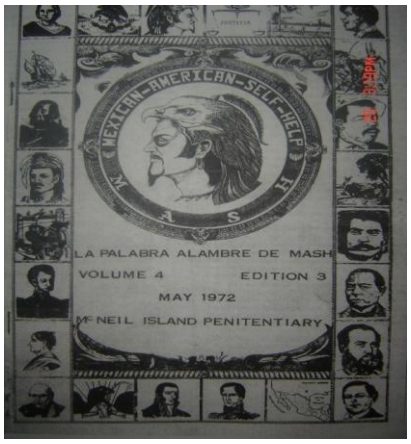

Figure 2. Alambre de MASH

Figure 3. A twist on La Raza Cósmica.

Music

Music and musical talent also existed among M.A.S.H.'s members. These special talents are noted, appreciated and congratulated in the group's writings. Along with other forms of art and music is a way to reach a person's soul. There are several notes about musical groups and genres in which M.A.S.H. members dabbled.

The first group of note was "Los Rancheros," a group that played traditional Mexican music that may have taken cue from the educational corridos/ballads of the times (see Figure 4). The other group at the time may have played music for more entertainment purposes. The group's name was "Combo Tropical," and they probably played more of the Cumbia type music to dance to and have fun with. These two musical groups performed during events and to the general

membership that may have given the Pintos a way to pass the time. Among the other musical groups within the prison that were mentioned were the "Dirty Shames."

Figure 4. Los Rancheros
(M.A.S.H. Presents Fiesta)

Theatre

Throughout the Chicano Movement, theatre was used as a way to educate members about happenings around the nation, to break down complex ideas, and to discuss history. Teatro Campesino founded by Luis Valdez of the United Farm Workers was the first and most widely known theatre group. It set and example for many Teatro groups that formed around the nation.

In the spring of 1970, the University of Washington formed Teatro Del Piojo It was modeled after the Teatro Campesino and was led by University of Washington outside steering committee member and M.A.S.H. supporter Tomas Ybarra-Frausto (Rosales, 2006). According to M.A.S.H. documents Teatro Del Piojo performed various times for M.A.S.H. and its members and quite likely helped initiate M.A.S.H.'s move to create their own Theater group.

M.A.S.H. members founded the theatre group Teatro Pinto. M.A.S.H. records indicate that they performed for prisoners at various times and also for others during open events. What is clear is that Teatro Pinto was an important way to reach out to fellow Pintos and to others. It empowered the performers by giving them an avenue to express themselves and replicate what their fellow performers were doing on the outside.

In the tradition Sanchez y Salinas (Poetry)

Raul Salinas and Ricardo Sanchez both are well known and nationally appreciated Chicano Pinto Poets. Unfortunately, or fortunately depending on your point of view, they honed their skills behind prison bars. Post-release they went on to do many great things including publishing books. Their poetry and status as Pintos was and continues to be an inspiration to many prisoners.

Although there seems to be no reference to these two individuals from the material available I mention them because they are the canon by which many view and judge Pinto poetry. M.A.S.H. members wrote a considerable volume of poetry as is evident from their newsletters and other records. They wrote on diversity of subjects from Chicano identity to prisoner insecurities about themselves or a significant other outside the prison walls.

Poetry referring to cultural and historical empowerment in reference to Chicano or brown pride surfaced repeatedly. An example follows:

"Bitter Tears"
Why cry bitter tears of anguish
When they are only tears of fear
With the taste of bitter gall;
Arise from your knees,
Raise your head high,
Fear no more, cry no more;
For it's time to show we're here,
Brown and proud,
With no fear,
With no more tears.

By Wally M. Taylor (La Palabra, May 1972)

Poetry that deals with everyday lives or struggles that we all go through as human beings and specifically the lives of those behind bars was highlighted also.

"**Recuerdos**"
Para los que amamos
Y están a nuestro lado
Para los que amamos
Y se encuentran lejos
Para los amigos
A quienes nos unen
Un hondo cariño
Y gratos recuerdos
Y para quellos que,
Por algún motivo
Hace mucho tiempo
Que no sabemos de ellos.

Por Eduardo Ozuna (La Palabra, October, 1973).

Pinto Trust Fund

M.A.S.H. also started a trust that would be available upon request and functioned to save and collect money for emergencies. A request could be made to the executive committee who would recognize worthy requests and approve or disapprove funding. The funds were released in forms of repayable loans and non-repayable grants. The trust fund listed events worthy of aid such as funerals and sickbed furloughs. Aid was available to help families with money before or after visits which may have caused hardships. Contributions came from the members themselves, but also from the outside community.

Success

Through their writings, correspondence, notes, and all the archival information made available at this time, success was two-fold. To M.A.S.H. success meant individual success post release by finding stability and stopping the flow of re-offenders. Secondly, success and

liberation for all Chicanos was an often stated premise. To some that meant conquering Aztlan; to others it meant realize higher representation inside of the government, or acceptance of one's unique identity.

Because America is a very individualistic society, I sought to cross reference individual names and keywords to find former M.A.S.H. members who may have been successful post release. Surprisingly running an internet search using full names and references to McNeil Island, I was able to find article in the San Francisco Chronicle that appears to reference a former M.A.S.H. president. The article highlights a former inmate's return to Alcatraz in 2004, and noted that Armando Mendoza's journey started first at Alcatraz and then McNeil Island, and then to the University of Washington where he earned a Bachelor's degree. He later went on to earn a Master's degree at San Jose State University. The article by Nolte (2004) states that: "Mendoza is one of those prisoners who learned something from prison. He said that when he first arrived he began writing." Inevitably because of research limitations, other individuals who went on to be successful and/or contribute to the Chicano movement were not included.

United Chicanos

During this same reform era Washington State Penitentiary in Walla Walla, Washington was going through similar changes although perhaps a little later than those at McNeil Island. The reforms allowed the prisoners small privileges such as wearing their choice of clothing and more open access throughout the prison, and outside visits.

United Chicanos was one of the many groups segmented in the Washington State penitentiary (WSP). Each racial group had its own club or organization. Much like M.A.S.H., it seems like United Chicanos (UC) was actively trying to be an integral part of the overall Chicano Movement both within prisons and the outside. They had meetings, put out a newsletter, held cultural events open to the public, and had speakers come into the prison.

Much like M.A.S.H. United Chicanos also believed that true rehabilitation could be reached through various means. Education through historical, cultural and language classes was important. Continuing communication with the outside world most notably through the events hosted at the prison was also deemed important.

Despite the similarities United Chicanos had unique aspects as well. The glaring difference is the clubs meeting space. United Chicanos had their own Chicano Cultural Center that is frequently referenced in their newspaper and correspondence as well as in the book *Concrete Mama: Prison profiles from Walla Walla* (Hoffman and McCoy, 1981). The center was much like the Chicana/o Latina/o center at Washington State University (WSU) and others sprouting across the nation's college campuses. This center gave the club its "safe space" to conduct business and feel free to act in ways they wanted to without fear of repercussions.

Much like M.A.S.H., United Chicano had close ties to higher education through M.E.Ch.A. at WSU and also through university classes taught at Washington State Penitentiary. In its relationship with WSU, M.E.Ch.A. created an even more visible two-way street because visits occurred on behalf of both sides, and not just through correspondence or outside visitors as in the case of M.A.S.H. In fact, at various times, M.E.Ch.A. members as well as Chicano Studies faculty and WSU students or staff went to Washington State Penitentiary (WSP) to visit the club (Fernandez, 1977). In one case they took the club art supplies so that they could work on art that would be displayed in Pullman in hopes of raising funds for the Pinto trust. The other side of the two-way street was that the club also made Pinto tours. During these tours two to three Pintos would travel to Pullman to make presentations and to interact with WSU students, faculty and staff. These trips allowed the prisoners to change stereotypes that many had of them and to learn about the students' activities as well. The Pintos spoke to the High School Equivalency Program students and other youth in order to help steer these youth from entering the criminal justice system. In the May 30, 1971 issue of La Raza Newspaper, the United Chicanos referenced the

fact that the May 26, 1971 visit to Pullman was the first time in history that Chicanos were allowed to leave the Penitentiary. They wrote: "These three Chicanos were not representing the institution. They were representing the UNITED CHICANOS."

United Chicanos began sometime in the early 70's and the last correspondence available between them and M.E.Ch.A. de WSU occurred in 1979-80. Several times that club was stopped for one reason or another and ties between them and the outside world were subsequently fragmented. However, through perseverance of individual prisoners and because of club ties that existed, communication between the United Chicanos and WSU M.E.Ch.A. continued meagerly. Nonetheless, much of the information regarding United Chicanos could not be found. What could be found was not easily accessible. Therefore more research is needed to help understand the club and its actions.

Downfall

The demise of both the United Chicanos and WSU M.E.Ch.A. cannot be attributed to any single factor, nor can an exact date be determined. What is certain is that towards the mid to late 70's conservatism was on the rise and by default prisoner reform began to be viewed as a waste of money and time. "Get tough on crime" was feeding society's thirst for punishment, while politicians used this fear and tough stance to catapult themselves into office. Prison was again to become a magical solution in which locking up criminals to keep them out of sight and out of mind was the solution. Given this rational and the cutbacks on rehabilitation, prison gang culture may have benefited. In the case of United Chicanos, the line may have been blurred between the Mexican mafia (La Eme) and the club. In their book *Concrete Mamma*, Hoffman and McCoy (1981) wrote that the then interim UC president was an Eme soldier using the club for personal gain. Instances such as these coupled with changes in society led to these clubs being seen as trouble and fronts for criminal activity.

In the case of M.A.S.H., its downfall is difficult to pinpoint. Nonetheless, we do know it was stopped once in 1973. It was outlawed because it was accused of being behind a work stoppage that began December 11, 1972. The last correspondence on behalf of the club was from the year 1974. The one thing that is certain is that the United State Penitentiary was scheduled to be closed by the mid- to late 1970's, which led to the transfer of inmates to other federal prisons (McClary, 2003). This could have been a factor influencing the case of the Mexican-American Self-Help group. Berkman (1979:134) placed some of the lack of success by some prisoner organizations in their final days to the emergence of new types of leaders. Berkman wrote: "…because many of the groups are now led by moderate elements, they find themselves more and more isolated." He clarified that this isolation fragmented the organization, made them more narrow minded, and was not conducive to a working coalition. As these organizations became extinct, a power vacuum was likely created that allowed prisoner gangs to flourish because of the racialized nature of prisons. One can only dream and imagine what could have been if these organizations had been allowed to continue to build relationships with the outside world.

CONCLUSION

The Mexican-American Self-Help Group and United Chicanos should be considered contributors to the Chicano movement in Washington State. Because there is no true measuring stick for who was and wasn't a contributor, more research and information on M.A.S.H. and other prisoner groups that sought to be part of the movement is still required.

The role of M.A.S.H. as the planner, organizer, leader, and evaluator of the rehabilitation of Chicano prisoners should be noted. They strived to do so much even though their movement was controlled and stunted by prison walls, and perhaps by the prison administration. Yet they found the courage to stand up and, in the tradition of Rasqachismo, make do with what they had and do

it as best they could. One cannot envision a prisoner organization today doing the things that M.A.S.H. did given current attitudes toward prison reform and rehabilitation, and because we are in a different era that is unlike that of the radical and turbulent 1960's and 70's.

M.A.S.H. and other prisoner organizations set a good example about how we can combat the increase in prisoners and limit the rise of the Prison Industrial Complex. They tried to understand the system and educate those interested in listening. They saw the injustices that existed and foresaw future problems. Their writings repeatedly touched on the disproportionate number of people of color incarcerated and the impact of the "war on drugs." When examined in light of today's statistics what they strived to do becomes even more amazing and visionary. According to the U.S. Bureau of Justice Prison Statistics (2006), there were 2.2 million people in prison. This included disproportionate rates for people of color. For example the Bureau report (BJS, 2006) states that: "At year end 2006 there were 3,042 black male sentenced prisoners per 100,000 black males in the United States, compared to 1,261 Hispanic male sentenced prisoners per 100,000 Hispanic males and 487 white male sentenced prisoners per 100,000 white males." This is alarming considering when people of color are fighting for representation throughout college campuses. Some people will offer the rebuttal that whites are the majority therefore that's why predominantly white colleges exist, it's not racist. Using this same logic whites should make up the majority of the prison population as well. Yet this argument falls on deaf ears given the negative stigma associated with reform or being soft on crime. The connections between higher education and prisons are distinct and should not be neglected.

Scholars repeatedly have written about the hostile environment that is created by the racism that breeds inside prison walls. Britton (2003) was firm on this issue when stating that "prisons are one of the most racialized institutions in American society." Interestingly enough, M.A.S.H. wrote about how prisons were racialized during their era as well. Through their various writings it was obvious that it would be beneficial to allow prisoners to make organizations based on race with an emphasis on identity education, humanization, rehabilitation, and support after being released. This would allow the racialized environment to be steered in positive directions and outlets rather than criminal activity.

There is no blue print for rehabilitation success. There are many theories, programs, steps, and organizations. Generally the process should begin on arrival, continue during one's prison term and then post release. The post release element is very important and an often overlooked step. We cannot assume that we can lock someone up in a cage for years and expect society to treat them well and for them to be appreciative and happy. This is why I believe M.A.S.H. made a point of reiterating that the two-way street with society must be maintained throughout one's prison term. Post release support is needed most in a society that often ostracizes ex-convicts. When coupled with rising recidivism rates, it is time for society to open its eyes and realize that prison is not a magical potion, but a poisonous one that increases the negative aspects of society. In fact it may serve as a college of criminal enterprise, providing an education to millions of disenfranchised individuals who, post release, may only be able to rely on crime to survive. Therefore it is important that in a racialized environment the education that inmates should be getting is positive. Instead of teaching new inmates how not to get caught once released, why not allow prisoner groups to teach each other about their culture and history. Allow them to build bridges with advocacy groups, universities, and such so that they can teach these types of classes to inmates, much like Cenobio Macias was doing for M.A.S.H. (Gomez, 2006).

The Mexican-American Self-Help group and United Chicanos were two very important aspects of the Chicano Movement and necessary components considering the times and repercussions they may have faced for relating to the cause. Evidence of this is the interest and the effort directed to them by active Chicanos such as Tomas Ybarra-Frausto and organizations such as M.E.Ch.A. de Washington State University. It is crucial that we expand the research on these organizations and give credit where credit is due to the prisoners and outside members who contributed to this great cause. Furthermore, when examining the stigma of prisons and crimes

perhaps we should consult with those in prison. They may hold the key to a true solution to the rising Prison Industrial Complex. We need to go back to the those days in the 1970's that Cummins (1994) wrote briefly about in California in which universities provided some form of education, newspapers critically wrote about the truth behind the walls, and prisoners were empowered in believing they could strive for change, while at the same time being cautious not romanticize or setting unrealistic goals.

It is only appropriate to end with a quote from *The First Three* (1971). It illustrates the ambiguous nature of prisons and the images that we conjure up in our mind based on media portrayals. When referring to the surprised reactions from WSU High School Equivalency Program students and staff in regards to the visiting Pintos not so stereotypical image, Parra, Martini, and Greigo (1971) wrote "it amused us to hear one co-ed state that she mistook one of the officers for a convict and the 'con' for an officer."

LIMITATIONS

The most notable limitation encountered throughout my research are the notion that prisoner, let alone a prisoner's history, is unimportant. This was exemplified in the fact that disinterested prison administrators did not maintain records of organizations such as the United Chicanos or refused at admit their existence. The misplacement of United Chicano club documents at WSP was a major obstacle. Prior to beginning the research the fact that they had their own cultural center gave me the false hope that their records were likely to be available. When contacting prison officials enquiring about the history of such an organization a wall was put up between the researcher and the employee in which no help or guidance was available.

The scarcity of the materials found in the Washington State University M.E.Ch.A. office was also a major obstacle because it limited my understanding of both organizations. Documents, newsletters, writings, were limited. Therefore the true story behind some of the events may be distorted given the limitations in the available documents.

Lastly another limitation was the fact that the prisoners involved were extremely hard to find. This is understandable because many have tried to leave their prison past behind them. I was unable to find and interview a single prisoner who was involved with the organizations. However, even with these limitations a foundation has been set, which hopefully will lead to further research and understanding of the significance of the Pinto organizations to the Chicano Movement in Washington State and society as a whole.

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COLLEGE STUDENTS' PERCEPTIONS OF THE PORTRAYALS OF AFRICAN AMERICANS IN THE MEDIA AND THE EFFECT ON RACE RELATIONS

Comment [srb1]:

Comment [srb2]:

Comment [srb3]:

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ABSTRACT

This study examined how college students perceived the portrayals of African Americans in the media, and how those portrayals affect race relations between African Americans and other ethnicities. Previous studies have shown that the depictions of African Americans through the medium of television have greatly affected society's perceptions and have contributed to the ways in which people relate to and interact with African Americans. Using focus groups, this study examined attitudes of college students in a Comparative Ethnic Studies course. The majority of students in this class had a general understanding of the concept of race and racism in the U.S by virtue of their enrollment in this and previous courses with similar content.. These students concluded that the media has a negative and damaging effect not only on race relations between African Americans and other ethnicities, specifically Caucasians, but on the ways in which African Americans are viewed throughout this society, and how African Americans view themselves.

INTRODUCTION

The mass media has such a powerful effect on how we think, what we do and what we believe. The different mediums within the mass media serve as tools that provide people with different images, ideologies and concepts that we process and reproduce. Unfortunately the media can also produce distorted images. Those distorted and sometimes negative images are continually observed and reproduced.

Mediated information is inherently comparative: audiences interpret a narrative or image through filters shaped by other media content and, of course, by direct experience (Entman and Rojecki, 2000). This research is designed to help illuminate how mass media news and entertainment messages affect self-perceptions among African Americans, and perceptions of African Americans by other ethnicities. Interpretations, along with direct experience, or lack thereof, have been shown to have an immeasurable impact on the ways in which people view our society and the people within it.

Here we focus on whether or not negative images in the mass media have an effect on how we perceive one another with regard to differences in ethnic background, and how that affects race relations. More specifically, we focus on African Americans in the mass media and how the mediated messages and portrayals of African Americans affect the perceptions African Americans have of themselves, as well as the perceptions other ethnicities have of African Americans. Although previous studies have examined different stereotypical portrayals in the

media, this study focuses on how those portrayals can affect the perceptions of college students because they represent the first post-civil rights movement generation. Our generation is the first to live without overt racism. The typical racial attitudes of Whites and the dominant cultural tendencies have moved significantly beyond old-fashioned racism. We are now facing the problem of covert and institutionalized racism that occurs in institutions such as public bodies and corporations, including universities.

The term institutional racism was coined by black nationalist, pan-Africanist and honorary prime minister of the Black Panther Party, Stokely Carmichael (see Law, 2002). In the late 1960s, he defined the term as "the collective failure of an organization to provide an appropriate and professional service to people because of their colour, culture or ethnic origin".

PREVIOUS RESEARCH

Previous research has shown that the media often produce negative images of African American men and women; these images have affected the way some African Americans perceive themselves, and how others perceive African Americans. Perception produces recognition and interpretation, which can have an effect on race relations. My hypothesis centers on the media's negative impact on the conceptions others have on African Americans. In his article, "Race in the News," Law (2002) finds that the media is a major contributor to the continual racial divides. Law concludes that the news media have, over time, been a key site for the representation of ideas about racialized groups, providing a mass of speculation, commentary and information. This cultural archive provides an immense store of knowledge, values and images that have assisted in the maintenance and reproduction of both racist and anti-racist ideas. These are fused in both historical and contemporary forms of racial ambivalence. Law's study is just one of the many that helped to further understand the complex problem our society is facing through its mediated messages. Law referenced many previous studies conducted along the lines of race and the media. One study that he cited most frequently was that of Robert M. Entman and Andrew Rojecki.

Entman and Rojecki's study reveals that the media, including television, have a great impact on the way White Americans interact with Black Americans. Building upon a large body of research, they employ close analyses of media content along with interview data to show the subtle way that racial images on television, and to a lesser extent other mass media, reflect and possibly influence Whites' ways of thinking on racial matters. Their research also confirms that "complex ambivalence" characterizes white racial attitudes, and that various media play a depleting role thus reducing social understanding. This, in turn, shifts prevailing ambivalence towards racial animosity. Within the first chapter, Entman and Rojecki point out that many Whites are ambivalent, or "a little bit scared" of some Blacks while admiring of others, like Bill Cosby, more on the basis of what they learn from the media than from personal experiences.

Yuki Fujikoya (1999) states that mediated information is more likely to exert influence on those people who have had little or no direct contact with objects because they are lacking in a sufficient method of evaluating information. Having only limited personal experience with African Americans, and raised in a culture where race is highly salient and African Americans rest at the bottom of the social hierarchy, White's may be more likely to remember the negative than the positive in all the unplanned, media generated impressions. Psychologists Banji, Hardin, and Rothman (1993) found that people remember negative information most readily. When reflecting on the end of racial representation, Entman and Rojecki (2000) argue that it stands to reason that Blacks' media images will continue to be critical in determining the degree to which African Americans are imagined by White Americans, and even by themselves, to be part of the community. In summary, they conclude that in the less obvious political realms of entertainment and advertising, the pattern of cultural representation is one of disengagement, separation and exaggeration.

The broadening of the television spectrum resulting from cable TV has created niche markets for which producers have crafted shows that obey market necessity by establishing product differentiation--a kind of cultural segregation. This inevitably leads to the heightening of racial distinction and significance, if not by appealing to cultural stereotyping than by the loading up of symbolic weight. Entman and Rojecki's study ends with suggestions of normative goals for the media to take into consideration in order to curb the problem of negative mediated messages and portrayals of African Americans. The normative ends for mediated communication in the life of a democratic community that Entman and Rojecki identify include the following:

1. Providing accurate representation of knowable facts (like the size of the Black population and the welfare budget);
2. Seeking to create dominant frames in the minds of audiences that are rooted in such facts, or at least in consciously chosen and openly announced value commitments. That is, selecting and highlighting and therefore popularizing understandings of social problems, causes and remedies based on what we know, not what we fear or unmindfully assume.
3. Providing self-critical material that offers context and clarifies the causes of the images that appear. In this way the news would continually remind the audience of the inadequacies and inevitable partiality of the mediated communications.

Entman and Rojecki understand that it would be way too much to ask certain media tools to analyze and potentially undermine their credibility. In response to this conundrum they encourage critical audience awareness and public deliberation over the effects on America's racial culture. The media's mission must be to provide a context that will encourage and allow audiences to engage in interpretation and actively challenge assumptions and stereotypes. The media must take responsibility for their actions. In their opinion any move toward racial representation that is more socially responsible, and that may even be more profitable, is a move worth making.

METHODOLOGY

In order to understand the full effect of the media and how students perceive the messages delivered, focus groups were conducted in a class entitled, Black Women in U.S. Society. While the level of understanding of race and racism varies from student to student, it can be assumed that by virtue of their enrollment, the majority of the students in this course had basic knowledge of the concepts of race and racism. The focus group provided the students an opportunity to give detailed responses to various questions addressing the following:

1. Compared to white college students (with little personal experience with African Americans), African American college students will perceive African American portrayals in the media to be more negative.
2. Perceptions among African American college students of negative media portrayals will be positively related to stronger identification with African Americans; that is, the more negatively media messages are perceived, the stronger identity with being African American.
3. Frequency of television use among college students will be related to negative stereotyping of African Americans; that is, the more frequent use, the more negative the stereotypes will be held by college students.

4. Perceptions of realism by white college students of media portrayals of African Americans will be related to negative stereotypes of African Americans; that is, the more realistic perceptions are, the more negative the stereotypes.

The questions asked focused on:

1. Frequency of use of television news, sports programs and entertainment programs.
2. Identification with African Americans (African American respondents only)
3. Stereotypes of African Americans and other racial groups.
4. Perceptions of portrayals of African Americans in television news and entertainment (positive-negative scale.)
5. Perceptions of portrayals of African Americans in television news and entertainment (positive-negative scale).

FINDINGS

All participants reported that they permanently reside in diverse, urban city settings. The group was composed of four African American women, one African American male, one African woman, one Hispanic woman, and one Caucasian male.

All respondents indicated that they spend a "fair amount of time watching television programs." Of the eight respondents, five said they spend time watching news programs, four indicated that they frequently watch sports programming, and eight said they spend a fair amount of time watching "Entertainment" shows such as drama, comedy or reality shows.

When asked "what race/ethnicity makes up the majority of the population" in news programs the respondents reported that the casts of news programs are usually Caucasian. In terms of the stories the news covers the respondents indicated that it depended upon t he type of news story. For example, they stated that African Americans make up the majority of blue-collar crime stories, but that Caucasians represent the majority of white-collar crime stories. Asian Americans and Hispanics were not mentioned.

In sport or sport-related programs, the respondents noted that in news coverage of professional sports, the telecasters are typically Caucasian or African American. For actual sports competition they noted that in professional football and basketball the majority of participants are African American. Similar responses were given regarding collegiate sports, though most telecasters according the participants are Caucasian though the majority of the athletes are likely to be African American.

With regard to entertainment, the respondents indicated that the majority of the population is Caucasian for comedy, drama, reality TV, and talk shows. When African Americans are not the majority, the common roles they portray are, according to the respondents, as comedians, "hired help," "thugs," "criminals," or "independent mothers." On participant commented that African Americans are portrayed either very negatively or very positively. In the respondent's words: *"They are either the "thug" or the "surgeon;" we are hardy portrayed as "normal."* Where African Americans are perceived to be the majority, they are typically very successful (doctors, lawyers,), wealthy, and family oriented. One respondent used the following example:

> *The Cosby Show is the best example of where African Americans are the majority; the parents were both very successful, happily married and had great children.*

When speaking about self-perception as an African American, one participant recalled how when she was younger, the television produced an image that told her it was better to be Caucasian. In her words:

> *"I used to watch shows like Punky Brewster, and Full House, and I thought the best thing was to be White."*

While her self-perception suffered, it was agreed upon throughout the discussion that when generated only from mediated messages perceptions other ethnicities have of African Americans is completely negative,. Personal experiences with African Americans can help curb the negative connotations filtered throughout the media. However, if someone does not have that personal experience, or any other exposure to African Americans outside of the media, they then tend to rely on the media's messages and stereotypes.

As Entman and Rojecki found, more generally people most readily remember negative information. So combined with little exposure and negative mediated messages, ambivalence toward African Americans develops, and may lead to racial animosity. This perception is illustrated in the following comments:

> *If someone who has had no experience with African Americans turn on the T.V they see shows like Maury Povich with topics like…I've Slept With Nine Men, Who's the Daddy?, where everybody on there is Black, or they watch the News where an ignorant Black person is up to no good, and that's what they think all Black people represent.*

> *They could watch Gangster movies like 'Boys In The Hood,' or 'Menace 2 Society,' and have a fear of Black people or certain Black communities, because of those, unless they are exposed and know that it is not at like that, it's not like that majority of the time.*

One topic of particular interesting the focus group discussion was the observation that some shows that try to teach the struggles of the African American culture in an entertaining or "funny" way can have a detrimental effect and have, in essence, backfired. Shows like "Minoritine" and "The Boondocks," were meant to be educational shows. Some members of the focus group did not realize that the purpose of those shows *was education. O*ne participant commented*:*

> *That is where the problem lies. The way in which 'The Boondoks' or 'Minoritine' gets their point across, in most ways, does nothing but reaffirm stereotypes.*

They have mirrored the popular comedy show, "The Chappelle Show," which focuses on stereotyping and racial humor. The fact that it is an "educational" television show is overlooked since in most cases there is no healthy dialogue discussing the show's content and the points the creators are trying to relay.

Overall the focus group members agreed that the media's portrayals of African Americans have negatively affected the prospering of race relations. In our society racism, prejudices and discrimination are not as overtly prevalent as it was forty years ago, but the first generation post civil rights people feel that it is still a major problem. According to one participant:

> *The media has a responsibility to produce positive messages that help our society, and because of its portrayals of African Americans, and other ethnicities,*

stereotyping period, it is hindering our society. We'll never progress, racially, if it continues.

CONCLUSION

From the focus group member's detailed answers regarding media's portrayals of African Americans in the media, self-perceptions and perceptions other ethnicities have, I have concluded that members of this generation agree that the media has a significant effect on perceptions, self-perception and race relations.

FURTHER RESEARCH

To get a better understanding of the effects mediated messages send to other ethnicities regarding African Americans, it would be interesting to continue this study with college students who have not been exposed to a Comparative Ethnic Studies background. However, it is a concern that a majority of college students who do not openly speak about or acknowledge issues of race and racism would be hesitant to completely divulge their feelings when answering questions. It would be interesting to continue this research with younger groups such as junior high and early high school students. These students may be more oblivious of racial problems than college students and able to honestly communicate their perceptions of African Americans through mediated messages.

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TEMPERATURE VARIATIONS IN THE TOUCHET RIVERBED, DAYTON, WASHINGTON

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ABSTRACT

Temperature variations in a steelhead trout-spawning habitat are examined as a possible way to detect vertical water movement. In the summer of 2004 over a period of four days riverbed and surface temperatures were taken in conjunction with rising head on the Touchet River. Deviations in temperatures were found but were not significant enough to detect vertical water movement. Early afternoon peaks in both riverbed and surface temperatures revealed a high influence of solar radiation.

INTRODUCTION

Temperature variations in streambeds have great potential to tell us about the quality of spawning habitat. First, several researchers have documented the dependency of fish emergence on oxygen and temperature (Acornley, 1999). Further studies have shown that temperature can be related to the movement of water through a riverbed (hydraulic flux) (Alexander and Cassie 2003; Conant 2004; Evans 1995; Silliman and Booth 1992). These studies provide much needed insight into the complex relationship between ground water and surface-water interaction.

This insight has several benefits in practical applications, including monitoring the quality of fish habitat, managing freshwater as a resource, and tracking sources of pollution. Hansen (1975) and Power et al. (1999) both found that vertical water movement brings oxygen and nutrients to fish eggs. Furthermore, Cooper (1965) investigated the link between the permeability (hydraulic flux) and the constituents of the streambed and showed that finer silts in the streambed produced lower fish survival rates. In the area of water resource management, knowledge of the relationship between surface water and ground water becomes a necessary asset because both were drawn on for irrigation, consumption, and recreation. Depleting one source of water will have direct consequences on the other. In addition, in many agriculture areas, pollution caused by erosion and chemical treatments has adverse effects on stream quality. If the path of these pollutants can be tracked, their sources can be pinpointed and perhaps reduced.

Keeping in mind the valuable insight provided by a project determining the interaction between ground water and surface water, the present study investigates the relationship between vertical water movement and temperature as an independent check to current methods of determining hydraulic flux.

Popular current methods to determine hydraulic flux include tracer analysis, particle size analysis, and slug tests. Tracer analysis has been employed largely in areas where contamination is a problem. By measuring the concentration of natural or inert chemicals, tracer analysis tracks

the path of water, helping identify areas of recharge, discharge, and parallel flow (Harvey and Bencala 1993; Lee et al. 1980; Meigs and Bahr 1995). Particle size analysis was developed on the principle described in Cooper's (1965) study relating the porosity of a stream bed to the survival rate of emerging fish (Chapman 1988; Cooper 1965). Rising head (or slug) tests measure the change in water level in a piezometer as the water recovers from a forced pressured state. This method is based on the concept that higher pressure under the riverbed will force water up through the streambed (causing up-welling) while a lower pressure under the riverbed will force water down through the streambed (down-welling).

Slug testing was the method utilized in the partner study to this research and funded by the State of Washington Water Research Center (Wu et al. 2003). In the summer of 2004, tests were performed concurrently with temperature measurements of the Touchet River near Dayton, Washington. The Touchet River demonstrates many of the conditions that require understanding the interaction between ground-water and surface-water including fish spawning, erosion, and flooding. In fact, in previous years the Touchet watershed has been considered for restoration (CBFWA, 2003).

METHODOLOGY[10]

Study Site: The Touchet River is located in Eastern Washington. It starts as four forks just south of Dayton, Washington. The river then makes its way southwest towards the Walla Walla River. A map of this area is shown in Figure 1 below.

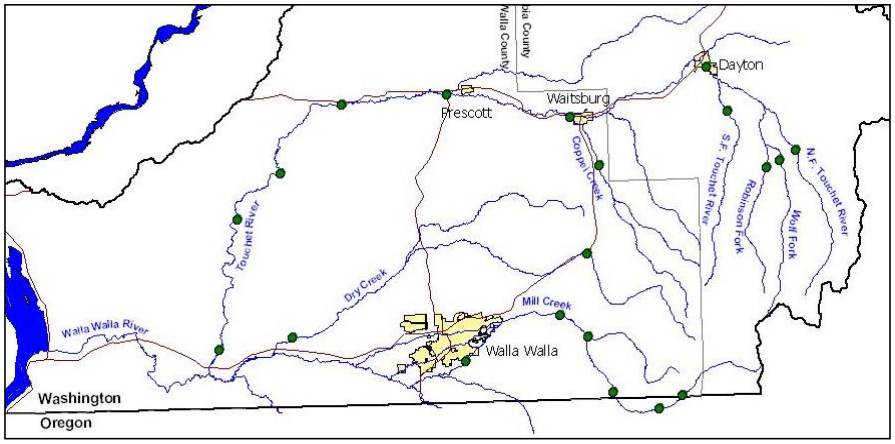

Figure 2. Walla Walla Watershed

Site information from the partner study (Leek et al., 2005) is as follows:

> Flow within the study reach of Touchet River typically ranges from less than 40 cfs in August to over 300 cfs in April (WSDOE 2005), over alluvial deposits of cobble, gravel and fine and, underlain by basalt bedrock at mean depth less than 1.5 m below riverbed surface. The ample grid spanned the entire width, 9 to 12 m,

[10] The complete methodology and results from the partner study can be found in Leek et al. (2005).

of the wetted perimeter of the river bed with water depths from 0 to 60 cm. The bed slope for the upper and lower reaches are 0.8% and 1.2% respectively, (elevation drop of approximately 60 cm in 50 m reach and 40 cm in the lower 50 m reach), width/depth ratio is approximately 25. The riverbed surface was covered with pebbles and cobbles in the main channel, with patches of fine silt near the south channel edge. – (Leek et al. 2005)

Temperature Recording: Slug tests were conducted on a 3 m × 5m sampling grid on two fifty meter reaches, bounded by riffle reaches (see Figure 2).

Figure 3. Grid Setup on One Fifty Meter Reach of Touchet River

Piezometers were driven into depths of 30 cm, 60 cm, 90 cm and 120 cm into the riverbed, if not blocked by bedrock or another obstruction. A submersible pressure/temperature transducer (Instrumentation Northwest, Inc. Model PS-9805; maximum accuracy ±0.75^{o}C), connected to a data logger onshore via a factory sealed cable, was lowered within the piezometers. A thermocouple Type T (Copper Constantan) with an accuracy of ±1.0^{o}C above 0^{o}C was placed on the outside of the piezometer to record ambient stream temperature.

During the pressurization and rapid release of the slug tests, temperature readings were recorded every 0.25 sec.

From these data, Microsoft Excel was used to identify the most representative temperature of each slug test. The date, time, duration, location (row, column, and depth), surface temperature (outside piezometer) and riverbed temperature (inside piezometer) were recorded.

RESULTS AND DISCUSSION

Figure 3 provides a representative graph of the original temperature and slug test recordings. The upper graph represents the change in pressure versus time for a typical slug test. This graph illustrates the pressurization of the unit, followed by opening of the rapid release valve, which allows for the recovery of hydraulic head. This procedure was repeated four times. The details of this test and its significance can be found in (Leek et al. 2005).

The focus of this study lies on the lower graph, which illustrates the change in both surface and riverbed temperature during the slug tests. First, the findings reveal that when the surface temperature is relatively constant, the riverbed temperature seems to decrease. However, it is disturbed by instrumentation each time the rapid release valve is opened. The temperature reading is also cut short due to the rapid conclusion of the four slug tests performed.

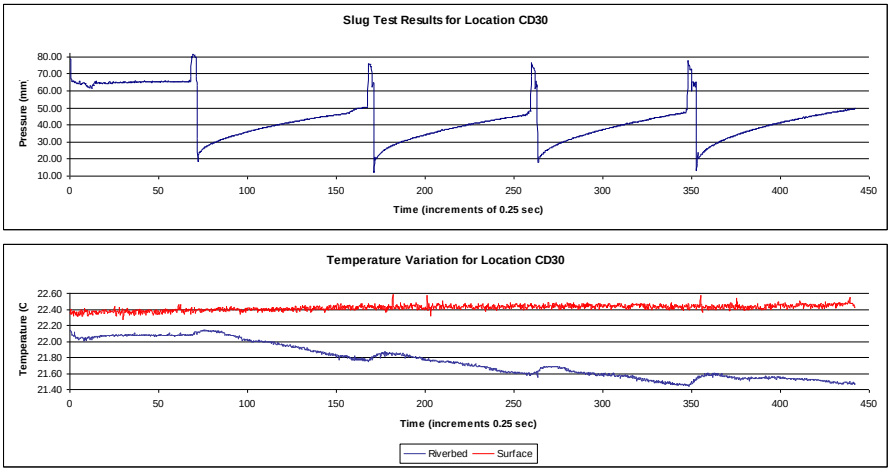

Figure 3. Preliminary Results of Slug Tests and Temperature Recordings

Further, the difference between the two temperatures must be closely examined. Basic statistics reveal that the average riverbed temperature for all runs varies within an average of 0.45°C of each other. This deviation lies within the maximum accuracy of the temperature transducer used to measure the riverbed temperature. Therefore, this graph and all temperature readings must be questioned given the fact that the equipment used may not be accurate when recording small deviations in temperature.

Because the temperature recordings taken every 0.25 seconds reflect a high degree of instrumentation noise during the pressurization and rapid release sequence, and because of the limited available data, the average of the riverbed and surface temperatures were assumed to be representative samples. Readings from several tests were discarded because they were extreme, unrealistic values. This is attributed to noise caused by the instrumentation or error in the data logging equipment.

It was originally hypothesized that a difference in streambed and riverbed temperature might lead to conclusions on upwelling, downwelling, and parallel flow. However, examination of a plot of average surface and riverbed temperatures reveals that the diurnal solar radiation pattern dominates the data; a very slight maximum can be seen around three in the afternoon (see Figure 4). In addition, when separated into different depths and surface and riverbed temperatures are plotted spatially, they reflect similar contours.

SUMMARY AND CONCLUSIONS

While temperature was found to vary spatially as well as temporally, at this stage it is challenging to infer the presence of vertical water movement by temperature readings alone. This is due both to the limits of the instrumentation used, and to the limits resulting from partnering this study closely with a slug test, which is a relatively shorter process.

Furthermore, solar radiation largely influences the temperature pattern, leading to a strong diurnal pattern. This phenomenon is marked by a low morning temperature and a high mid afternoon temperature.

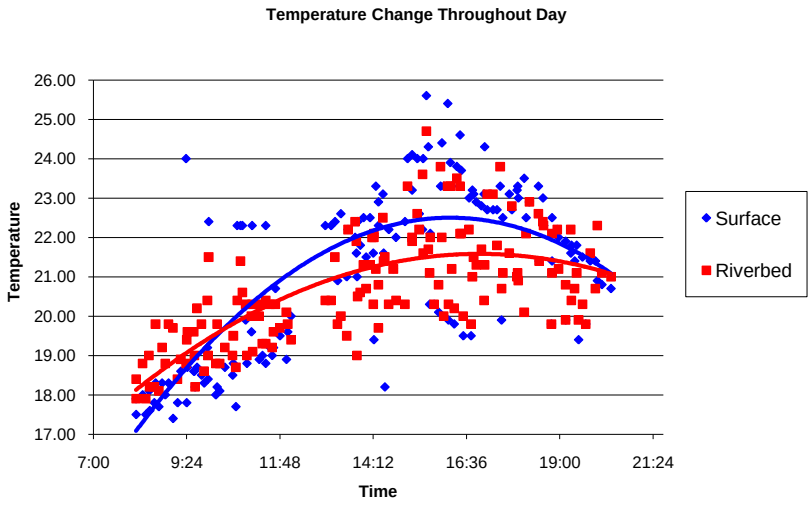

Figure 4. Diurnal Solar Radiation Effect during Time of Study

FURTHER RESEARCH

Because the strong diurnal pattern was a large setback to this study, a longitudinal study is recommended. This would reduce the effect of a diurnal pattern and perhaps show overall temperature trends. Separating the temperature readings and the slug tests would also limit the pressurization and depressurization noise in the data. Furthermore, using more precise instruments to detect very small temperature variations could reveal more deviations in surface and riverbed temperatures.

Also, several earlier studies have shown that it is beneficial to track local weather including seasonal and climate changes that strongly influence the stream conditions (Alexander and Cassie 2003; Silliman and Booth 1993).

ACKNOWLEDGEMENTS

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DUCTILE SHEAR ZONE ANALYSIS OF GRANITE POINT, SOUTHEASTERN WASHINGTON

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Dr. A. John Watkinson, Faculty Mentor
Department of Geology

ABSTRACT

Deep under the surface rocks deform in a ductile manner and are expressed as a shear zone. These shear zones are an area of weakness within the rock that often translate into weaknesses in overlying rock units. Through quantitative analysis it was determined that the westernmost shear zone at Granite Point in southeastern Washington, is a normal sinistral shear zone that experienced 3.0 meters of offset in the vertical direction and 2.8 meters of offset in the horizontal direction. Based on the amount of brittle and/or ductile deformation that the minerals experienced, namely quartz, feldspar and hornblende, the range of temperatures, depths, and pressures present at the time of deformation were 400-500°C, 13-16km, and 0.4-0.5GPa respectively.

INTRODUCTION

Mountain belts are formed at the intersection of two converging plates. Near the surface rocks are deformed in a brittle manner, which is expressed as an earthquake. Deeper in the crust these earthquake zones change their expression to ductile deformation. This type of deformation occurs as a solid state flow and is a combination of the straining of the mineral grains and dynamic recrystalization.

Ductile deformation is a slow process that cannot be observed directly. Therefore, the result can be seen only after uplift and erosion bring the zone of deformation to the surface. Since this process has never been observed first-hand, the exact path of deformation cannot be resolved. Luckily, characteristic markers left by the deformation process can be analyzed and a total magnitude and direction of displacement often can be determined.

There is a local example of a shear zone located near the margin of North America in a granitic exposure along the Snake River in Southeastern Washington (Figure 1). Since shear zones are an area of relative weakness in a rock and often act as conduits for underground water movement, understanding these zones of weakness can have important implications for a better understanding of the deep paths of water distribution within the Palouse region.

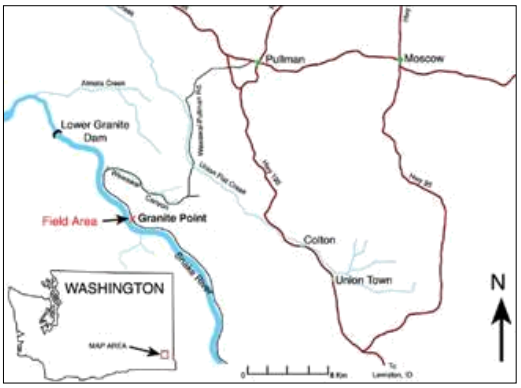

Figure 1. Granite Point, Southeastern Washington.

LITERATURE REVIEW

The only recent published work specifically addressing Granite Point is by Hooper and Rosenberg (1970). The paper describes the rock type as coarse grained and of granitic composition. However, it makes little mention of the structures of the rock and no mention of the shear zones.

Ramsay (1979) discusses how strain is related to displacement across a shear zone and how the characteristic markers in a shear zone can be related to displacement and strain. Ramsay also provides a general review of characteristic structures seen in most shear zones and a clearly laid out method for quantitatively applying measurements taken from these characteristic markers.

Ramsay and Graham (1970) published a seminal paper entitled "Strain Variation in Shear Belts." This is a key paper because it is the first, and one of the few papers of its kind, that provides a detailed mathematical description of the kinematics of a shear zone.

Passchier and Trouw (1996) provide a general review of the various methods of both brittle and ductile deformation. They also describe how to use rocks in thin section to identify the characteristic structures of each. Finally, they describe the process of collecting hand samples and using them to make correctly oriented thin sections.

HYPOTHESIS

We will be able to determine the magnitude of displacement and characteristic properties of the westernmost shear zone at Granite Point by using the integration of careful field mapping and measurements, collection of oriented hand samples, thin section analysis, assessment of shear zone gradients and quantitative analysis.

METHODOLOGY

A grid system was set up over the vertical and horizontal faces of the shear zone so that the boundaries of the shear zone could be determined (see Figure 2). This also permitted accurately scaled drawings of the important features of the zone, such as the angles of the mafic rich lithologic layer and lineations that are swept in and out of the shear zone.

The type of deformation that minerals experience is dependent on the temperature and pressure conditions present during the deformation event. Identifying the deformation responses of specific minerals allows for an interpretation of the range of temperature, pressure and depth gradients at the time of deformation. To examine this, oriented hand samples were collected from Granite Point and then cut into thin sections and analyzed under a petrographic microscope to see how quartz, feldspar, and amphibole grains respond to strain at the micro scale level.

Figure 2. Grid system on vertical shear zone face.

The results of the detailed field mapping and the strain analysis will be used in a mathematical model developed by Ramsay and Graham (1970). This will allow for the integration of the shear strain and the derivation of displacement across the zone. These results will then be compared to the observed fabric in the shear zone.

ASSUMPTIONS

Measurements were obtained from markers both inside and outside of the shear zone. It was assumed that these markers acted in a passive manner and did not affect the mechanics of the shear zone. The second assumption is that of simple shear, which means that there was no compression or dilation across the shear zone (see Figure 3). If compression or dilation were involved in the shearing process, then the passive markers would reflect both the movement of the simple shear and the compression or dilation.

Lastly, only one side of the horizontal face of the shear zone is well exposed so it was assumed that the shear zone is symmetric about center. This allowed us to rotate the integration by 180° to obtain an estimate of the magnitude of displacement across the whole shear zone.

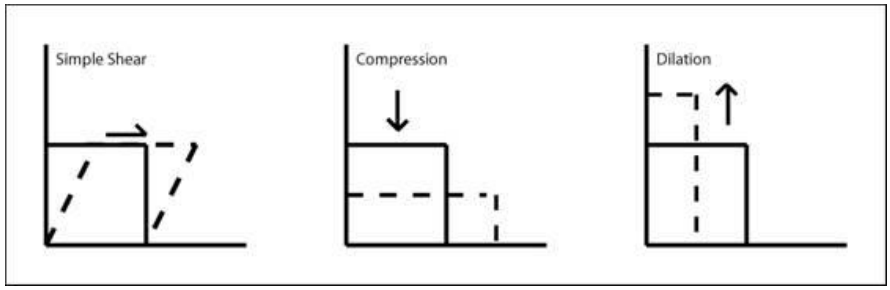

Figure 3. Schematic of simple shear, compression and dilation.

OBSERVATIONS

Vertical Face

A dark, mafic rich, lithologically distinct layer intersects the shear zone at a 90° angle, sweeps through the shear zone and, after an approximate 3 meters of offset, exits the opposite side at a 90° angle (Figure 4). The shear zone is approximately 2 meters wide and is a normal ductile fault, meaning the west side of the shear zone moved down relative to the east side.

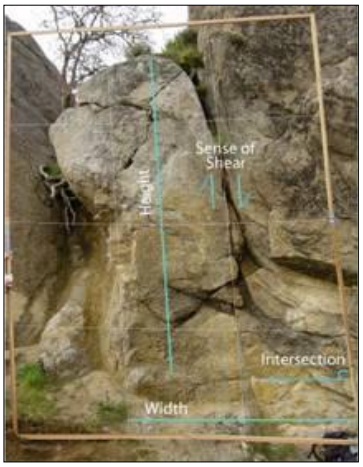

Figure 4. Vertical shear zone face showing sense of shear, height and width measurements, and the mafic layer intersection angle

Horizontal Face

Determining the offset along the horizontal face proved to be a much more difficult task. There is no mafic layer conveniently sweeping through the shear zone to allow a quick estimation of the amount of offset. However, a linear fabric is deflected into the shear zone, which at least reveals a left-lateral sense of shear (see Figure 5).

Figure 5. Horizontal shear zone face showing sense of shear and width measurement.

Stretching Lineation

A stretching lineation, which is located in the center of a shear zone, is visible at Granite Point due to the specific erosional pattern at this site. The stretching lineation is composed of elongate feldspar grains and aligned mafic minerals, and traces the actual movement of the rock caused by the activity of the shear zone (see Figure 6).

Figure 6. Stretching lineation at Granite Point pitching at 47° SW.

Petrology

Hooper and Rosenberg (1970) analyzed in detail the petrography of Granite Point. They determined that the rock at Granite Point is coarse grained, composed of abundant feldspar and quartz with lesser amounts of hornblende and biotite, along with trace amounts of accessory minerals. Once the rock was fully cooled a later deformation event, probably the convergence of two tectonic plates, realigned the minerals into a nearly north-south linear fabric. The rock was then locally deformed by the shear zone.

The analysis of the Granite Point rock in thin section indicated that quartz displays purely ductile deformation as indicated by subgrain development, deformation lamellae, and grain size reduction relative to the undeformed rock (see Figure 7). The feldspar grains showed both growth and deformation twinning, myrmekite at grain boundaries and moderate fractures. This indicates that feldspar, experienced both brittle and ductile deformation on the single grain level. The hornblende grains were highly fractured and experienced purely brittle deformation.

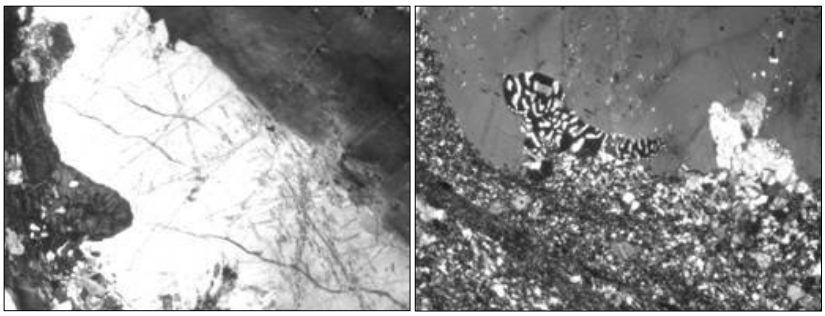

Figure 7. Quartz grain with subgrain development (left) and myrmekite at feldspar grain boundary (right).

INTERPRETATIONS

Vertical Face

The mafic rich layer entered the shear zone at a 90°angle and then was deflected to nearly vertical before the deflection angle began to decrease again and then it exited perpendicularly out the other side. At various points along the deflected mafic rich layer, a tangent line was drawn to its lower boundary (see Figure 8). A measurement was taken of both the deflection angle and the distance from the shear zone boundary.

Figure 8. Vertical shear zone face with tangent lines drawn to the lower boundary of the mafic rich layer.

Next, the shear strain γ, which is the tangent of the deflection angle, is plotted against it's distance from the shear zone boundary. This is a measurement of the variation in strain across the shear zone. According to Ramsay and Graham's (1970) model, by connecting the points a parabolic curve should develop and the area under the curve will be the magnitude of offset along the shear zone (see Figure 9). This offset is also referred to as the flux and is represented by the following equation:

$$s = \int_{0}^{x} \gamma dx$$

The vertical offset is easily estimated by Simpson's rule, which yielded a value of 3.02 meters. This is almost exactly the amount of offset estimated by visually tracing the mafic rich lithologic layer through the shear zone.

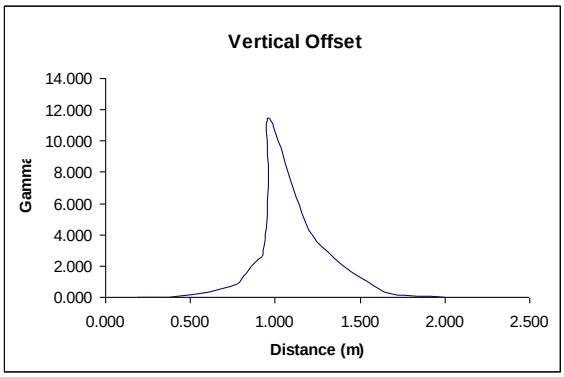

Figure 9. Area under the curve (3.2 meters) is the magnitude of offset along the vertical face of the shear zone.

Horizontal Face and Stretching Lineation

The linear traces outside the shear zone have a cardinal direction of 357° and are deflected to a maximum orientation of 220°. A laboratory experiment involving computer cards and a constrained box was used to mimic the pattern of offset on one-half of the horizontal face (see Figure 10). Then by scaling it to the outcrop scale and applying our assumption of symmetry by doubling the result to estimate the displacement across the whole shear zone, the estimated offset is 2.9 meters on the horizontal face.

$$displacement = \frac{(9cm)(.7m)}{(4cm)} = 2.9m$$

Another method for determining the magnitude of offset in the horizontal direction is basic trigonometry where the variables are the 43° (90°-pitch) of the stretching lineation and the magnitude of offset in the vertical direction (3 meters) and the displacement across the shear zone.

$$displacement = (3m)(\tan 43°) = 2.8m$$

The second method predicted an offset of 2.8 meters in the horizontal direction, which is almost identical to the offset determined by the above computer card experiment.

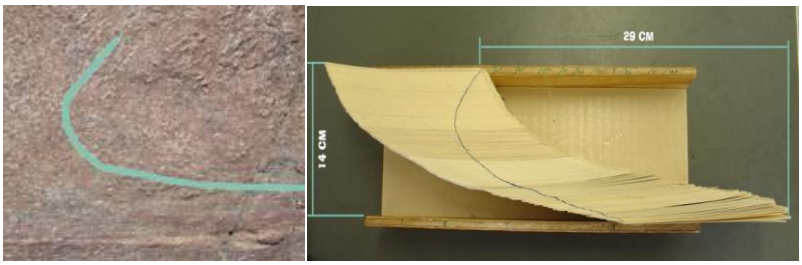

Figure 10. Horizontal shear zone face (left) and computer card experiment mimicking the geometry of the deflected linear traces (right).

Petrology

According to Passchier and Trouw (1996), quartz begins to behave in a ductile fashion at approximately 300° Celsius. As stated above, the quartz at Granite Point has experienced purely ductile deformation, which means that the temperature at deformation was greater than 300° Celsius. The feldspar at Granite Point displays both brittle and ductile deformation. Since feldspar begins to become ductile at around 400° Celsius, this suggests that the temperature at the time of deformation must have been at least 400° Celsius. Lastly, hornblende is highly fractured and shows no ductile deformation. Since hornblende does not begin to display ductile deformation until temperatures of greater than 500° Celsius are reached, the temperature at deformation must have been less than 500 degrees Celsius.

Therefore, based on the deformation styles of quartz, feldspar and hornblende the general temperature range must have been greater than 400° Celsius but less than 500° Celsius. For an assumed geothermal gradient of 30° per km depth, the deformation might have occurred between 13 and 16 km under the earth's surface. By using a pressure gradient of 1 GPa per 33 km depth, a pressure range of 0.4-0.5 GPa was determined.

CONCLUSION

At some time in the past, after the rock was fully cooled and after the deformation event that formed the lineatsion, the rock at Granite Point experienced a relative offset of 3.0 meters in the vertical direction, 2.8 meters in the horizontal direction and followed a pitch of 43°. The pressure, temperature and depth conditions present at the time of deformation are estimated to be 400-500° Celsius, 13-16 km, and 0.4-0.5 GPa.

FUTURE RESEARCH

Granite Point is a structurally complicated area. As a result, many issues still need to be resolved. One that pertains to the shear zone addressed above is to analyze the direction of rotation of feldspar grains. If the majority of the feldspar grains have rotated in the same direction then compression or dilation could be ruled out more definitively.

ACKNOWLEDGEMENTS

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PERCEIVED CREDIBILITY IN WEB BASED DISCUSSION GROUPS

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ABSTRACT

This study investigates the information users of online discussion boards consider to establish the credibility of posters. This study used survey responses from volunteers from an online sports discussion board. Each participant read a discussion thread randomly selected from a simulated discussion board similar to the live sports discussion board they regularly use and used what they considered relevant discussion board information. The participants then completed a survey questionnaire about their experiences and impressions concerning the discussion threads they had viewed. Questions addressed the credibility of each poster, and the information thought to be relevant in determining credibility. The findings suggest that the issue of credibility is different depending on the type and purpose of the WEB site. Users of sites that involve some risk are concerned with credibility. Users of non-formal discussion sites are less concerned with credibility.

INTRODUCTION

The use of, and reliance on, WEB based information systems is a relatively recent phenomenon. We can divide the use of WEB based systems into two different groups. The first refers to those systems that involve financial transactions or some other transaction that involves risk and therefore some level of trust is important. The second involves any type of information transfer that either party is free to accept or ignore with no further consequences. Whatever the type, users of WEB based information systems (or electronic media) must be able to establish the credibility of the site and the information presented.

Some define credibility simply as believability (Wathen and Burkell, 2002). However, there are many different types of credibility. Tseng and Fogg (1999), for example, identify four types of source credibility: presumed, reputed, surface, and experienced. Here we are concerned with surface credibility. According Tseng and Fogg, surface credibility derives from a user's simple inspection of superficial characteristics such as "judging a book by its cover."

REVIEW OF RELATED LITERATURE

As with non-Web based transactions such as phone or mail orders, participants make judgments concerning the credibility and trustfulness of the person or institution with whom they are going to do business. With the anonymity of on-line systems, the indicators once used to judge credibility and trustworthiness are either no longer available or easily falsified. Because this is an emerging phenomenon, there has not been a great deal of research in this area. However, one recent study by Morzy, et al. (2005) examined online auction systems and how the Web's anonymity tempts online users to cheat. Current methods employed by most sites to assist user in determining someone's credibility use a simplistic number of auctions completed coupled with feedback information. As Morzy, et al. note that malicious participants can easily deceive these primitive mechanisms. To help solve this problem Morzy and colleagues proposed an algorithm

to help on-line users. However, executing an algorithm is not practical for most people. This problem or deceit is not limited to systems involving financial transactions, but also in systems that involve information sharing.

A more practical solution for determining the credibility of online partners involves judging the characteristics of others. Xiong and Liu (2004) examined parameters used by participants in a Peer-to-Peer (P2P) network to establish "Peer Trust." The authors propose a sophisticated model that uses feedback, number of transactions and other information to establish a dynamic trust model for P2P networks. The focus is to detect participants who attempt to deceive the system and violate a trust relationship. The information used in this model is readily available to everyone. Less critical, but no less important, are those on-line systems that only deal with information without the inherent vulnerability of the first group.

The second group involves the transfer of information between people. The usefulness of this information is dependent upon the perceived credibility of the person or site that is presenting it. Unlike face-to-face information transfers, which provide interactive feedback and clues about the credibility of the information provider, on-line systems are anonymous and ready for use by people who are intent on deception. The ability of even knowledgeable Internet users to detect deception is difficult (Grazioli, 2004). However, the ability to detect deception is critical to a user in establishing the credibility of the information presented. Newman, et al. (2003), created linguistic profiles and analyzed them to determine the possibility of trends with deceptive information. They determined that there was a reliable consistent linguistic profile for deceptive information. Among the indicators was the use of positive and negative emotions.

Similar work by Fogg, et al. (2002) examined Web site characteristics that make a site more or less credible. Their findings show that among other things, the following factors tended to increase site credibility: 1) "The site provided comprehensive information that is attributable to a specific source;" and, 2) "The site lists authors' credentials for each article." Conversely, if a site "has a typographical error" the site's credibility tended to decrease.

To summarize, credibility is a complex and varied subject with many facets. When a user visits an online discussion site how they perceive the site is the first step in their credibility assessment (Wathen and Burkell, 2002). Provided the users are satisfied with their first impressions, they will shift attention from the site to the content. At the point that they start to read a posting they also begin their assessment of the user who posted the information and therefore the credibility of the information.

As Wathen and Burkell (2002) note, users will rely on many different aspects of the information in forming their credibility assessment including the message itself, their reaction to the message, and the source of the message. As the user makes a credibility assessment, he or she will base it on such factors as whether the poster using good grammar and spelling, and whether the poster thought about the content of the posting and structured it in a logical manner. The readers' emotional reaction to the message is also important. This will tend to overlap with their first assessment concerning logical structure. Is the poster relying on an emotional argument to make a point? How the reader feels about posting will also affect their emotional evaluation. The users will then turn their attention to the poster and ask, "Who is this person and what is his or her experience? The answer to this question can come from the personal biographical information the poster may have left or their past activity, as indicated be the number of postings or contributions the user left.

This study attempts to add to the existing information base by examining factors that affect credibility perception of users reading postings in a Web based bulletin board. We attempt to determine the types of information that a reader of informational postings is most likely to use to determine credibility.

HYPOTHESES

- **H1:** Posters with a large number of postings will be perceived to be more credible than those with few postings and/or those that use inappropriate graphics.
- **H2:** Posters that use emotional or inflammatory language will be perceived as less credible than posters that use well-constructed logic.
- **H3:** Posters that list biographical and/or links to recent postings will be perceived as more credible than posters that choose to remain anonymous.

METHODOLOGY

This study used a simulated sports discussion board environment populated with discussion threads and user information that would normally be present in a live discussion board. For each participant, the simulated discussion board will be populated with information randomly taken from a pool of four sample sets (see Appendices I and II), which have changes in the three factors that are of concern in this study.

The factors studied are emotional vs. logical postings, number of previous postings; and, biographical information completeness. We use within-treatment and between-treatment analyses and compare mean differences across factors. The pool of participants was drawn from visitors, both posters and lurkers, to www.cougarfan.com.

Subjects: The subjects for this study were volunteers recruited from a sport Web site. The subjects were predominantly male (92.4 percent), white (92 percent), and college educated (approximately 87 percent had a bachelor's degree or greater). The average age of the subjects was 38.4 years (S.D. = 13.2). Over 67 percent reported annual family incomes of over $75,000. Most respondents (80.6 percent) were affiliated with a local university.

Data Collection: Using an online prompt, visitors to the Web site were to participate by clicking on a link that would redirect them to a survey site. The survey site provided instructions on how to complete the survey (Appendix I). Following the instructions, each subject was presented with one of four randomly selected discussion postings. These simulated postings were created using real responses from a group of volunteers not associated with the Web site. Subjects were asked to answer questions about the postings and posters.

FINDINGS

The overriding research question is, "What information does a person use to establish the creditability of a poster on a sports discussion web site?" After validating the survey results the data were analyzed using a Paired-Sample T-Test to compare the mean difference across factors both within subject and between subject, and an ANOVA Affiliation post hoc Scheffe test was used to confirm an anomaly discovered during manual data review.

HiPost vs. LowPost: The credibility mean for posters with a high post count was 2.7759 with a standard deviation of .74125 across all respondents. For those posters with low post counts the credibility mean was 2.7952 with a standard deviation of .5898 (see Table 1). The results in Table 2 reveal that comparing high to low posters the mean difference was -.0193 (S.D.= .77696). This difference was not significant (p=.657).

Emotional vs. Logical: For posters who tended to use emotional language, the credibility mean was 2.7085 with a standard deviation of .96134. For posters who tended to use logic in their postings the credibility mean was 2.7952 (S.D. = .5898; see Table 1). The findings in Table 2 reveal that when comparing emotional to logical the mean difference was -.0867 S.D.= .98405). Again, this difference is not significant (p= .116).

Biographical vs. Anonymous: The findings in Table 1 show that for posters who provided biographical information the credibility mean was 2.7673 (S.D. = .62516). For posters that

provided no biographical information the credibility mean was 2.7343 (S.D. = .57256). Comparing biographical to anonymous the mean difference was .033 (S.D. = .69656) Once again, the difference is not significant (p= .399; see Table 2).

In sum, then, none of our hypotheses was supported by the data. Given this, the data were then analyzed comparing three different groupings: 1) posters who appeared to be affiliated with the local university, 2) posters who were from a rival school, and, 3) posters from non-rival schools. The results of this analysis follow:

For posters who appeared to be affiliated with the local university, the credibility mean was 2.9707 (S.D. = .03442). The credibility mean for posters who appeared to be affiliated with a rival school was 2.5141 (S.D. = .05718, see Table 1). For posters with an apparent neutral affiliation the credibility mean was 2.6061 (S.D. =.03358).

The differences in mean scores are shown in Table 2. Comparing local affiliation to rival affiliation the difference in means was .4566 (S.D. = 1.11723). This difference is significant (p= 0.000). Similarly, when comparing local to Neutral affiliation the difference in means was .3647 (S.D.= .65907). Again this difference is statistically significant p= 0.000). However, when comparing the Neutral affiliation to rival school affiliation the difference in mean scores was only .092 (S.D.= 1.09534). This difference was not significant (p= .135).

Table 1. Paired Samples Statistics

	Pairs	Mean	N	S.D.	Std. Error
1	**HIPOST**	2.7759	319	0.74125	0.04150
	LOPOST	2.7952	319	0.5898	0.03302
2	**EMO**	2.7085	319	0.96134	0.05382
	LOGIC	2.7952	319	0.5898	0.03302
3	**BIO**	2.7673	318	0.62516	0.03506
	NOBIO	2.7343	318	0.57256	0.03211
4	**AFL_COUG**	2.9707	319	0.61473	0.03442
	AFL_OTHR	2.5141	319	1.02129	0.05718
5	**AFL_COUG**	2.9707	319	0.61473	0.03442
	AFL_NEUT	2.6061	319	0.59975	0.03358
6	**AFL_NEUT**	2.6061	319	0.59975	0.03358
	AFL_OTHR	2.5141	319	1.02129	0.05718

SUMMARY

Analysis of credibility ratings reveals that post count was not very important in determining the credibility of a poster. Similarly, the emotional content was not particularly important either. Finally, the credibility ratings for posters that included biographical information and those that did not was were not significantly different.

Analysis of the data regarding affiliation revealed that the apparent school affiliation of the poster was a factor in determining the credibility of the poster. Group affiliation with the local university showed a very little variability within the data compared to affiliation other school, both rivals and non-rivals (neutral) even though the differences between rivals and non-rivals were not significant, suggesting a strong within group identification and apparent bias.

Table 2. Paired Samples Difference of Means Test

Pairs	Mean	S.D.	S.E.	95% Confidence Interval Upper	Lower	t	df	*p*=
HIPOST-LOPOST	-.0193	.7770	.0435	-.1049	.0663	-.444	318	.657
EMO - LOGIC	.0867	.9840	.0551	-.1951	.0217	-1.574	318	.116
BIO - NOBIO	.0330	.6966	.0391	-.0438	.1099	.845	317	.399
AFL_COUG - AFL_OTHR	.4566	1.1172	.0626	.3336	.5797	7.300	318	.000
AFL_COUG - AFL_NEUT	.3647	.6591	.0369	.2921	.4373	9.883	318	.000
AFL_NEUT - AFL_OTHR	.0920	1.0953	.0613	.0287	.2126	1.499	318	.135

*Two-tailed test

CONCLUSION

The result of this study indicates that users of non-critical or social information WEB sites are not exceedingly concerned with the credibility of the poster. Readers appear to be influenced more by the poster's affiliation. This result is consistent with previous research that suggests that users are influenced most by those similar to themselves (Pornpitakpan, 2004). In addition, prior research also indicates that users will seek out Web sites that have a similar general point of view (Johnson and Kaye, 2004).

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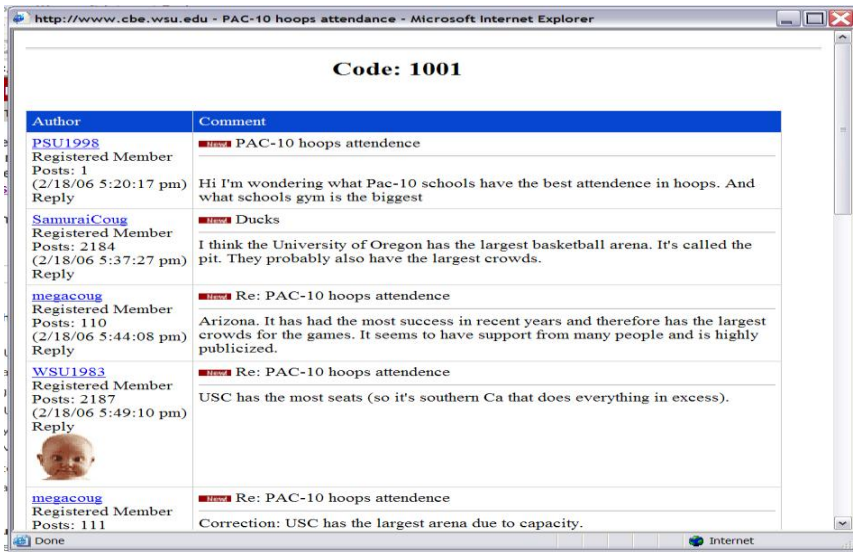
APPENDIX I: SAMPLE DISCUSSION DATA



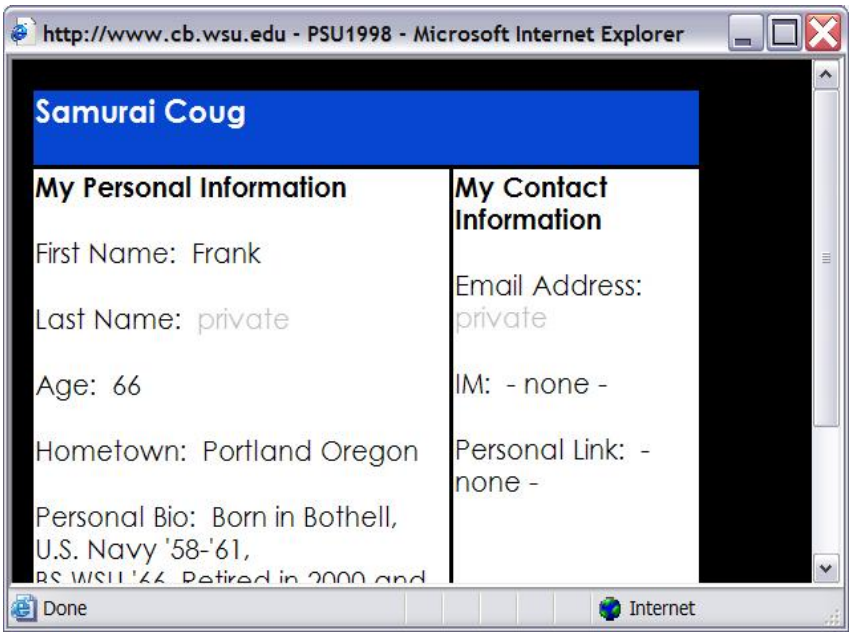
http://www.cbe.wsu.edu - PAC-10 hoops attendance - Microsoft Internet Explorer

Code: 1001

Author	Comment
PSU1998 Registered Member Posts: 1 (2/18/06 5:20:17 pm) Reply	PAC-10 hoops attendence Hi I'm wondering what Pac-10 schools have the best attendence in hoops. And what schools gym is the biggest
SamuraiCoug Registered Member Posts: 2184 (2/18/06 5:37:27 pm) Reply	Ducks I think the University of Oregon has the largest basketball arena. It's called the pit. They probably also have the largest crowds.
megacoug Registered Member Posts: 110 (2/18/06 5:44:08 pm) Reply	Re: PAC-10 hoops attendence Arizona. It has had the most success in recent years and therefore has the largest crowds for the games. It seems to have support from many people and is highly publicized.
WSU1983 Registered Member Posts: 2187 (2/18/06 5:49:10 pm) Reply	Re: PAC-10 hoops attendence USC has the most seats (so it's southern Ca that does everything in excess).
megacoug Registered Member Posts: 111	Re: PAC-10 hoops attendence Correction: USC has the largest arena due to capacity.

Done Internet

APPENDIX II: SAMPLE BIOGRAPHICAL DATA



http://www.cb.wsu.edu - PSU1998 - Microsoft Internet Explorer

Samurai Coug

My Personal Information

First Name: Frank

Last Name: private

Age: 66

Hometown: Portland Oregon

Personal Bio: Born in Bothell, U.S. Navy '58-'61,

My Contact Information

Email Address: private

IM: - none -

Personal Link: - none -

Done Internet

AN INVESTIGATION INTO THE RETENTION RATES OF LATINA/O STUDENTS AT THE TWO LARGEST PUBLIC INSTITUTIONS OF HIGER EDUCATION IN THE STATE OF WASHINGTON

Heather María Magaña, McNair Scholar
Dr. Carmen R. Lugo-Lugo, Faculty Mentor
Department of Comparative Ethnic Studies

ABSTRACT

Higher education is one vehicle to maintain or gain access to higher-waged careers, networking opportunities, prestige and self-worth. However, one must graduate in order to reap these potential benefits. This research seeks to identify factors that contribute to the academic success of Latinos. It also seeks to present college administrators in the state of Washington with information to help them increase the retention and graduation rates of Latinos in the state. Institutions of higher education in the state of Washington should work to alleviate the financial need of students so that they are not forced to work more than part-time in addition to their studies, encourage campus/organizational involvement especially within the present Latino community, and further investigate the barriers faced by first-generation. Last but not least, the universities must show a committed effort towards improving the education of Latino/a students.

INTRODUCTION

Higher education has been used as a vehicle to maintain or gain access to social and human resources such as higher-waged careers, networking opportunities, prestige and self-worth. Thus, the value of earning a bachelor's degree in itself carries much more than just monetary rewards. However, admittance into a college or university does not guarantee access to the breadth of resources. One must graduate in order to reap the benefits of a college education.

Nationwide, the admittance of students into college has not been equal to the number of students earning their bachelor's degrees. This is particularly salient for ethnic minority university students, particularly Latino students whose attrition rates are severely pronounced on university campuses. Overall, the attrition rates of Latino's at U. S. four year colleges and universities have exceeded 50 percent (Maldonado, 2004: 13). The most influential factor accounting for Latino university students' retention in higher education has been financial hardship or need (cite). It may be helpful, then, for universities to take a proactive stance into ensuring that financial needs of Latino students do not compromise their academic aspirations in attaining baccalaureate degrees.

Likewise, when examining the proportion of students earning bachelor's degrees, one notices drastic difference across racial lines (Gregory, 2003). Not only are Latino university students considered to have among the lowest rates of retention rates of all ethnic minorities, however, they are also only half as likely to graduate from college as their white counterparts (Garcia: 196). Additionally, despite the fact that Latinos made up 12.5 percent of the US population in 2002, they represented approximately nine percent of all undergraduates. Moreover, in terms of

graduation, Latino students accounted for only 6.1 percent of those who earned baccalaureate degrees (Longerbeam, et al., 2004).

The state of Washington mirrors these statistical disparities in the retention and graduation of Latino university students. For example, at one public university in Washington only 50 percent of Latinos students awarded the Pell Grant graduated with the baccalaureate within six years (Multicultural Student Retention Summit). Thus, graduation rates for Latino students in the state of Washington are a serious issue that needs to be addressed if educational attainment is to be equitable.

Various factors contribute to student retention and eventual graduation from college. The purpose of this research is to unveil and examine these factors to determine what contributes to Latino academic success in the state of Washington. From the results of the study we hope to identify and emphasize the useful strategies promoting Latino graduation success.

LITERATURE REVIEW

Several recent works have focused on Latino retention in higher education. These works identify various factors influencing Latino undergraduate persistence and offer suggestions to increase persistence. The limited research available does not address the issues of Latino retention in the state of Washington and is further complicated because of the vast diversity within the Latino population. This lack of available research coupled with the increasing disparities between Latinos and the white population within higher education have created the need for further research.

Pre-university success enables students to envision the possibility of pursuing higher education. Traditionally, however, Latino students have been marginalized in education. Patricia Gándara (2005:5) states in Fragile *Future: Risk and Vulnerability among Latino High Achievers*:

> Latinos who demonstrate high academic ability—especially those of Mexican and Puerto Rican ancestry—are not as likely to come from economically and educationally advantaged backgrounds. Disproportionately, the schools that minority and low-income students attend are less likely to offer rigorous curricula and Advanced Placement classes. They also tend to have lower percentages of qualified teachers and fewer resources overall. Moreover, the aspirations for these students tend to be lower, since neither peers nor teachers expect them to shoot for high academic goals.

Students that receive inadequate preparation for university level education are less apt to be successful even if they attain acceptance to a university/college. According to Gándara (2005:5) few students envision continuing their education because of the inefficiency of the public school system. Gándara explicitly states that:

> …it is hardly a secret that schools in this country that serve the poor children tend to serve them poorly, and, partly as a result, low-income and disadvantaged children with the same potential as their middle-class peers score worse on standardized tests of academic achievement.

University admissions departments have tried a variety of strategies to combat this phenomenon. One such program instituted at a Texas university includes automatically admitting the top ten percent of each high school (Chopa, 2002). The X percentage plans, as Jorge Chopa (2002) calls them in his article, "Affirmative Action, X Percent Plans, and Latino Access to Higher Education in the Twenty-First Century," were instituted because of the outlawing of affirmative action.

Enrollment of Latinos into institutions of higher education has been increasing with their increasing population in the United States. Sheila Gregory (2003) uses the U.S. census bureau to illustrate that as Latinos have become the second largest "underrepresented" population in the U. S., the number of Latinos enrolling in institutions of higher education has also increased. This increasing enrollment, she tells us, necessitates a proactive approach to increasing the retention rates of these students. She proposes a framework focusing on five specific issues: recruitment and admissions, financial aid, student services, academic services and curriculum and instruction (Gregory, 2003:15-17). Gregory advocates a comprehensive approach to "graduating Latinos." Her "framework for retention" was developed on the success of three higher education programs employing four basic components including: "efforts to strengthen students' motivation to remain at the university and graduate," "opportunities…to enhance basic academic skills and learning behaviors of students", providing "opportunities to interact academically and socially with other diverse campus students, faculty and staff," and "institutions…provid[ing] a more hospitable climate for all students of color." The financial aid aspect is not mentioned in the four components important for Latino retention, but is included in Gregory's framework of retention.

When it comes to retention, Anna Ortiz (2004) calls student services to action. She acknowledges that Latinos have many hurdles to overcome in their journey through higher education. Ortiz suggests that school personnel should learn the histories and experiences of Latino students, understand the importance and impact of family, build webs of connection among faculty, staff and students, become aware of the impact of racism against Latino students, include K-12 schools and community colleges in a seamless educational experience, and focus on experiential learning and building community. However, the first step is to bring students to campus. For instance, community colleges have often been used by people of color, specifically Latinos and the poor, as an intermediate step to pursuing their baccalaureates. Brown, Santiago and Lopez (2003) state in *Latinos in Higher Education: Today and Tomorrow*, those community colleges serve many important purposes for large numbers of students. However, 'the ambition to begin at a community college and then transfer to four-year institutions is not often realized" (Brown, et al., 2003:42). Ortiz (2004) stresses that attention to Latino retention will benefit the larger academic community. In, essence, Latino retention helps the academic community by injecting an element of diversity and multiculturalism.

Various elements influence the success of Latinos in higher education: 1) legal policy; 2) racism experienced on the college/university campuses, and, 3) the types of social networks that are formed and fostered while attending institutions of higher education. As Ramón Herrera (2005: 2) states in *Acculturation and Chicano College Students' Willingness to Seek Counseling: Alternative Resources and Shame as Mediating Variables*, "nonacademic factors are frequently more reliable predictors of persistence in college." Susan Longerbeam, et al. (2004:544) in their article *In Their Own Voices: Latino Retention* articulate that Latino's "leave school because it would 'cost more than [their] family or [they] could afford,' because of 'lack of academic ability' and 'to enter the military service." Brenda Maldonado (2004: iv) further argues in *Voices to be Heard: Latinas in Higher Education*, that institutional support and the role of family and friends are also key to the academic success of Latinas.

Maldonado (2004) discusses models that have been developed to analyze issues related to persistence including Tinto's (1993) Student Involvement Model, Bean's Attrition Model (see Bean, et al., 2000), and Astin's (1999) Theory of Student Involvement. Maldonado argues that these models are inadequate for Latino populations: "[M]ost Latino scholars are not convinced that [the] existing models are persuasive in fully explaining the reason for the persistence or withdrawal of Latino students" (p.14). In his Student Involvement Model, Tinto stresses student's creating strong community ties within the university community for optimal retention. The development of a new model or framework for retention is necessary to account for the multiple elements that contribute to the academic success of Latino students and the various barriers they encounter in higher education.

GOALS OF THE STUDY

This research seeks to identify factors that contribute to the academic success of Latinos. It also seeks to present college administrators in the State of Washington with enough information to help them increase the retention and graduation rates of Latinos by providing data on different elements used by Latino students at the two research universities in the state of Washington to stay in school.

METHODOLOGY

Though the term "Latino" has traditionally been defined as a person of Latin American descent, in this study the term used as an umbrella label and the respondents self-identified as Latino. Subjects contact was through the McNair program and Multicultural Student Services.

The respondents completed an electronic questionnaire that asked them about their educational background, how they are currently progressing in school, extracurricular activities, questions about working, financial aid, academic resources, networks, school satisfaction and familial background and demographic questions. The questions focused on key factors that have been attributed to persistence in higher education.

The survey asked several questions regarding perceptions of their academic experience in higher education. The survey was divided into seven sections. The first section, educational background, looked at pre-college factors that may influence persistence in higher education. Some sample questions that were posed include: "Did you take college prep. courses?" and "Did you go to community college before enrolling at WSU/UW?" The second section asked questions about the student's current status. It was in this section that the current GPA was obtained, used to gauge student's academic to the students current academic standing. The third section asked questions about outside influences. Some outside influences included finances, extra-curricular activities and mentorship (questions were asked reflecting such aspects of the college experience). The fourth section addressed issues relating to the types of social networks the student has developed. The fifth section asked questions regarding the students' satisfaction with a few different elements of their academics. The seventh section questioned whether students knew of anyone who had dropped out of college and that students reasoning for doing so. The last section was devoted to the demographic characteristics of the surveyed population.

Grade Point Average (GPA) was used to gauge students' academic success. The students' educational background, outside influences, networks and school satisfaction were compared to their respective GPAs. The data the students provided was used as a guide to identify those elements in a student's experience that contribute to their academic success.

RESULTS

Twenty-three respondents self-identified as Mexican, Latina/o, Hispanic, Peruvian, Ecuadorian, Mexican-American, and Chicana/o. The respondents ranged from 19-36 years of age, and 17 were females. Almost all the respondents were Catholics and unmarried. All of the respondents had graduated high school in the US with high GPAs (only two had below a 3.00). Fifteen of these students had taken college preparation courses. For most students, the path into the university was directly from high school. However, five transferred from community colleges while three took time off and one transferred from another four year institution.

Many of the students classified themselves as Seniors in college or Post-baccalaureates (12), but some respondents reported their status as Juniors (7) and Sophomores (4). These students had generally high GPAs: nineteen students had above a 3.00 and only four had GPAs between the 2.50-2.49 range. Eighteen students were Liberal Arts majors, four were Science majors, and one student was undecided in major.

Financially, all but five of the students received financial aid through grants, scholarship and loans. Most of the students were also employed, including 11 who worked at full-time status or more. Approximately half of the respondents reported that their families had the economic means to help support them in college. Most students (16) stated that they were not responsible for supporting anyone other than themselves. Seven were on some sort of public assistance.

These university students were also deeply involved with their college communities. Twelve were involved in three or more organizations. Also, an overwhelming number of students had been mentored in the past, were currently being mentored or were mentoring others. Fifteen of the students had been mentored at one point in time while 11 of the students were presently being mentored by faculty members.

Most Latino respondents were first-generation college students. Only six students stated that their parents graduated from college. The students whose parents had graduated from college had a considerably higher average GPA than first-generation students. The average GPA of first-generation students was 3.29 compared to 3.48 for those whose parents had graduated. Additionally, nine students shared that they did not feel that they were adequately prepared for college-level coursework. Students' perceived preparedness for university level coursework was reflected in their GPA. Those who felt prepared had an average GPA of 3.42 compared to 3.20 for those that did not feel prepared.

All the respondents had some type of social network. Fourteen students felt very close to their families while four felt that they were neither distant nor close to their families. However, almost all of the students communicated with their families very often or often (only 1 student seldom communicated with family members).

The amount of hours students' worked per week moderately affected their GPA. Students who did not work at all had an average GPA of 3.37, whereas students who worked part-time had an average of 3.36 and those students who worked full-time or more had an average of 3.24. Also, the degree to which students were involved with the Latino campus community positively affected their academic performance. Students involved in three or more organization had an average GPA of 3.39 while students not involved in any organizations or at most one or two had an average of 3.28.

Factors that did not affect GPA included: the mentoring of students by faculty and students taking college preparation course in high school. Class standing did not predict GPA, but resembled the following sequence: Seniors had an average GPA of 3.34, Juniors 3.38 and Sophomores 3.26.

Interestingly, most students named their family as the major contributing factor in their academic success. Other responses included: self, community, college preparation, institutional support, religion and friends. Students cited the following reasons for other students dropping out of school: finances, academics, lack of institutional support (often involving racism), family and self (academic preparedness and emotionally).

DISCUSSION AND CONCLUSIONS

Various factors affect the persistence of Latino students in higher education even among the high achieving. The student with the lowest grade point average had a 2.74, averaging a B-, and all but four of the students were above a 3.00. Some of the variance was related to the total hours each student worked, the number of organizations in which they participated, whether they were first generation students and their perceived preparedness for college. Elements found to not affect the success of Latinos, at least in this study, were whether the student was mentored by a faculty member and if the student took college preparation classes in high school.

This research is a preliminary study of Latino academic success in the state of Washington. Although it did not use a representative sample, the results are important because they provide a basis for looking further into Latino retention specifically in the State of Washington. A

representative sample of Latinos would allow for a nuanced analysis of other factors including language barriers, additional generational standings, e.g., immigration status, first/second generation college students, and/or transfer status. Future research should also focus on students who have graduated recently, those about to graduate and graduate students. This would be done in order to identify key factors of persistence, for they are the ones who have succeeded.

Although this is a preliminary study, we offer the following suggestions. Institutions of higher education in the state of Washington should work to alleviate the financial need of students so that they are not forced to work more than part-time in addition to their studies and encourage campus/organizational involvement especially within the Latino community.

Future research should investigate the barriers faced by first-generation students and seek new avenues to prepare high school students for university life. Last but not least, the universities must show a committed effort towards improving the education of Latino/a students.

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APPENDIX A

Consent to Serve as a Subject in Research

My name is Heather Magaña, the principal investigator for this study. I am an undergraduate student at Washington State University in the Department of Women Studies. I am conducting a quantitative study on Latinas/os in higher education that have successfully completed at least one year of university level course work in order to identify factors that contribute to retention.

I am inviting you to participate in this study; your time commitment would be approximately twenty minutes. Your participation is completely voluntary and is completely anonymous. In order to preserve anonymity, I will be numbering the responses. Submitting responses to the survey acknowledges your consent to be a subject in the study.

This survey poses no known risks to your health and your name will not be associated with the findings. It has also been approved through Washington State Universities Institutional Review Board (IRB # 9155). If you have any questions not addressed in this consent form, please do not hesitate to ask. You should keep a copy of this form for your records.

Thank you for your time.

Heather Magaña

APPENDIX B

Latinas/os: Higher Education Survey

I. Educational Background:

1. Did you go to grade school in the United States (U.S.)?	Yes	No
2. Did you go to middle/junior high school in the U. S.?	Yes	No
3. Did you graduate from high school or finish an equivalency degree (GED)?	Yes	No
4. Where did you go to high school?		
5. What was your high school grade point average (GPA)?		
6. Did you take college prep courses?	Yes	No
7. Did you take time off after graduating from high school?	Yes	No
8. Did you go to community college before enrolling at WSU/UW?	Yes	No
If yes, for how long?		
9. Did you transfer from another four year college?	Yes	No
If yes, from where?		

II. Current Status

1. Class Standing:
2. Current GPA:
3. Number of credits completed so far:
4. Major (Please write undecided if you have not chosen a major yet):

III. Outside Influences

1. List extra-curricular activities/organizations:		
2. Are you a student mentor?	Yes	No
If yes, how many students do you mentor?		
For which program(s) do you mentor?		
3. Were you mentored when you first came to WSU/UW?	Yes	No
4. Are you currently being mentored?	Yes	No
If yes, through which program(s)?		
5. Are you currently mentored/tutored by a faculty mentor?	Yes	No
If yes, is it: formally or informally		
6. Do you receive financial aid?	Yes	No
If yes, from how many sources (scholarships, grants, loans, etc.)		
List the various sources:		
7. Do you work?	Yes	No
If yes, how many hours per week?		
How many jobs do you currently have?		
8. Do you receive economic support from your family?	Yes	No
If yes, how much a month?		
9. Do you support any family members?	Yes	No
If yes, how many (excluding yourself)?		
10. Do you receive public/state economic assistance (excluding financial aid)?	Yes	No
11. Have your parents graduated from college?	Yes	No

12. Has anybody in your immediate/extended family graduated from college? Yes No
13. Have you felt prepared for college level classes? Yes No
14. What has helped you in getting to where you are?

IV. Networks

1. How close are you to your immediate family? Please pick one
2. How often do you communicate with your family? Please pick one
3. How important was your family in your decision to pursue higher education? Please pick one
4. How many close friends do you have here at WSU/UW?
5. How involved are your friend in helping you succeed? Please pick one
6. How often do you socialize with your friends? Please pick one

V. School Satisfaction

1. How satisfied are you with your college experience? Please pick one
2. How satisfied are you with your major? Please pick one
3. How satisfied are you with your professors? Please pick one
4. How satisfied are you with your classes? Please pick one

VI. Other Information

This survey seeks to discover why Latino/a students have succeeded or failed in their university experience. If you know of any students that have left their university prior to graduation, please indicate reasons why they did so:

VII. Demographics

1. How old are you?
2. What is your gender?
3. What is your marital status?
4. What is your race/ethnicity?
5. What religion, if any, are you apart of?

Thank you! Please press the Submit button below

Submit Reset

THE CIRCULAR RELATIONSHIP BETWEEN THE MEANING OF MATHEMATICAL CONCEPTS, THE LANGUAGE USED AND APPLICATIONS IN DAILY LIFE

Hong Pham, McNair Scholar
Dr. Kimberly Vincent, Faculty Mentor
Department of Mathematics

ABSTRACT

This study investigates the bridge between mathematics and language for English Language Learners (ELLs). Traditionally mathematics teachers encouraged students to substitute numbers into formulas, and then perform calculations to obtain answers; this is easier for ELLs because it does not depend on English. However, problems posed in mathematics are usually represented with English language. Thus, competence with English can improve Ell's achievement in mathematics. In addition, when learning mathematical concepts, daily life provides a bridge between mathematics and English. This circular relationship between daily life, the meaning of mathematical concepts and English language should be of special attention for ELL educators.

INTRODUCTION

Studying mathematics provides students the ability to understand the world around them, to estimate the suitable solution, and to manage complex results (Dossey, et al., 2002). Mathematics plays a huge role in our daily lives. Basic math skills are necessary for us in our daily life from figuring out prices at the grocery store to building new things in our homes. Mathematical knowledge should increase the self-esteem and self-confidence students have as they becomes aware of how this knowledge can help them to do many simple things in their daily activities (Dossey et al., 2002).

When learning is embedded in the context of daily activities, students begin to build appropriate solutions to problems they are studying (Dossey et al., 2002). They are no longer passive students absorbing information, but are actively constructing knowledge and defining their own connections to meaning. The role students assume in the class also changes. The students begin to assume responsibility for their own learning (Piaget, 1955)**.** The first step in making mathematics accessible is matching the appropriate vocabulary with the basic materials and mathematical concept (Herrell, 2000). People learn about what they see and hear when they can see the connection to something they already know (Vygotsky, 1978). Thus, teachers should take advantage of the connection between what students already know and their daily lives to provide the extra language support necessary for helping them understand the meaning of concepts of mathematics represented with both numbers and words.

For teachers to make good decisions about instructional practices, they must understand how their students learn the language of mathematics. Krashen (1982) states that "language acquisition is a natural and gradual process based on how learners receive and understand messages, build receptive vocabulary, and attempt verbal production of the language in a highly supportive, not-stressful situation" (p 84). Thus, teachers are responsible for providing this "understandable language" or "comprehensible input," along with whatever support is necessary for students to understand messages.

In contrast to most school system in the United States, schools in many other countries emphasize mathematics at the elementary and middle school levels much more than reading and literature (NCTM, 1989). For many years, U. S. students learned mathematics through direct instruction by substituting numbers into formulas, performing some calculations, and providing answers (NCTM, 1997). It makes logical sense that mathematics taught in a traditional manner would be easier for immigrants because it does not seem to be dependent on knowing English. For some this proves to be true, but only for a very limited uses of mathematics.

In the United States, teachers tend to introduce mathematical functions by explaining the process and then asking students to practice individually on related problems (Dossey et al., 2002). Despite curricula reform, many classrooms still teach mathematics using these traditional methods (Dossey et al., 2002), which ignore or minimize mathematical concepts. Often this means the mathematics is taught with symbols and procedures, but the meaning of the concept and the interpretation of the numbers have not been put into words. When they do appear, the verbal or written descriptions used create confusion, especially for English as Language Learners (ELLs) who's English is not up to the level used in the classroom.

Often the special terms and language that mathematicians use to explain their subjects seem much like magical rhymes used to communicate their specialized proficiency and maintain their authority. Books, teachers, pictures and other educational resources that present these same concepts in more familiar terms and metaphors are good introductions. Once students know the concepts, the "special" language is easier to adopt (Campbell, 1995).

Mathematics teachers need to make an extra effort to remove the "magic smoke" of academic terminology and metaphor in order to raise the confidence levels of their students. This would be particularly beneficial for ELLs who will be able to understand mathematics and the relationship between concepts, words and daily life. The student needs no special skills, only a willingness to investigate the connections between familiar words, lives and concepts as experts do. Several recent exemplary programs based on NCTM (2000; 1989) standards emphasize problem solving of life-like situations as a way to learn mathematics by understanding its meaning. Such programs include: the Connected Mathematics Project (CMP); Mathematics in Context; MathSpace; the Core-Plus Mathematics Project; Contemporary, Interactive Mathematics Project (IMP); and, Interactive Mathematics. Due to the heavy dependence on the English language used when making connections to daily life, these reform efforts need further investigation for ELLs..

Mathematical terms and the English vocabulary are two major difficulties for ELLs because there are some technical mathematical terms that do not have the same meaning in everyday use. However, students pick up language in daily activities and they know mathematics is applied in daily activities. It is evident that students can understand the mathematical language from everyday language (Dossey et al., 2002). Then they can use daily language to build up their mathematical and English vocabularies.

Here, I explore the mutual relationship of mathematics, daily activities, and language used as the way of success in academic achievements of ELLs. I also examine the attitude of ELLs toward leaning English and studying mathematics.

REVIEW OF RELATED LITERATURE

Since the late 1960s, the under achievements of students in mathematics have led to an increasing percentage of youngsters not finishing high school. By the 1980s, this number had approached 73 percent (NCTM**,** 1997)**.** A lack of understanding regarding the concepts of mathematics is considered the most common reason for this under achievement (Croom, 1997). Student accomplishment in mathematics is related to how they express the meaning of the concept of mathematics with numbers, symbols, and words.

Mathematics is often considered valuable only for those students who will pursue careers in science, engineering or technology. This is a fallacious opinion. In fact, mathematics affects

every aspect of life (Steen, 2005). Therefore, studying the concepts of mathematics gives students an opportunity to develop their reasoning and analytical skills and to achieve their full learning potential (NCTM, 2000). Jobs of the future will expect workers to deal with the complexities of the workplace through teamwork, logical reasoning and the use of problem-solving skills (Croom, 1997). Not only is conceptual understanding important for use, but NCTM (2000) espouses that the link between a concept of mathematics and how it is used at work, home or on the playground will motivate students to learn and bring the meaning of mathematics closer to their activities**.** Learning activities should present mathematics as alive, exciting, and useful to human society (Mathematical Association of America, 1987).

Traditionally, students learned mathematics by following rules for how to get the right answer rather than why or how the processes or formulas work (Malloy, 1997; Wilson, 2004). Hence, students typically focused on their right or wrong answer without thinking of the meaning of the formulas. As a result of reliance on rules rather than concepts, students could get the right answer but be unable to explain in words the meaning of the formula. For example, a perimeter formula of a rectangle is found by calculating the sum of a length and a width of a rectangle, but its conceptual meaning is to measure of the distance around the bounder ledges of a rectangle. By definition, the perimeter of a figure is the total distance around the closed figure. The two crucial questions that need to be answered to understand the concept of perimeter are: 1) what is the shape of the figure; and 2) what is the total distance around the figure? These are crucial in the problem solving process if the formula is not provided. Most students do not make the conceptual connection to the meaning of perimeter to the formula, when all they have relied on is plugging numbers into a formula.

To instill the importance and usefulness of mathematics in students it is necessary for them to develop conceptual meaning. When students can recognize symbolic representations or interpret the words, then it is obvious that they will develop the meaning of the mathematical concepts (Dossey et al., 2002). This acquisition would help students know how to construct knowledge and an understanding of mathematics. For example, the perimeter formula can be derived or remembered easily if the concept of distance around the boundary is understood. The meaning of the concepts will also give students opportunities to realize how mathematics fits in their life in a meaningful way (Chapman, 1993). When students begin to value mathematics, they are more likely to be motivated to learn and be able to interpret, explain and share what they have understood with their friends and families. Mathematical conceptual understanding relies on an understanding of the languages used to describe mathematical meaning.

If we are to teach mathematics conceptually using language, we must consider the impact of the perceivable new language on English ELLs. Traditional methods of teaching ELLs included a sequence of listening, speaking, reading and writing, (Freeman, 2001). This sequence creates a chain of actions: "We see, we understand, we say, and we write." The Freeman research team (2001) claims that the comprehensive input and output will be the main factors to show that ELLs achieve the process of language acquisition. When studying the meaning of the mathematics concepts, it is necessary for the ELLs to not only focus on the numbers, but they also have to concentrate on vocabulary, grammar, reading, and writing for completing their assignment perfectly. To learn the language of mathematics students first must clarify their perceptions, and interpretations, then they must confirm that they are correct. Assuming their perceptions are appropriate, then they apply their meaning and logic to all aspects of life (Dossey et al., 2002). Teachers must take the responsibility to provide students with a precise, accurate and meaningful experience in learning mathematics.

Lessons especially should be created to reflect on students' prior knowledge of learning English language so that they can make the connection between what they have studied and what they are currently studying; and, to create a cohesive bridge between visual images students have from their past and those that they are creating in their present studies. The ultimate goal is to have ELLs comprehend and identify important information when they learn the meaning of the

mathematical concept, and understand how math and life relate to each other. In order to learn mathematics, ELLs need to connect the mathematical language to their native language. Instead, mathematics is taught so that the formal mathematical vocabulary is tied to English. So the meaning of the mathematical concept is being used as intermediacy between English and their native language. However, if they already know the mathematical vocabulary, then the mathematics can be viewed as the bridge.

Providing a bridge for this relationship is a necessary task of all mathematics teachers. This bridge is to allow students to make connections between a real life context, the mathematical concept, the language used to describe context and content, and to make connections. A bridge can be constructed in many ways. Consider the following example: One cup of coffee costs $2.00; two cups of coffee costs $4.00 and three cups of coffee costs $6.00. You can say that

- Your total price will be directly proportional to the number of cups of coffee you buy. The mathematical concept is direct proportionality.
- If you buy more cups of coffee, then you spend more money. The mathematical concept is repeated addition or multiplication.
- Your total price will increase, when you increase the number of cups of coffee purchased. The mathematical concepts include dependent and independent variables, rate of change and functional relationships.

However, in each of the examples the vocabulary may interfere with the comprehensive input of ELLs. If the mathematical language does not provide the bridge, then a visual can supply the connection for ELLs. So the relationship between the number of cups of coffee and the total price can be shown pictorially and numerically to help understand the vocabulary (see Figure 1)

Another way to help ELLs with mathematical symbols, shapes, vocabularies, and concepts is an attractive glossy book with photographed illustrations. Through these illustrations, students can visually understand the relationship between the symbol and the meaning of the mathematical term (Shapiro and Adelson-Goldstein, 1998). This can be done in many different ways. Table 2 is an example of using illustrations to bridge concepts, vocabulary, and daily life. A diagram also is another way to express each concept, and all necessary vocabulary**.**

Another approach is to give the use of the mathematical concept associated to a common activity from daily life. For example, you have to go to the grocery store to buy coffee, milk, and eggs. Coffee is $5, milk is $3 and a dozen eggs cost $2.50. If we want to find the total there are many ways we can word the question such as: What is the total cost of the three items? Find the sum of the prices? Add the prices to determine how much you have to pay? From the daily activity, students know they must add the prices, this allows them to develop an understanding of key words that are synonymous with addition. Students also need to learn the vocabulary that indicates that they need to perform addition. Table 3 illustrates that students can learn meaning of mathematical vocabulary by the use of given pictures. It also provides the connections between mathematical language, notation and a visual representation of objects from daily life.

With the reform efforts in mathematics placing so much emphasis on conceptual understanding, communication and representation (NCTM, 1989), it is necessary to attend to ELLs progress. In many schools, ELLs are placed in remedial math classes (Dossey et al, 2002), not because they cannot do the mathematics, but because the language creates a roadblock.

RESEARCH METHODS

In this study, I explore the circular relationship between the meaning of mathematical concepts, language used and applications in daily life for ELLs. First, I investigate how ELLS use the recursive relationship is used as a bridge for studying Mathematics. Second, I investigate what motivates students to learn mathematics.

Table 1. The numerical/ graphical connection between total price and of cups of coffee.

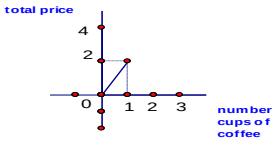
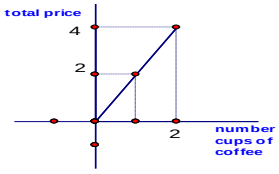
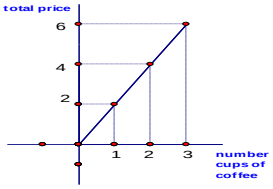
# of cups of coffee	Total price	Graph
	*$2.00*	
	*$2.00+$2.00= $4.00* *$2.00x2 (cups)= $4.00*	
	*$2.00+$2.00+$2.00 = $6.00* *$2.00x3 (cups) = $6.00*	

Table 2. To develop the language and concepts of ratio

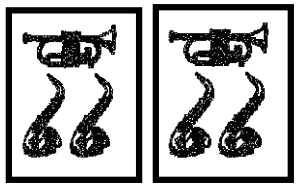
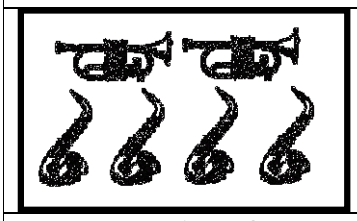
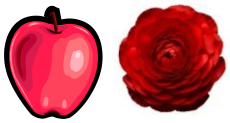
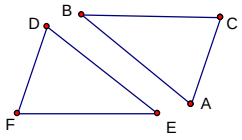
We see	We say	We write
	The **ratio** of the number of **tubas** to the number of **saxophones** is 1 to 2	$\frac{1}{2}$
	The **ratio** of the number of **tubas** to the number of **saxophones** is 2 to 4	$\frac{2}{4}$
We say : $\frac{1}{2}$ and $\frac{2}{4}$ are **equal ratios**		**We write** $\frac{1}{2} = \frac{2}{4}$

Table3. The connection between visual, symbols and language used.

Physical version	Language used	Notation or shorthand symbolic representation	Mathematical meaning of the word
	5 coins of one cent **equal** one coin of nickel.	5 cents =1 nickel	**Equal**: the same in size, value, amount, number etc as something else
	An apple and a flower have the **same** red color	No standard symbol used	**Same**: used to say two or more people, things etc are exactly like each other.
	These two triangles are **congruent**	Δ ABC $\cong$ Δ DEF	**Congruent**: congruent (triangle) are the same size and shape

To meet these objectives, I used a mixed method survey including some fill in the blank and some opened questions to provide qualitative data. I looked not only what participants do, but why they act or feel a certain way. I focused on their perceptions of behavior using qualitative data. The survey was designed to provide an alternative opportunity to understand the effect of circumstances on outcomes in relationship to approach of ELLs to solving mathematics problems. The second type of data was derived from videotaping a small focus group to identify the individual viewpoints of the participants.

All participants in the study were ELLs and all responses were voluntary. The data were collected at two locations. The first was a community college that was selected because it has a large ELL population. The sample included twenty-six students in an Algebra class. The class was chosen because I wanted to study the efficiency of ELLS in applying academic and common language while they were learning mathematics and English. Moreover, Algebra is the gatekeeper for all fields of study in higher education. Students have to pass the Algebra level in order to move forward.

The survey included mathematical questions, demographic background, and questions about how ELLs feel about learning mathematics in English. The Algebra survey included 20 background questions, 19 short algebra problems, and 13 reflective queries (see appendix A). Students in this class did not have a chance to complete the survey due to time constraints. Given that, 18 additional students were surveyed in a technical writing class for ELLs at a post-baccalaureate institution. The questions were edited to reflect the change in participants to facilitate completion of the survey (see appendix B.) The English class at the university gave me a chance to investigate whether English proficiency benefited ELL's study in mathematics. I also wanted to discover their ability to comprehend and their point of views on learning mathematics

and acquiring English. Additionally, I wanted to examine how students perceive the relationship between mathematics and English problems.

Finally, the focus group videotaping involved three volunteer algebra students at the community college. The videotape was burned on a DVD to facilitate the analysis. The focus group study was used to reduce discomfort and bashfulness, and to investigate individual reactions through conversation. The conversation consisted of a set of questions designed to reflect on the individual experience in process of learning mathematics and (see Appendix C.)

METHODS

Constant comparative methods were used to analyze data through comparative, synthesis, and inferential answers (Leedy and Ormrod, 2001). Two categories were identified to group the participants' viewpoints. The comparative technique was used to verify any differences between students. The synthesis technique was used to identify respondent perceptions. The inferential techniques identified trends within groups as well as individuals. The analysis of included two main categories: the students' attitude about studying mathematics, and the students' view on solving mathematical problems. Subcategories emerged upon further analysis within the two categories.

Various aspects of the data were combined to develop common themes and recurrent events. For example, the percentage of correct answers to mathematics questions based on formula recognition was higher at the community college than at the university. In contrast, the percentage of correct answers to mathematics questions that relied on interpreting verbal cues was higher at the university than at the community college. These results lead to the generation of criteria for common themes in the two survey sets.

Those participants who relied on reviewing previous lessons for studying, used written language in her/his interview. Those participants who depended on a physical model when studying used spoken language in her/his interview. If participants believe in mathematical formula or notation to study, they applied single words or slang in their interview. After carefully scrutinizing a verbatim report of the conversation on the DVD, I determined that students' language backgrounds affected their study behavior and determined their preferred learning style. Thus, language background was used as a coding category for further analysis of discourse in the focus study group.

To gain permission to conduct the survey at the community college, a list of Algebra classes, instructors, and contact information was obtained from the chair of the Mathematics Department. Two instructors volunteered their classes for the survey. However, only one class was able to take the class time to complete the survey.

RESULTS

The Algebra class of 26 students at the community college was comprised of 69.4 percent freshmen, 92 percent that had finished high school in the USA, and 81 percent that had been in the USA more than three years. The data analysis for this group was divided into subgroups by students' approach to studying mathematics and solving mathematical problems. In the first subgroup, language difficulties were the first concern for students when they were studying mathematics because they did not understand the mathematical vocabulary. Many students had a tendency to use memorized formulas to find a solution, rather than rely on the meaning of the mathematical concept. The analysis for this subgroup also showed that students did not see the relation between the meaning of the mathematical concepts and the language used.

Students in the second subgroup preferred to rely on a formula or a key word rather than the conceptual language to solve mathematical problems. Students in this group liked problems with figures or pictures because they thought they would easily figure out the answer with the use of

such visual aids. Similarly, if students refreshed their memories from previous problems or the daily connection, then they could use the work on previous problems to help solve other mathematical problems.

At the university, the instructor of technical writing for ELLs volunteered her class for my survey. The English technical writing class of 18 students included 27 percent juniors, 68 percent seniors, 89 percent had finished high school in their home countries, 22 percent had finished high school in USA, and 94 percent had been in USA more than three years. The data analysis of this group focused on two common themes: students' attitudes about studying mathematics and students' views about solving mathematical problems.

For the first group, the data revealed three main outcomes. The first stated that students robotically thought of mathematics as numbers. The second showed that students had to understand a problem before they applied a formula. The third confirmed that mathematical vocabulary will caused students' difficulty even at the higher levels of English proficiency. Since the students at the university were seniors and juniors, they had more experiences using English. In other words these findings were consistent with the notion that students use their competence in English to establish their ability to match the language used and the mathematical concept, then translate the mathematical language to the formula and were therefore are capable of applying the language used rather than simply rely on the use of the formula.

More in depth data about attitudes toward mathematics was collected from a small focus group. Three volunteer males were recruited from the algebra students at the community college. The participant was a freshman from Africa. He has been living in the USA for two and half years. He finished high school in his home country. The second member was a freshman from Asia. He came to the USA at about the age of five, but he did not start kindergarten until the age of eight. He finished elementary and high school in the USA. The third participant was a freshman from Africa. He came to the USA eight years ago with –no English or education in his home country. He started the first day in school at the age of eleven and by skipping several grades graduated from high school in 2004 in Southern California.

Two prominent themes emerged from the analysis of the video-taped focused group discussion. The students who had both native written and spoken language backgrounds fell into a habit of translating into his native language to understand the problems. They would break the main problem into sub-problems, use the dictionary for the new vocabulary, and connect this to daily activities to increase their comprehension. On the other hand, the students who had only spoken native language backgrounds got used to relying on the formula and English vocabulary to understand the mathematical problems. These students often looked for support in a physical model that linked to previous learning to decode mathematical problems. Mover, they used a hint or clue as a compass for determining the direction of their work.

DISCUSSION

In summary, freshmen ELLs are likely to use an illustration or decipherment as a suitable groundwork to support their education. On the other hand, the post baccalaureate students were more proficient with academic language and relied on this understanding to achieve mathematically and in English.

ELLs who have only spoken native language backgrounds are likely to use physical models, previous lessons, or symbols to find direction when solving mathematical problems. In contrast, students who have both spoken and written native language, have more resources to support their education. They are likely to use a dictionary or translate problems into an assemblage of their native language. Obviously, native language could be an alternative connection to help ELLs in learning academic language proficiency (see Teachers of English to Speakers of Other Languages, 1997). Hence, educators need to pay attention to students' language background in order to help students in their learning process.

The final stage of data analysis was to look for commonalities and differences between all of the participants in the two survey groups and the focus group. Four common themes emerged from this analysis: 1) Students consider mathematics as numbers, formulas, and notations; 2) daily activities can help study mathematics and learn English; 3) the meaning of the mathematical concept and the English language has no connection for the students; 4) students rely on a physical model to understand the meaning of the mathematical concept or English vocabulary. Each theme is discussed below.

1. *Students consider mathematics as numbers formulas and notations.*

It became evident that students' thought mathematics involved only numbers, symbols and formulas. The survey at the community college students' showed that 50 percent had the right answer on the formula question. In the process of solving mathematical problems, students obviously needed to operate with numbers for some steps in the problem solving process, such as computing number, applying formulas, and understanding symbols in order to find the answer. However, students always focus on the application of the formulas, numbers, or notations as a result of the traditional method teaching rather than the application of the meaning of the mathematical concepts. Thus, students often have this narrow, limited impression of how they should study mathematics and that they think the word "Mathematics" connotes only numbers, formulas, or notations.

For example, the African participant in the focus study group said that "mathematics is number…" when he was asked about the connection between mathematics and the English language. The Asian focus group member revealed his strategy in solving mathematical problems: "I like to go by formula because I mean mathematics is about formula."

2. *Daily activities can help studying by mathematics and learning English.*

Some participants of the focus group eagerly said, "Math is what we do everyday like daily life…" or "I learn my math through similar daily life…" These statements show that some students recognize that their daily activities can be expressed in mathematical terms. For example, one can state the equation between two units (5 cents equals one dime) to explain the connection between two things (two shirts are similar), or to classify the object (same size and same color) (see Dossey et al., 2002). Students also realized that through requesting information, explaining actions, participating group study, or expressing needs in their daily activities helps them learn English (see Teachers of English to Speakers of Other Languages, 1997).

3. *The meaning of the mathematical concept and the English language has no connection.*

According to Dossey (2002), students must be proficient at using and interpreting multiple representations to be able to model mathematical situations. This requires conceptual understanding and the ability to translate and communicate connections. These data show that most students' regarded mathematics as symbols and English language as words. They did not see any connection between the two. However, symbols are a short hand representation of the mathematical concept and should contribute to students' comprehension through the meaning of the mathematical concept. However, students must interpret the symbols by using English language in order to develop conceptual understanding. For example, the notation "+" is represented for the concept of addition. The notation "+" would be the meaning of plus, increase, sum, or some, depending on what situation within which the term is embedded. As soon as students understand the meaning of the concept of addition, they will be able to apply this concept in more situations through the use of English. In other words, students will be able to

view, describe and represent the mathematical concept through variety aspects once they capture the meaning of the mathematical concept.

4. *Students rely on a physical model to understand the meaning of the mathematical concept or English vocabulary.*

The ELLs in my study were more successful solving problems when they used visual representations. The use of a physical model allowed students to understand what they saw and explain what they comprehended. Reliance on a physical model gave the students an opportunity to contribute to their understanding of the meaning of the mathematical concepts or English vocabulary because they could deduce meaning from the picture. Thus, ELLs appear to be visual learners. It is unclear whether this is their preferred learning style or whether it was developed to avoid difficulties with the language. The literature suggests that visual learners are more inclined to draw or describe their work using a physical object or mental picture. Through these physical representations, they develop their comprehensions and are able to process their assignments (Dossey et al., 2002). Students should make their own method of learning so that they can feel more comfortable for their academic achievements (Dossey et al., 2002).

CONCLUSIONS

This research reveals that ELLs consider mathematics as formulas, numbers and notations. It is not incorrect to think of mathematics in this manner. However, it limits the ability of students to apply mathematics in different situations. When students see mathematics as numbers, they forget that numbers can be understood as a collective word of a group of persons or objects as well. People can use these words, such as flock, herd, drove, pack, gang, or brood, to denote a number of animals, birds, or fish, without naming specific digits. For example, instead of saying four elephants, people can say the herd of elephants. This shows that mathematics is not only numbers, but that an understanding of English language can expand a person's uses of mathematics.

In mathematics, formulas are typically written by symbols to state a logical relation between mathematical concepts. When students use them, they focus on substituting numbers into formulas without considering that the mathematical concepts can be expressed in verbal from as well. Recall the example of the rectangular perimeter in which:

$$P = 2(L + W)$$

Where P is a perimeter of rectangle, L is a length of rectangle, and W is a width of rectangle. This can be understood as the total length around a rectangle. Students are more familiar with questions that ask them to find the perimeter of a rectangular than a length around a rectangle. This traditional approach contributes to students thinking mechanically that mathematics is formulas rather turn concepts represented verbally.

Students who equate mathematics with numbers, formulas or notations have a general misunderstanding of numerical concepts. The reason for this is because students with an ability to perform well with numbers do not necessarily arrive at the correct answers or understand the conceptual meaning of behind mathematical concepts. Moreover, students who show that they can use formulas fluently do not prove that they would know appropriate situations in which to use formulas. For example, on the verbal problem in the survey question, 42.3 percent of the students correctly used the area rectangular formula to find the rectangular perimeter. This is evidence of students using inappropriate formula and obtaining the wrong final answer. ???

It was initially assumed that the meaning of a mathematical concept would be the main factor that would allow ELLs to move between studying mathematics, learning English, and connecting

mathematics to daily life. In the following figure (see Figure 1), the solid lines show the anticipated ELL pattern:

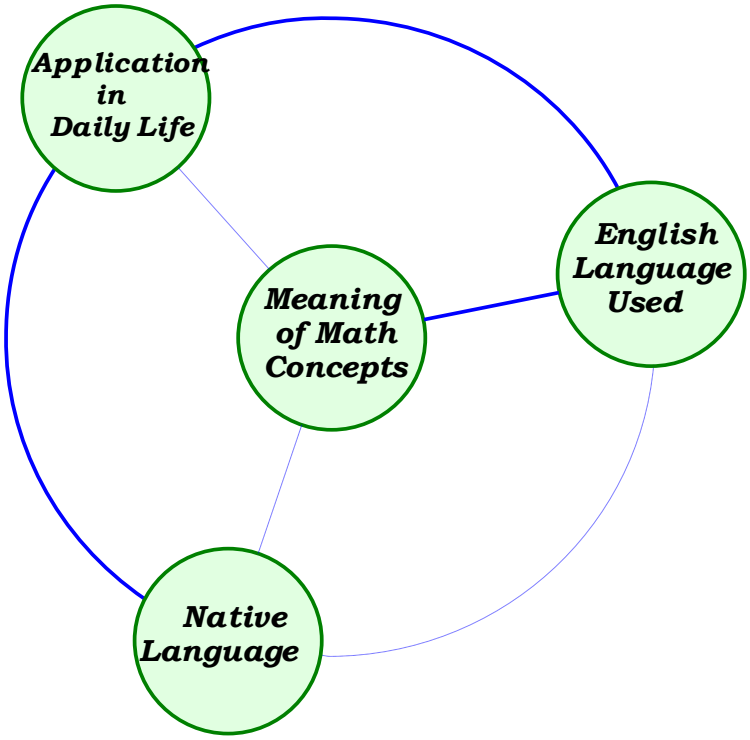


Figure 1: Hypothetical relationships among the study variables

Given the students' attitudes and statements about what they rely on when solving mathematics problems, it is evident that for some ELLs the meaning of mathematical concepts was not a tool they relied on. This suggests that the meaning of mathematical concept and native language should be switched. Thus, the native language becomes an option that may or not be used. Two groups did not rely on their native language. Those with high level of English proficiency did not necessarily need to use their native language. The other group was comprised of students who lacked a formal education in their own country. Because these two groups do not rely on their native language and the fact that most of the ELLs did not rely on the meaning of mathematical concepts the relationships identified in Figure 2 are suggested:

If students have low levels of English proficiency, they cannot make the circular relationship between the meaning of the mathematical concept, their daily activities and the language used without using the native language or a physical model. They did well only if they had a formula. These students have the option of moving between items in the outer ring of the diagram if they rely upon their Native language.

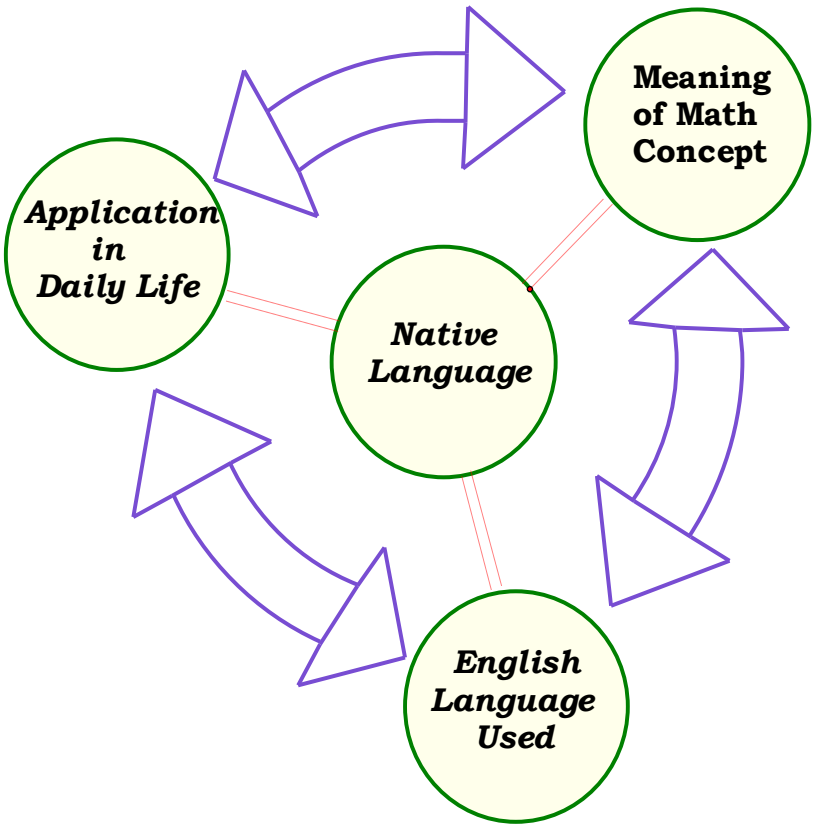


Figure 2: Empirically based relationships among the study variables

In the meantime, students with a high level of English proficiency could make the circle work without relying on their native language. They rely on the meaning of the mathematical concept given through the language used or a physical model.

Mathematics is more than formula to be memorized. If connections are made between the meaning of a mathematical concept and daily activities then more mathematical problems can be solved and more English vocabulary may be learned. By using a physical model, the native language, or using higher English proficiency as a bridge, students can make the circle work to improve their ability and understanding of both mathematics and English.

LIMITATIONS AND FUTURE RESEARCH

There were several limitations to my research. Timing was a big issue that resulted in less data being collected than initially anticipated. Location was another limitation because it was not easy to find a suitable room to videotape the focus group. Further, I did not have time to develop rapport with the students before the focus study group. As a result they may have felt shy about sharing their experiences of studying mathematics and learning English. Similarly, I did not have

time to consult with the algebra teachers about the content of the classes the students were taking. Thus, there were some math questions on the survey students were not able to answer.

In the future, I would like to encourage female students to participate in a focus study group, use more physical models in posing mathematics problems, and discuss the mathematical background of the students before handing out the mathematical problems. In addition, it would be useful to investigate how teachers can use the connection with daily life and visualization to help students understand the meaning of mathematical concepts and move away from a reliance on formulas when teaching mathematics.

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THE TRIATHLON OF ROLES: THE MYTH OF THE BLACK SUPERWOMAN

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ABSTRACT

Historical and societal barriers of racism and poverty, which contributed to the separation of the African American nuclear family, have required African American women to be overtly strong, confident and nurturing all at once. African American periodicals such as Ebony, Essence, and Jet were created to combat historical stereotypes and encourage African Americans to combat stereotypes through individual success in order to move beyond the stereotypes connected with second-class citizenry. The desire to combat stereotypes has led to the exposure of African American women to the expectation that they must become superwomen who maintain career and family with little to no assistance.

INTRODUCTION

"Black mothers work, end of story. It's a backhanded gift from American history, left over from slavery and the Jim Crow laws that made it illegal for a Black woman to stay at home and not toil as a sharecropper alongside the rest of her family." This statement by author Lonnae O'Neal Parker (2005: 21) epitomizes the fact that it is taken for granted by American society that African American women can be everything at once.

This paper attempts to answer questions concerning how minority women balance their relationships, careers and families. We address the question: How are the messages presented to African American women concerning family, relationships and careers different from messages presented to African American men?

In the past, the depiction of Black women in various media has been studied with an emphasis on Black women portrayed as sexual objects. Studies on the pressures confronted by African American women in the business world have also been conducted. Missing are studies that examine how the image of a Black superwoman is portrayed to African American women, and how this message compares to messages presented to African American men. The purpose of this study is to determine whether the pressures to succeed in all areas of life are presented equally to both sexes in the African American community.

REVIEW OF LITERATURE

Numerous studies focus on the multiple roles of women within the household (Pleck, 1977; Kruger, 1998a.). There is a general consensus among scholars that an inequitable distribution of duties has been the norm in American households, with the brunt of household labor and childcare traditionally being defined as the responsibility of women. In an era preceded by Women's Liberation and the mass entrance of America women into the workforce, scholars have reexamined this issue.

In general, research has found that although there has been a slow progression towards a more equal system, the traditional division of household labor still exists. However, there has been less research on the effect of this traditional mindset on women who, historically speaking, have been active in the workforce. In particular, there has been little research on African American women who have consistently worked outside of the home since their entrance into the Americas, and the role this traditional mindset has played in communities that encourage financial independence, and social and cultural uplift.

Messages of personal uplift and the expectation that individuals contribute to uplifting the Black community in general, can be found championed in respected African American periodicals. This study investigates the idea of a Black Superwoman and the expectation that African American women become "superwomen" within the African American community is portrayed in African American periodicals.

African American Family Structure

It is believed by some researchers that African American families are traditionally matrilineal. This family structure is considered a cultural trait rooted in West African culture. Family traditions in Western Africa served as the model for family life during the period of slavery in America (Franklin and Moss, 1988). In West Africa, ties to a common female ancestor bound members of a clan to one another. The family lives of Africans brought to the American colonies as slaves retained some of the same qualities particularly the matriarchal focus (Gutman, 1977; Franklin and Moss, 1988).

The contemporary matrilineal structure of Black communities is not solely a function of African culture. Historical and cultural influences such as: racism, urbanization, migration, discrimination, segregation, and immigration have profoundly shaped contemporary African-American family systems (Gutman, 1977). According to Franklin and Moss (1988): "Undermining and replacing family structures with temporary relationships built around self-identity as slaves had a significant historical contribution to the current structure of many Black families." It is important to make clear that the unmarriageable status of a large portion of African American men is due in a large part to poverty, incarceration, and disenfranchisement, and that these are important factors accounting for the number of single-parent households in America (Tucker and Mitchell-Kernan, 1995). In 2004, according to the U.S. Census Bureau, more than half (54.6 percent) of African American children were born to unwed parents. These factors contribute to the fact that African American families display about 70 different structural formations, versus about 40 among White families. The majority of Black family structures are matrilineal in nature. As a result, according to Nicholson (2002), it is not uncommon for African American families to practice "multiple mothering."

"Multiple mothers" refers to grandmothers, aunts, cousins, close friends, or people considered "kin" to a child's mother (Boyd-Franklin, 2003). They need not be biologically related. These multiple mothers provide emotional safety valves, sounding boards, and alternative role models to children while often providing their biological mothers with support in the form of child care (Boyd-Franklin, 2003).

The literature on Black families suggests that African American women may take on the task of multiple mothering because they assume or perceive a pressure to fulfill matriarchal duties (Parker, 2005). Results from a study that tracked 400 African-American women 1993 and 1999, revealed that Black women were most stressed about the fate of Black children, even those who were not their own (Chapman, 1997). "Our health seems to fare poorly, compared to other groups in the United States," said Dr. Mona Phillips, a professor in the Sociology and Anthropology Department at Spelman University, and a principal investigator in the study. "The whole nurturing role – worrying about Black children as a group – is a significant stressor among women of all ages" (Chapman, 1997).

African American women have traditionally held a more authoritative and dominant position in the family than have Caucasian women (Baker, 2005). However, the often-matriarchal Black family structure has been criticized as a weakness of Black families. For example, Lindsey (1997) argued that given the responsibilities of Black women within the family, Black men are made to feel powerless within both that context and within society.

The racially charged history of African Americans in the United States has influenced how Black women have been perceived and how they function in their roles as workers and family caregivers (Wyatt, 1997). Some argue that Black women have used tenacity and self-reliance to survive racial- and gender-oppression, which are presumed to have contributed to their need to balance work and family throughout history (Hooks, 1993; Warren, 2004).

African American Men and Women in the Workforce

Historically, African American men have had higher earnings than Caucasian women. However, by the 1980's their positions reversed. At that time earnings of White women exceeded those of Black men and this difference continues to increase. Statistically, Black women's wages have remained relatively stable and low (U.S. Department of Labor, 1993). A study by Sorensen (as cited by the U.S. Department of Labor, 1993: 13) found that in the 1980s, "[w]omen made tremendous gains in their wages relative to those of men [while] [t]he pay disparity between Blacks and Whites increased." Black women have consistently earned the lowest wages. According to the 1993 U.S. Department of Labor report, African American women earned roughly 90 percent as much per hour as White women, 80 percent of African American males and 75 percent of Caucasian males.

In 1940, Black women earned only 40 percent as much per hour as White women. Because of historically based prejudices and racism, Black women were concentrated in low-status occupations. Almost 70 percent worked as servants and farm laborers (U.S. Bureau of Labor Statistics, 2004). In contemporary society, Black women continue to be less likely than White women to work in middle- and high-status occupations such as clerical jobs, and more likely to work in low-status occupations such as factory and service jobs (U.S. Department of Labor, 1993). In 1992, the U.S. Department of Labor found that Black women compared to White women, were five times more likely to live in poverty, five times more likely to be on welfare, and three times more likely to be unemployed.

These trends have a great impact on social status of many Black families. According to a recent U.S. Bureau of Labor Statistics report (2004), married African American women have higher labor force participation rates (71 percent) than their Caucasian counterparts (54 percent). On average, Black husbands earn only two-thirds as much as White husbands (U.S. Commission on Civil Rights, 1990). Therefore, the labor market earnings of Black women make up a larger fraction of the family income than White women's.

Part of the reason for these disparities in the work force is that minority groups are still discriminated against. Black family incomes are already comparatively low and any negative effect of professional or career discrimination on their take-home pay has a particularly harmful effect on the economic status of Black women and their families (U.S. Commission on Civil Rights, 1990). Research shows that minorities are often forced to emulate White Americans in dress, speech, behavior and responses to excel in their workplace (Hooks, 1992). This emulation of a majority culture is called code switching or character changing. Code switching is the act of changing one's demeanor to diminish ethnic traits and fit in among the majority group (McClendon, 2006).

A study by Roberts (as cited by Stark, 2005) suggests that sterling credentials can be overshadowed by personal and cultural traits. Anything from a person's name, the spelling of said name, hairstyle, ethnic jewelry, animated hand gestures, and certain manicures can prevent advancement for minority professionals. This bias is especially prevalent for minorities who work

in higher paying white-collar positions. Code switching is often considered the price of promotion in a business world where white men account for 98 percent of CEOs and 95 percent of top earners in Fortune 500 companies (Gardner, 2005).

In one recent study (Joyce, 2005), 33 percent of discrimination claims reported cited that bias was involved in decisions to withhold promotion from an employee and 29 percent of the reports stated that additional pay was denied based on discrimination. In a working environment, such realities can have an effect on the mental state of minorities combating bias (Joyce, 2005; and Leary, 2006). Psychologists have found that, in general, trying to adhere to the demands of work and life can cause considerable challenges to psychological and physical health (Barnett, 1999). Although the rates of mental health problems are higher than average for African Americans because of psychological factors that result directly from their experience as Africans Americans, e.g. racism, cultural alienation, and violence and sexual exploitation, there is evidence that African American women acutely feel this stress (Leary, 2006). The depression rate among African American women is estimated to be almost 50 percent higher than that of Caucasian women (Leary, 2006).

Historically, African American women may be portrayed as a monument of strength and determination. They have had to balance multiple roles such as wife, mother, caregiver and breadwinner, while simultaneously having to hurdle the barriers of race, class and gender (Hewlett and West, 2002). Coping with roles of a paid-worker and primary family caregiver is central to the African American woman's historical experience (Warren, 2004). It has become an expectation that African American women learn to juggle traditional roles in addition to any modern roles undertaken.

Portrayals of the Perfect Family

In contemporary American society, a man and a woman are more likely to share the responsibility of providing financially for their household. The division of labor, concerning the family and the household duties, is limited by nostalgic family ideals and gender stereotypes. The basic assumption that the role of caregiver to the family is a role assigned to women remains.

Women are required to expand their individual roles to encompass motherhood and primary caregiver while men are not required to make expansive changes to their individuality when they become a parent (Kruger, 1998b). The expansion of their individuality causes women to feel pressure to meet the expectations the ideal worker (Williams, 2000). This pressure increases with women outside of the middle class who cannot afford to work part-time or ease their minds concerning childcare with professional in-home childcare. The pressure is especially acute among women who do not have the perceived support that is derived from being married and in the middle to upper social class (Williams, 2000).

These limited perspectives of family and the role of women are influenced by media (Hogarth, 1995). Even with the modernization of the woman's role in society, gender roles are still defined, according to Wark (2002) by traditional propaganda. The spread of technology has exasperated the traditional beliefs of the "Victorian era" (Wark, 2002). Television depicted the archetype white-bread wholesome American family in such shows as "Father Knows Best," "Leave It to Beaver" and "The Adventures of Ozzie and Harriet." The father would leave the house in his suit and tie to go earn a living, leaving the mother in her dress and pearl necklace to supervise the youngsters (Kennedy, 2003). Television families of the 1950s and 1960s were not a reflection of the American family, but established the notion of what a perfect American family should be (Jayson, 2006).

In the 1980s, "The Cosby Show" also drastically changed the content of mainstream television with its departure from accepted racial stereotypes. Still they represented the notion of the perfect family and succeeded in bringing that notion into the homes of African Americans. Critics of the show felt that the Huxtable family represented only a small minority of Black

people and failed to acknowledge the discrimination that prevented most black Americans from reaching the Huxtable's level of success (Jhally and Lewis, 1992).

Social statistics outside of television show that during the 1980s and 1990s the advances made by Black Americans during the 1960s and 1970s were in the process of reversing (Jhally and Lewis, 1992). "The Cosby Show" was viewed by some as teaching minorities to believe what was viewed as the "harmful myth of social mobility" (Jhally and Lewis, 1992). The Huxtable's were not the only African American TV family that misrepresented Black reality. Sitcoms such as "Good Times (the first season)," "Family Matters," and "My Wife and Kids" all had mothers who worked outside of the home, yet the women were never seen interacting outside of their household duties (Pilgrim, 2000). The ideal that household management and problem solving is the responsibility of women was reinforced in these television series (Hogarth, 1995). In addition to household management, the mothers also maintained careers with little to no help and no visible signs of stress. Black television families tended to follow the trend of the traditional TV family, that is, nuclear and intact middle to upper-middle class, thus ignoring the reality of contemporary family structures (Hogarth, 1995).

Portrayals of African American Women in the Media

Researchers have extensively examined gender stereotyping and the roles traditionally assigned to males and females within American society. These studies mostly focus on Caucasian women. Only a limited literature is available concerning the representation and portrayal of African American women in magazine articles. Material on the portrayal of working Black women in magazines is virtually absent. However, there have been magazine studies that investigate the representation and portrayal of ethnic or racial minorities especially in advertisements (Plous and Neptune, 1997; Baker. 2005). Prominent stereotypes that African American women are portrayed as include that of the Jezebel, in which the woman is portrayed as sexually aggressive, or that of the Aunt Jemima or Matriarch, in which the woman is portrayed as emasculating (Bowen and Schmid, 1997; Plous and Neptune 1997; Baker 2005). Ultimately both stereotypes are deviations of the passive female stereotype that pervades the American society (Plous and Neptune 1997; Baker 2005).

Most women often face the paradox of being considered domineering if they adhere to a traditionally male leadership style or not being respected if they are stereotypically warm and nurturing (Kawakami, White and Langer, 2000). Black women are doubly affected by this paradox because aggressive behavior can conjure up the negative matriarch image (Mastin and Woodard, 1999). The Black matriarch is portrayed as deviant because she challenges the assumption of the patriarchal family. This historical image of the dominant and independent Black matriarch is so pervasive that it likely affects the way that Black women are portrayed in the media and the way Black women are viewed in everyday life (Baker, 2005).

Portrayals of women in the media are important because the media are socializing forces that affect how people think about and act toward women and how women think about themselves. Socialization theories argue that "prolonged exposure to the media comes to teach us about our world and our role in it" (Harris, 1993). According to Stephen Winzenburg, a communications professor at Grand View College in Des Moines, Iowa: "People watch television and feel as if they must imitate what they see" (Kennedy, 2003).

According to Jewell (1993), "[t]he Black media have been instrumental in portraying images of African American women that transcend socioeconomic class." However, the extent to which Black media outlets have succeeded at portraying positive images of Black women is unclear. Early magazines aimed at increasing pride in their achievements among African-Americans by portraying the Black American experience (Johnson, 2006). Today African American magazines continue to combat racial stereotypes in the same manner, but instead of racial stereotypes, gender stereotypes significant to the African American culture are being produced. African

American women are portrayed as powerful beings that are able to accomplish a multitude of tasks without the need or expectation of help. Mastin and Woodard note "that editors and writers might struggle to separate the positive and negative characteristics of being a matriarch" (1999). In an effort to present positive images, negative stereotypes are being perpetuated.

Portrayals of African American Men in the Media

In the United States, representations of Black masculinity are historically structured by and against dominant ideals of masculinity and race (Harper, 1996). While this can be partially attributed to the role of African American men in American history, more recently, the social dynamics of the Black urban life have been a contributing factor (Booker, 1997). Traditionally, the Black man lacked authority over his family and could not control the destinies of either his wife or his children, making a patriarchal role virtually impossible (Wallace, 1990). To reinforce the message of a powerless Black man, historical media often presented the African American man as lazy and child-like (Wallace, 1990).

At the turn of the century and during the Anti-Bellum Slavery era, the Black man began to be portrayed as a threat to White society at large. Early forms of entertainment such as film and vaudeville shows propagandized the Buck image (Denzin, 1998; Robinson, 1997). For instance, in 1915, D.W. Griffith's film *Birth of a Nation* (adapted from the book, *The Clansman*) depicts the bestial Black rapist in pursuit of virginal White women (Robinson, 1997). Instead of succumbing to the Black man, women would rather throw themselves off of a cliff to their death (Robinson, 1997).

This image was later restored and reinforced within the African American community through the "Blaxploitation" of the 1960s and 1970s. Black cinema brought aggressive, anti-White African American males into theatres. Some of the prominent Black heroes fit the "Buck" caricature (Pilgrim, 2000). The private detective in Shaft (1971) and the pimp in Superfly (1972) are examples of men characterized by and exalted for their sexual prowess (Pilgrim, 2000). Wallace (1990) described the Buck in the following way: "he is the personification of the Black threat to White womanhood and, more importantly, to White male dominance."

Similar to the Buck, the image of the Black Brute also characterized Black males' masculinity following Emancipation. The Brute was also depicted as a threat to Caucasian women (Bogle, 2001). However, the Brute was often depicted with weapons (Marchioro, 2001). The Brute illustrated that Black males were unable to be trusted and could become violent at the slightest provocation (Dines, 1998; Hoberman, 2000). Propagation of this aggressive image of Black males justified the violence of mob action and lynchings that were imposed upon them as the emancipated Black labor force threatened White jobs (Dines, 1998).

In the 1980s and 1990s, the Brute became nameless and sometimes faceless. He committed senseless crimes as he robbed, raped, and murdered (Pilgrim, 2000). Often he was a gangbanger; sometimes he was a dope fiend (Bogle, 2001). Television shows like *Law and Order, Homicide: Life on the Streets, ER,* and *NYPD Blue* perpetuated the nameless Black Brutes that assaulted, maimed, and killed (Pilgrim, 2000).

It is the Black Buck and the Black Brute who perpetuated the image of African American men who engaged in sexual activity without responsibility for health, safety or possible offspring (Hooks, 2004). It is undeniable that 54.6 percent of African American children were born into homes where the parents were not married (U.S. Census Bureau). The absence of Black fathers has been accepted as characteristic of the African American community even though the number of African American children living in two-parent, married couple homes rose from 34.8 in 1995 to 38.9 percent in 2005 (Aird, 2003). This is also evidenced by how little research can be found on Black fathers except to study their absence. According to Hutchison (2000): "The media in American society has wrapped its tight cloak of invisibility around Black fatherhood when, in

fact, many are still present." Even Black publications such as *Essence, Ebony*, and *Jet* have only occasionally published articles on Black fathers (Hutchinson, 2000).

The Role of Ebony, Essence and Jet Magazines in African American Community

Because they have been in existence for decades, when most people think of African American magazines, *Ebony*, *Essence* and *Jet* come to mind. *Jet*, the nation's leading Black newsweekly, started in 1951. *Ebony*, the number one Black magazine in the world, began publication in 1945 and has reached an iconic status (Jefferson, 2004). Readership for Black magazines abounds and is still growing. Today, 36 million African Americans comprise 13 percent of the total U.S. population. Furthermore, 84 percent of Black adults are magazine readers reading on average 13.3 issues per month compared to just 9.7 issues per month for all U.S. adults (see, Smith, 2004).

Magazines that target African Americans are in a unique position of influence. African American consumers trust the information disseminated to them by the African American media. The Black-owned magazines are trusted more than any other Black medium. According to a study by Ketchum in Public Relations Worldwide (PR News, 1998), 87 percent of African Americans trust the information content of Black-owned magazines, Black TV news and newspapers (80 percent), and Black radio, (77 percent). The messages portrayed through these publications are most likely to be accepted as truth. Therefore articles within these three prominent magazines that champion the message that African American women are or should be Black Superwoman are not only likely to be believed, but the characteristics of a superwoman are also likely to be established as a measures of success.

RESEARCH QUESTIONS

This study focuses on the following research questions:

1. How is family and work discussed in African American magazines?
2. How are the messages presented in print media to African American women concerning family, relationships, and careers different from the messages presented to African American men concerning the same subjects?
3. What terminology is used in order to support the message and image of a Black Superwoman stereotype?

METHODOLOGY

Content Analysis: A content analysis is a detailed and systematic examination of contents of a particular body of material for the purposes of identifying patterns, themes or biases. Content are usually performed on forms of human communication, including but not limited to: books, newspapers, periodicals, films and television (Leedy, 1996). This study used content analysis to examine how popular African American periodicals portray African American women as superwomen. African American women are pressured to fulfill the roles of financially independent career professional, romantic partner and mother. To understand how African American periodicals have influenced this pressure the researcher collected relevant articles from established (based on longevity) Black-targeted magazines. The time period was from1995- 2005.

A total of three periodicals were selected based on initial publication date and circulation size as reported by the individual magazines. The periodicals that were included in the sample are *Ebony, Essence,* and *Jet* magazines.

Content analysis was used to investigate a sample of magazine articles published in Ebony, Essence and Jet. The sample from these publications was appropriate based on their target

audience circulation. These three magazines are some of the oldest African American publications to date and hold significant influence in the African American community. Ebony was first published in 1945 and Jet magazine has been in publication since 1951(Johnson Publishing Co.). Essence magazine came into fruition in 1970 (Time Inc.). They are the most circulated African American magazines in the country. *Ebony*, *Essence*, and *Jet* have a paid circulation of 1.7 million, 1 million, and approximately 900,000 respectively (Trumbell, 2005). An estimated 12 million people a month read these publications, according to its family-owned producer Johnson Publishing Co. Samples of the magazine article content included references to career, family and romantic relationship. Career was defined as an occupation, profession, or hourly-wage employment that enables the holder to gain financially from the work produced from the position.

Not all of the individuals in the article needed to possess these characteristics, but it was evident that the journalist(s) had made the assumption that a career, family and relationship were at least goals for the individuals or for the target audience.

Sample: Three magazines were used in this study were chosen based on their prominence. Prominence was based on longevity in Black media and readership statistics. The three magazines are described below:

In November, 1945, *Ebony* magazine was established as the first African American magazine. It is the number one African-American magazine in the world. *Ebony* has more features on Black women, men, teens, children and families than any other. It was founded to offer new hope and positive images in a world that showed few positive images of African-Americans.

Jet magazine is the sister magazine to *Ebony*. It is the number one African American newsweekly in the world and was first published in November 1951. *Jet* is written for an African-American audience and focuses on news and features that fuse Black history and contemporary living.

Essence magazine began publication in May, 1970. *Essence* provides reporting and services on every aspect of the lives of African-Americans. *Essence* magazine covers such topics as health, career, contemporary living, and family concerns as well as fashion, beauty and fitness.

Fourteen combinations of key terms were entered into the "Proquest" search engine to generate a sample of articles published during the identified time period. Articles were selected based on the categorization of articles by the publication. The key terms used focused on Career and Family. Using "African American" (and any other term to describe African Americans) as a prefix, the key terms were: "women," "men," "career women," "working mothers," "mothers," "fathers," "children," "families," "relationships," and "marriages."

Only articles categorized as Career and Family were selected for this study. To ensure congruency these articles were coded by two coders using a coding sheet tested for inter-coder reliability. The coding sheet also examined marital status, parenting, career status and lexis that identified power, totality, distress, management and words of pressure.

Measures: The measures reflect the descriptive elements defined as characteristic of a superhuman. Inter-coder reliability was determined by employing Scott's Pi, which in communication studies is the accepted standard for inter-coder reliability for nominal data. Scott's Pi deducts the level of "observed agreement" by the level of "expected agreement" due to chance. The minimum level of acceptability for Scott's Pi is p= .75. The reliability for this study ranged from .70-1.0.

Article Category

Career- A career article category includes articles that focus on job related or professional endeavors (Scott's pi = .93).

Family- A family article category consists of articles that focus on issues related to family, children, parenting and marriage (Scott's pi = 1.0).

Relationships- A relationship category includes articles that focus on issues related to dating (Scott's pi = 1.0).

Other- Any article that does not have a subject that falls into the above categories. These articles include letters to the editor (Scott's pi = 1.0).

Article Type

Feature- A feature article focuses on a specific individual or individuals as the main subject of the article. The purpose is to portray the details of a personality or some facet of the subject's life. The person may be well known, but it is not a requirement of the article to be classified as a feature (Scott's pi = .93).

General- An article labeled "general' would not qualify as any of the other article types, but is still considered relevant to the study (Scott's pi = .93).

Instructional- An instructional article is an article that informs readers on how to accomplish a specific task. These articles are often, but not solely referred to as "How to" articles or labeled "advice columns." They can also be identified as step- by- step articles or educational articles (Scott's pi = 1.0).

Editorial- An editorial is qualified as a commentary that focuses on a subject relevant to the study. The editorial may have references to the life of the editor or author of the commentary. An editorial is often written in first person (Scott's pi = 1.0).

Subjects

Subjects Topics- The primary topic the article refers to the categories of marriage, family, career, finances, household, health or other (Scott's pi = .86).

Secondary Topic- An additional subject matter that the article refers to frequently, but is not the primary focus of the article (Scott's pi = .75)

Marital Status

Marriage- Includes any mention or reference to marriage or committed partnerships or lack thereof (Scott's pi = 1.0).

Parenting Status

Parenting- Any mention of the care giving of a dependent child (Scott's pi = 1.0).

Parenting mentioned positively- References to parenting or children that speak of happiness, joy or fulfillment (Scott's pi = .89).

Fatherhood mentioned positively- References to a male who is caring for dependent children that speak of enjoyment and/or fulfillment in this role (Scott's pi = .74).

Motherhood mentioned positively- References to a female who is caring for dependent children that speak of enjoyment and/or fulfillment in this role (Scott's pi = .89).

Childcare- The everyday rearing of a child, such as feeding, transportation, dressing or discipline (Scott's pi = 1.0).

Primary Caregiver- The individual who undertakes a majority of the day-to-day tasks, responsibilities and needs of a household (Scott's pi = .70)

Helper- A person who does not take responsibility for the primary care of the children, but rather assists (Scott's pi = 1.0)

Sacrifice

Sacrifice- Any incident that required one of the partners to relinquish or even retain element for the good of the family unit, career or self (Scott's pi = 1.0).

Sacrifice (by gender) - Statements that indicate which person in a partnership sacrificed based on gender (Scott's pi = .95)

Career

Career- Terms that refer to jobs or careers outside of advancement. (Scott's pi =.93).

Male Career- A reference to the employment status or career field of a male individual (Scott's pi = 1.0).

Female Career- A reference to the employment status or career field of a male individual (Scott's pi = 1.0).

Blue Collar- A work position in which workers earn an hourly wage and/or perform manual labor. Some form of manual labor must be apart of the job in order to be "blue collar" (Scott's pi = 1.0).

White Collar- A work position that includes a supervisory role. Jobs that do not fall under the category of 'blue collar' will be considered 'white collar' (Scott's pi = 1.0).

Rhetoric

Words of Power- Words of power include any words or terms that allude to strength or prowess of some kind (Scott's pi = .89)

Words of Totality- Words of totality include any words or terms that refer to an all encompassing success (Scott's pi = .1.0)

Words of Distress- Mention of hardship as a result of parenting, family, career or relationships (Scott's pi = .82)

Words of Management- Any reference to balancing more than one activity or time management of several activities (Scott's pi = .82)

RESULTS

A total of 77 articles published between 1995 and 2005 were analyzed. Each article focused on career and family in African American homes and related topics. The mean article length was 1,262 words, which is significantly shorter than average 2,000 word length in the magazine industry. A majority of the articles (45.5 percent, n= 35) were categorized as Career-articles. The magazines' classification of the articles differed from the categorization of the articles by the coders. The articles were categorized based on the main subject topic of the articles' content (see Figure 1). Although the magazines categorized almost half of the articles as Career- articles, the expert coders identified 58 percent (n= 45) of the articles a Family-articles. A third (30 percent, n= 23) of the articles were coded as Career-articles.

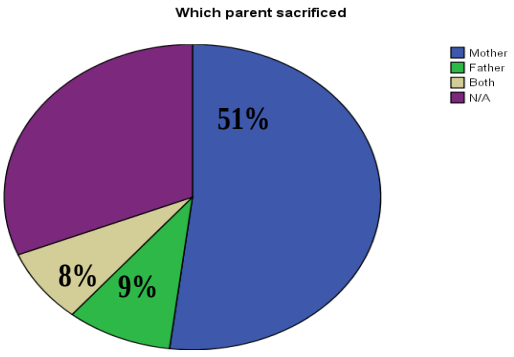

Figure 1 Percentage of parents who sacrificed based on gender

***Career and Family*:** The articles sampled presented a skewed version of the realities of the African American family structure. Almost 90 percent (n= 69) of the articles mentioned the marital status of the individuals featured in the articles. Seventy percent (n= 46) of those were listed as married. This number contradicts the reality of marital status within African American community. A 2004 survey by the U.S. Census Bureau reported that more than 50 percent of African American children were born to unwed parents. In this sample, 14 percent (n= 11) of the participants were single and 13 percent (n= 10) were divorced (see Table 1). Thus, the descriptive features of the articles did not reflect the African American community. This can be explained by the mission of the periodicals, that is, to present images of positive and upwardly mobile individuals to their mass audiences.

Parenting was mentioned in 97 percent (n= 75) of the articles. This was expected considering the criteria for article selection centered on the combination of career and family. Half of the references to parenting were positive (49 percent, n= 38). Individuals quoted in the articles made an equal number of negative and neutral references about parenting (23 percent, n= 18). Motherhood was generally mentioned positively (38 percent, n= 29), as was fatherhood (35 percent, n= 27). However, motherhood was mentioned negatively twice (18 percent, n= 14) as often as fatherhood (9 percent, n= 7).

Table 1. Frequency of Social Class Elements Presented vs. Real World Elements (N= 77)

Social Class Elements	Frequency (%)	Real World	Frequency (%)
Marriage Status			
Single	14	Single*	44
Divorced	13	Divorced	11
Married	60	Married	32
Partnered	1	Partnered	n/a
Career Status			
Male- White Collar	50	Male- White Collar	40
Male- Blue Collar	3	Male- Blue Collar	60
Female- White Collar	60	Female- White Collar	63
Female- Blue Collar	3	Female- Blue Collar	37
Supervisor Role			
Male	9	Male	22
Female	15	Female	31
Both	9	N/A	

* The US Census Bureau denotes single as one who has never married.
(U.S Census Bureau, 2004 a and b).

The Role of the Mother. The mothers represented in the sample were required to function in many roles. Childcare and childcare activities were mentioned in 50 articles (65 percent). In most of the articles, mothers served as the primary childcare providers (44 percent, n= 34). In contrast, fathers were listed as the primary childcare providers in only five (6.5 percent) of the articles. This number was just slightly higher than individuals listed as "other" primary caregivers (4 percent, n= 3). Less than one-tenth of the articles referenced both parents as the primary caregiver. In addition to being the primary caregiver of the home and its dependents, females more often than men held a supervisory role in their workplace (19.5 percent, n= 15; vs. 12 percent, n= 9). A third of the mothers (33 percent, n=5) who were supervisors in their workplaces were also the primary caregiver in their home. None of the husbands whose wives were supervisors were listed

as the sole primary caregiver. Rather, they shared the duty of primary caregiver with the mother (n= 3) or they were helpers (n= 3).

The Role of the Father. Fathers were frequently referred to as a helper in terms of childcare (21 percent, n= 16). Other individuals who were not considered a father or a mother of the children discussed, were cited as helpers more than were actual fathers (22 percent, n= 17). More than half of the articles (55 percent, n= 42) made no mention of any helper, inferring that the mother managed the duties of primary caregiver, career woman, and sometimes supervisor on her own, even though a large majority of the mothers in the articles were married. Marriage was not viewed as a factor in diminishing stress. Married individuals used terminology that indicated stress in high numbers (74 percent, n= 34). Interestingly, mothers reported the largest number of sacrifices (52 percent, n= 40).

Sixty-nine percent (n= 53) of the articles mentioned sacrifice. Seventy-five percent (n= 40) of those sacrifices were mentioned by the women. The most documented sacrifices could be classified as: career for the family (18 percent, n= 14); family for a career (17 percent, n= 13); and, personal time (19.5 percent, n= 15). Other sacrifices mentioned were health, romance, and a sense of general sacrifice.

Superwoman Semantics. This study tracked five categories of terminology that helped gauge the general disposition of those who were interviewed. The five categories included words of power (56 percent, n= 43), totality (52 percent, n= 40), distress (80.5 percent, n= 62), management (59 percent, n= 45), and pressure (57 percent, n= 44).

The most prevalent expressions of power (or its synonyms) denoted a level of success in a hierarchal manner (19.5 percent, n= 15) and/or denoted an individual as being superhuman in some way, shape or form (18 percent, n= 14). A smaller, but still significant number (14 percent, n= 11) referred to an individual in terms of their accomplishments. Thirty-eight percent (n= 29) of these statements were in reference to a female.

Words of totality include those that referred to the idea of achieving every level of happiness. Words of totality were in more than half of the articles (52 percent, n= 40). The most common expressions of totality referred to the pressure or ability to "do-it-all" (13 percent, n= 10) or "have-it-all" (23 percent, n= 18). Sixteen percent of the articles relayed a general sense of totality by speaking about the individual's life as a whole. An overwhelming number of these references were made by or geared toward women (43 percent, n= 33) compared to men (4 percent, n= 3).

Terms of distress, that is, words that signified some sort of challenge or stress, far outnumbered other word categories (80.5 percent, n=62). The most prevalent language coinciding with distress included references to challenges (19.5 percent, n= 15), a declaration of demands placed on individuals (14 percent, n= 11), feelings of exhaustion (13 percent, n= 10) and feelings of stress (14 percent, n= 11). As with the other word categories the majority (53 percent, n= 41) of these comments were directed to or made by women.

The terms of management were consistent with the other categories. Almost 60 percent of the articles contained a word or words referring to management (59 percent, n= 45). Most of the words were in reference to a woman (47 percent, n= 36). This category was constructed primarily of words such as balance (25 percent, n= 19) and juggle (21 percent, n= 16), which characterize a time management struggle.

The main themes surrounding the language in the pressure category were pressure "to have it all" (10 percent, n= 8), "do it all" and "do it well" (17 percent, n= 13) and significant pressure to fulfill social expectations (23 percent, n= 18). Fifty-seven percent (n= 44) of the articles contained language that could be classified in this category. Most of the language was geared toward women in general (48 percent, n= 37).

DISCUSSION

Previous research suggests that unequal expectations are still the norm for African American women. African American women are more likely than men to be primary caregivers and they are more likely to be in a high-ranking position within their workplace. Thus it is no surprise that they admit to a higher rate of sacrifice than their male counterparts who often hold positions as helpers. The findings that African American women are often the chief individual in both home and career is also consistent with evidence that Black women are more likely than Black men to report high levels of stress. The women in the articles examined were significant contributors to their household incomes as well as the primary caregivers to dependents within their households. Many were also in demanding positions as supervisors. This triathlon of roles requires that these women take on the strain of being the primary consultant in all aspect of their lives, with little to no help.

The families depicted in Ebony, Jet, and Essence magazines are not representative of the family structures in the African American community. They do reflect the mentality that even if married a woman in the Black community must expect and is expected by others to undertake major responsibilities in several areas of her life. The superwoman message is most often presented in a positive manner that reflects an exaltation of the Black women.

As is evident from their mission statements and in an effort to combat historically negative stereotypes, Black-targeted periodicals disseminate a pressure-filled expectation that African American women are supposed to be superhuman. It appears that, in many instances, African American women are portrayed to be sacrificial in nurturing and supporting the needs of others without receiving this type of care in return. The fact that African American magazines contribute to the history and relevance of Black media we can assume that the Black Superwoman ideal has spread to other media, and by extension, that this message has been disseminated and reinforced throughout the Black community.

Further research must be conducted to fully understand the implications of these findings. The far-reaching effect of the messages noted here should be examined to determine if in fact they have spread to other media outlets that penetrate the Black community. The impact of such messages on African American women should also be explored. In addition, the effect of Black Superwoman propaganda on African American men needs to be examined to determine what it means with respect to a male presence in the African American home.

The ideal of the Black Superwoman may have a counter positive effect. The Black Superwoman concept is traditionally an exaltation of the Black woman. However, both women and their male counterparts may feel the pressure such a message promotes. This mythic representation of African American women may affect the manner in which relationships are established between African American men and women. Since many African American women are reared to be self-sufficient in their daily roles, many African American men may feel that they have little to contribute to the relationship. Therefore, some may avoid pursuing relationships with African American women. The extent to which this is true needs to be examined.

This study found that Black periodicals endorse the message of a Black Superwoman. Even in magazines that strive to publish positive images of African American individuals there is very little literature on Black men as fathers. Black mothers are often portrayed in a beyond human manner and in such articles expressed the strain that is accompanied with these expectations.

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PURIFICATION AND BIOCHEMICAL CHARACTERIZATION OF RECOMBINANT PLASTIDIAL SERINE HYDROXYMETHYLTRANSFERASE FROM ARABIDOPSIS

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ABSTRACT

Serine hydroxymethyltransferase (SHMT) catalyzes the reversible transfer of a one-carbon group from serine (Ser) to Tetrahydrofolate (THF), yielding glycine (Gly) and 5,10-CH2-THF. SHMT activity has been detected in mitochondria, plastids, and the cytosol in plants. A single plastidial SHMT has been purified and partially characterized and an SHMT from plant mitochondria has been characterized and cloned. Mammalian SHMTs in the presence of Gly also catalyze irreversible conversion of 5, 10-CH=THF to 5-CHO-THF. 5-CHO-THF is not known to be a donor of one-carbon units, but is a potent inhibitor of several enzymes, including plant mitochondrial SHMT. The sensitivity of SHMTs from other sub cellular compartments to this metabolite has never been investigated. The ability of plant SHMTs to catalyze conversion of 5, 10-CH=THF to the regulatory folate 5-CHO-THF has not been investigated either, yet 5-CHO-THF has been detected in plants. Bioinformatic evidence suggests that the Arabidopsis genome encodes seven SHMTs: two appear to be localized in mitochondria, one in plastids, two in the cytosol, and two in the nucleus. Here, we report cloning by RT-PCR functional over-expression in E. coli, purification, and initial biochemical characterization of the recombinant SHMT from Arabidopsis, which is predicted to be localized in plastids.

INTRODUCTION

Serine hydroxymethyltransferase (SHMT) (EC 2.1.2.1) catalyzes the reversible conversion of serine and tetrahydrofolate into glycine and 5,10-methylene-tetrahydrofolate (see all references from Bailey and Gregory, 2000 through Sheer, et al., 2005). This reaction is important because methylenetetrahydrofolate, a one carbon (C1) group donor, plays a central role in C1 metabolism which is involved in the synthesis of numerous compounds such as purines, thymidylate, methionine or formyl-methionine tRNA (Besson, et al., 1993). C1 metabolism has four major parts. It covers folate mediated reactions, folate independent reactions, the activated methyl cycle, and the S-methylmethionine cycle (Hanson and Roje, 2001). Serine, glycine and the metabolism of other molecules generate specific one carbon derivatives of tetrahydrofolate (THF) that are interconverted among different oxidation states. 15% of all carbon atoms assimilated from glucose are estimated to pass through the glycine-serine pathway (Bauwe and Kolukisaoglu, 2003). Figure 1 below provides an illustration involving all of the folate mediated reactions.

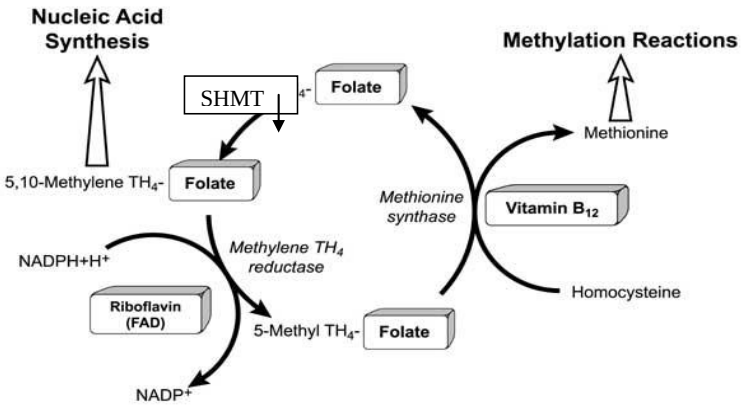

Figure 1. Illustration of folate mediated reactions. The position of SHMT is visible where it catalyzes the reversible reaction of Serine + THF↔ Glycine + 5,10-CH2-THF.

It is recognized through amino acid sequencing that SHMT does this conversion in plants, humans, fungi, and other mammals. SHMTs in all the life forms are shown to be homologous proteins related in size and proteins (Kruschwitz, et al., 1995). In mammals, the reaction tends to take place in the order of converting serine to glycine. In plants, the opposite conversion takes place when considering the operation of photorespiration (Henricson and Ericson, 1998). SHMT may be developmentally, hormonally, and nutrient availability regulated in animal and human cells (Stover, et al., 1997). SHMT itself is a tetramer of pyridoxyl-5-phosphate (PLP). In 1995, it was found to exist in three cellular compartments: mitochondria, chloroplasts, and the cytosol (Besson, et al., 1995). There are seven isoforms of SHMT, and two of these are also located in the nucleus, as shown below in Table 1. 25% of a cell's total activity is made up by SHMT chloroplastic activity (Bailey and Gregory, 2000). This study focuses on SHMT3.

Table 1. Isoforms of SHMT in the Cell and their locations.

Gene	Protein	Putative Localization
At4g37930	SHMT1	Mitochondria
At5g26780	SHMT2	Mitochondria
At4g32520	SHMT3	Chloroplast
At4g13930	SHMT4	Cytoplasm
At4g13890	SHMT5	Cytoplasm
At1g36370	SHMT6	Nucleus
At1g22020	SHMT7	Nucleus

In humans, SHMT behaves similarly. One carbon metabolism is the core of folate mediated reactions essential to nutrition. Human and animal cells need an external supply of folate (Kruschwitz, et al., 1995). If an animal or human is inadequately supplied with folate, they run the risk of several health concerns. Proper folate levels ensure the efficient function of metabolite

enzymes, such as SHMT. These enzymes then ensure the cascade of interconversions following is properly manufactured. This is why SHMT and other metabolite cofactor enzymes may influence cell growth and proliferation, and they may be targets for the development of antineoplastic agents (Bailey and Gregory, 2000). SHMT is necessary because serine provides a pivotal carbon in the cascade. Incorporation of the beta carbon of serine into DNA and SHMT activity are increased when cells are stimulated to proliferate and during the S phase of the cell cycle and SHMT activity is elevated in a variety of tumor tissues. SHMT has potential for use as a target for anti-proliferation agents (Bailey and Gregory, 2000).

Good folate intake is also needed for proper nucleic acid synthesis, and in methionine regeneration. Without it, the risk increases for certain types of chronic diseases and developmental disorders, such as neural tube defects. Also, elevated plasma homocysteines due to folate deficiency are linked with an increased risk for several types of vascular diseases, and megaloblastic anemia in the bone marrow (Bailey and Gregory, 2000).

Vitamin B-6 is another vitamin essential to good health. Human SHMT mediated one carbon metabolism can be seriously disrupted by inadequate Vitamin B-6 intake (Scjeer. Et a;/. 2005). Also, Vitamin B-12 deficiency induced by dietary manipulation shows folate coenzymes accumulate as their 5-methyl derivative at the expense of other reduced folates. This is called the methyl-trap hypothesis. It occurs because the B-12 dependent enzyme (methionine synthase) becomes inhibited due to a lack of B-12 (Taylor and Weissbach, 1965).

The objective of this study was to determine a method for the purification of recombinant, plastidial SHMT in order to biochemically characterize it. In the relevant literature, various methods existed regarding SHMT purification from original plant sources, but not for recombinant SHMT. This is important for the eventual engineering of *Arabidopsis thaliana*. Currently, flour in the United States has been fortified with Folic Acid to try and reduce folate deficiencies. Folic Acid is a synthetic compound that is converted to folate in the body. There is concern, however, that the body might process Folic Acid and natural folates differently, and such supplementation might mask Vitamin B-12 deficiencies (Bailey and Gregory, 2000). Engineered plants with increased folate content would be a good source for natural folates that could be more easily made available even to the developing world. Arabidopsis plants that over accumulate folates can potentially boost levels of proper folate intake worldwide.

METHODS AND MATERIALS

Purification

The purification of SHMT3 required several precise steps. In order to obtain a more concentrated amount of purified enzyme, four SHMT3 pellets were mechanically broken with zirconia beads in a 1x binding buffer (1x= .5M NaCl, 20mM Tris-HCl, 5mM Imidazole, pH 7.9) from Novagen. This was done in a BeadBeater machine for three minutes. 100uM Pyridoxal-5-phosphate (PLP) and 1mM Tris hydroxyproyl phosphine (THP) were added to the binding buffer and all other buffers used in order to protect the folding and activity of SHMT3. Supernatant from the mechanical breakage was extracted and centrifuged. The resulting supernatant was then incubated for five minutes with 1mL charged His Bind Resin (Novagen), 10mL 1x binding buffer, and 2uL Benzonase to reduce viscosity.

The incubated mixture underwent His Tag Purification, or immobilized metal affinity chromatography. The mixture was filtered through a small affinity column that caught the resin containing the enzyme, letting all other products flow through. Four washes were filtered through the resin; three with 22mL total 1x Binding Buffer and one with 10mL 1x Wash Buffer (1x= 0.5M NaCl, 20mM Tris-HCl, 60mM Imidazole, pH 7.9). 3mL of 1x Elution Buffer (1x= 0.5M NaCl, 20mM Tris-HCl, 1M Imidazole, pH 7.9) were added onto the column and collected in six 0.5mL fractions. The first four fractions containing SHMT3 were mixed together for a total of

2mL. These fractions underwent FPLC with a Superdex-200 column (Amersham Biosciences) equilibrated in 20mM Tris-HCl buffer, pH 7.5, with 10% glycerol, PLP and THP (Mitchell, et al., 1986).

Five fractions, 2.2mL total, eluted from the Superdex column were collected and digested with 2uL Enterokinase for one hour at room temperature. This cleaved off the histidine tag from the SHMT3. The contents of the digest were split up into four 0.438 mL fractions with 200uL charged resin and 62.5uL 8x binding buffer added to each fraction. These four fractions were then incubated on a 120rpm shaker at +8 °C for 45 minutes. The four fractions were filtered through another affinity column to be desalted, and 2mL of the flow through were saved.

The 2mL of flow through were then loaded onto the FPLC for a second run on the Superdex-200 column. The column was equilibrated in 20mM Potassium phosphate, pH 7.5, with 10% glycerol, PLP and THP. Five fractions eluted off of the Superdex column containing SHMT3 were mixed together and aliquoted into 90 tubes with 20uL each. These tubes were frozen with liquid nitrogen and stored at -80 °C. A gel was loaded with all Superdex fractions and other fractions collected during the purification to show the purified SHMT3 band.

Characterization

A Bradford assay was completed to determine protein concentration. It was conducted to the specifications of the original assay (see, Bradford, 1976). An enzyme activity assay was completed to show that the small amount of SHMT3 was active. The radioactive activity assay method used was originally produced by Taylor and Weissbach (1965; see also, Stover, et al., 1997). 14C-Serine was used to show the completion of the reaction below in the presence of SHMT:

L-Serine + Tetrahydrofolate ↔ Glycine + 5,10-Methylenetetrahydrofolate

The reaction was run for 20 minutes at 30 °C and also for 40 minutes at 30 °C.

RESULTS

As shown in Figure 2, the clean SHMT3 bands at 50kD show that the purification was a success, as evidenced by lanes 13 through 17. The single band is a clean monomer unit of SHMT3. The size of the SHMT3 bands in lanes 8-11 increased dramatically after the histidine tag was cut.

Table 2 below shows the amount of protein recovered during the various steps of the purification. These values were determined by the Bradford Assay. The final purified SHMT3 yielded 0.077mg of protein in a 2mL sample. Therefore, the final concentration of the protein purified was 38.5µg/mL.

Figure 3 below shows the results of the enzyme activity assay. The counts for the 20 minute incubated reaction had an average of 10,036 DPM, and the counts for the 40 minute incubation had an average of 16,077 DPM. This demonstrates that the amount of SHMT purified was active and had a linear time course for at least 40 minutes. When calculated, the average activity for the sample reactions incubated for 20 and 40 minutes was 457 nmol/min/mL. The specific activity was calculated with the activity and concentration. The specific activity for the purified enzyme was 11.87 mmol/min/mg.

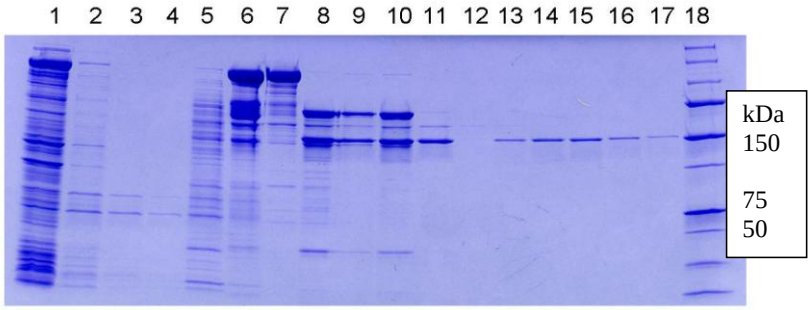

Figure 2. Purification of the recombinant AtSHMT3. 1, *E. coli* crude extract; 2,3,4, Washes with His-Tag Binding Buffer; 5, Wash with His-Tag Wash Buffer; 6, His-Tag eluate; 7, Pooled Superdex-200 fractions; 8, Enterokinase digest; 9, 10, Desalted Enterokinase digest; 11, Flowthrough after the second His-Tag purification; 12-17, Fractions after the second Superdex-200 purification; 18, Bio-Rad precision protein marker.

Table 2. Bradford results including those for the final purified SHMT3.

Sample	Absorbance@595nm	Concentration(ug/uL)	Total Yield (mg)
Superdex #1 Mix	0.937	1.163	1.163
Desalted Mix	0.643	0.758	0.758
HisTag#2 Flowthrough	0.585	0.68	0.136
Purified SHMT	0.354	0.384	0.077

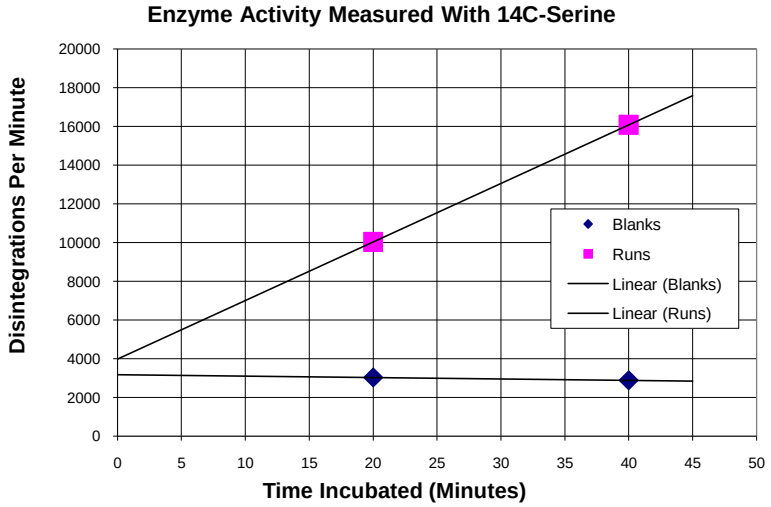

Figure 3. Results of the enzyme assay obtained on a Beckman Scintillation Analyzer. The time course is linear for 40 minutes. The blanks are the same over time, indicating the accuracy of the assay.

DISCUSSION

Serine hydroxymethyltransferase is a very stable enzyme to work with. It responded well to a lot of manipulation. The enzyme proved it could be stored at -80°C for several weeks and not lose activity. The enzyme was able to withstand the entire purification process surviving active and intact, and was functionally over-expressed. This was facilitated by the addition of PLP and THP. Also, every purification step was performed on ice, except for the Enterokinase cleavage.

FPLC made the total purification possible. Size exclusion chromatography with the Superdex-200 column was highly effective. In Figure 4 below, two Superdex runs are shown to visually illustrate the degrees of purification obtained by the column. The top run was equilibrated in Tris-HCl buffer and the bottom run was equilibrated in Potassium phosphate buffer. The amount of separation of SHMT from other cellular products was readily apparent. Superdex-200 eluted the enzyme and other associated bands out in the same fractions on every attempt and the enzyme eluted quickly from the size column. The use of this column also precisely demonstrated the size of the enzyme as being a tetramer of ~50kD per monomer (Rao and Rao, 1982). Initially, the purification was attempted with ion exchange columns, such as MonoQ and MonoS that precipitated the enzyme.

To release the protein, mechanical breakage was necessary. Initially, cells containing protein were exposed to lysing reagents, such as BugBuster (Novagen). Lysing reagents had no effect on the insoluble protein. SHMT3 was cloned in a vector with a large histidine tag with six histidine residues shown below in Figure 5.

The vector, pET 44, shows the site for the Enterokinase cleavage after the histidine tag. Due to the careful digestion and desalting, two His-Tag purifications were needed. With the purification optimized, eventually, more characterization must be done in order to complete the engineering of Arabidopsis. Michaelis Menton kinetics would make up the body of the characterization, including the determination of Km and Vmax values for the enzyme.

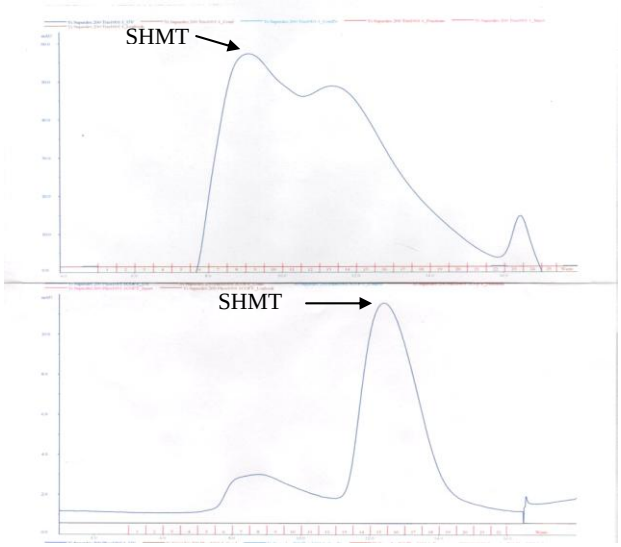

Figure 4. Top: The first Superdex-200 purification in Tris-HCl buffer. Bottom: The FinalSuperdex-200 Purification in Potassium Phosphate buffer.

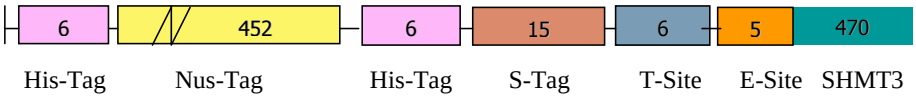

Figure 5. Schematic of the N-terminal additions to the recombinant protein, expressed in pET44. Each region is described as a box with amino acid length indicated inside the box. The 'E-Site' and 'T-site' refer, respectively, to the Enterokinase and Thrombin cleavage sites.

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INTRODUCTION OF NEW DOGS TO ESTABLISHED GROUPS IN SHELTER ENVIRONMENTS

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ABSTRACT

Many animal shelters place dogs in single-housing units to avoid the spread of disease and aggression among dogs. However, this precautionary measure may be counterproductive as some dogs residing in single-housing dwellings tend to exhibit repetitive behaviors, e.g. circling and pacing, to reduce their stress levels. Group housing, therefore, may represent a viable alternative in enabling dogs to interact and form social bonds. This study examines the effects of introducing new dogs to an existing pack to assess the level of social interaction. In both control and experimental groups, there was a higher rate of interaction of new dogs with the dominant dogs of the existing group than with the subordinate of the existing group. Additional research regarding the benefits of arranging dogs in group-housing may beckon animal shelters to modify their existing protocols in utilizing single-housing facilities.

INTRODUCTION

Most animal shelters house their dogs in single-housing to prevent spread of disease and aggression among dogs. However, as the negative effects of social restriction have become better known, the trend towards group housing has been growing. Past research has pointed to social and spatial restrictions as causing stress manifested as aggression (Beerda, et al., 1998). Wells (2003) outlines certain measures that can be taken to provide enrichment in a kennel environment, highlighting social contact with conspecifics as well as humans as the most vital source of enrichment.

Given the above, the norm of housing dogs individually in shelter environments does not fulfill their requirements for social companionship. Repetitive behaviors are observed more often in single housing, whereas high activity, social behavior and investigation are observed more often in group housing (Hubrecht et al., 1992). The repetitive behaviors associated with single housing are also related to stress levels (Beerda et al., 1998). Repetitive behaviors include such actions as circling, pacing, and continuous self-licking of an isolated area. There appear to be, then, some obvious benefits to group housing.

The dilemma for group housing lies in forming groups of dogs without encountering aggression among dogs. Larger groups of dogs develop a pack mentality and begin to function as a unit instead of individuals. Group behavior must then be addressed cautiously for the safety of the staff as well as the dogs. Wells (2000) reported a positive correlation between aggression and age, claiming that adult dogs were most likely to demonstrate aggression. Adult dogs are more likely to have established their role in a pack hierarchy and thus quicker to defend it. This usually happens around the age of 2 in wolves and is similar in domestic dogs.

A safe method for forming social groups must be identified to enable a smooth transition of a new dog into the group. This study focused on two methods of introduction and the behavioral variations observed therein. The research was conducted at the shelter of the Whitman County Humane Society located in Pullman, WA.

METHODS

Dogs were housed in indoor kennels at night between the hours of 5:30 p.m. and 8:30 a.m. There are twelve indoor kennels of 6'x4' and one of 6'x 5'. The other nine hours were spent in outdoor pens. The outdoor pen used for this study is approximately 2700 sq. ft. Dogs are for the most part kept isolated in individual outdoor pens but some are kept in groups of two to four dogs. I have made use of grouped dogs in this project.

Based on established practice, at the time of arrival at the shelter, new dogs were kept in isolation and handled three times a day for walks. After a period of seven days, the dogs were given shots and sent to WSU Teaching Hospital to be spayed/neutered. Upon return to the shelter these new dogs were incorporated into the study.

Two methods of introduction and two group sizes were used. In the control method of introduction, or current method being used, a dog is introduced into an established group in that group's established territory. The new dog was led into the outdoor pen by leash and then released once inside the gate. The second method of introduction used was the experimental method in which a new dog was introduced to the established group in a new pen. The new dog was released into the neutral pen first. The dogs from the established group were introduced into the pen on leash one-by-one in random order. An established group was defined as a group which had existed for the period of five to seven days.

Groups were observed and recorded with video camera on days 1 and 2 of introduction for a period of one hour starting at approximately 10:15 a.m. After day 2, dogs were determined to be either compatible or non-compatible based on the frequency and degree of aggressive behaviors observed. Feeding took place once all dogs within the studied group were introduced. Shelter staff fed dogs in individual bowls well spaced apart and stood by to prevent any injury of dogs due to food aggression. Dogs that were judged to have been more dominant by staff standards were fed first and submissive dogs last.

Group behaviors were quantified using an ethogram. To determine the reliability of the ethogram, tests for inter- and intra-observer concordance were conducted before commencing the project and the ethogram was refined as needed to ensure that the behavioral data was collected in a consistent manner. Observations took place in the morning for environmental control as the shelter opens to the public at 1:00 p.m. Behaviors were counted in sessions where a session was marked with commencement of behavior and terminated once the particular behavior had ceased for a minimum of 10 seconds.

RESULTS

Data was recorded from videos once the introductions were completed. Due to difficulty with defining clear observation of behavior several behaviors were dropped from the study. These included: sniff pen, staring, and stiff posture, high and low tail wagging. Due to time constraints and availability of dogs only four groups were attained for each method of introduction. One of the control groups was terminated early due to high levels of aggression and therefore was dropped from the analysis. The low number of groups does not allow for a statistically sound analysis. However, some interesting trends were observed. Overall, there was a higher rate of interaction between new dogs and the existing group to which they were introduced in experimental groups (Graph 1). In both control and experimental groups there was a higher rate of interaction of new dogs with the dominant dogs of the existing group than with the subordinate of the existing group (Table 2). Existing groups were observed during their 5-7 day grouping period and categorized as either dominant or submissive. Criteria for categorization included among other things mounting, growling, raising, hackles, barring teeth, and hierarchy of food consumption.

Table 1. Ethogram

Behavior	Definition
Sniff Dog	Nose in contact with any part of another dog
Bark	Vocalization
Play Bow	Standing on hind legs with forelegs on the floor
Growling	A low pitched sound in the throat is made
Raising Hackles	Hair on neck, back and hindquarters is raised
Barring teeth	Lip is pulled back to expose canines
Pawing	Dog's paw strikes any part of another dogs
Mouthing	Dog's jaws are placed around any part of another dog without much force
Mount Dog	Attempt made to or full mount of another dog
Cowering	Tail between legs, low crouch
Submissive urination	Dog urinates while in contact with another dog
Dominant urination	Dog urinates on another dog
Attack Dog	Lunging towards another dog, biting
Escaping	Dog moves quickly away from another dog

Graph 1

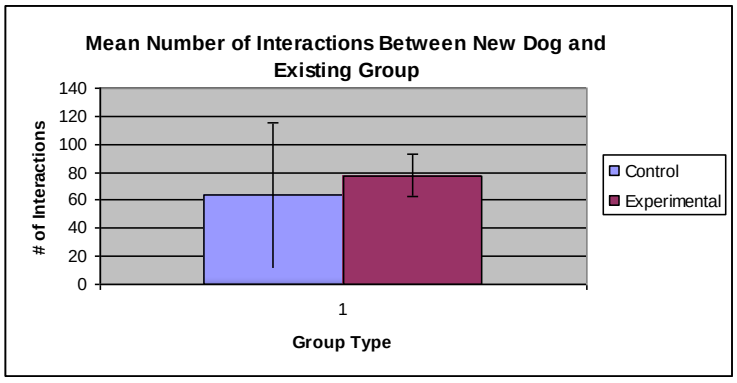
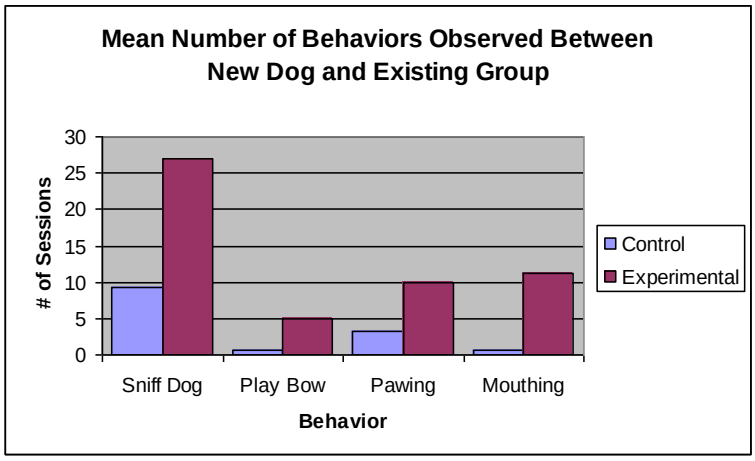


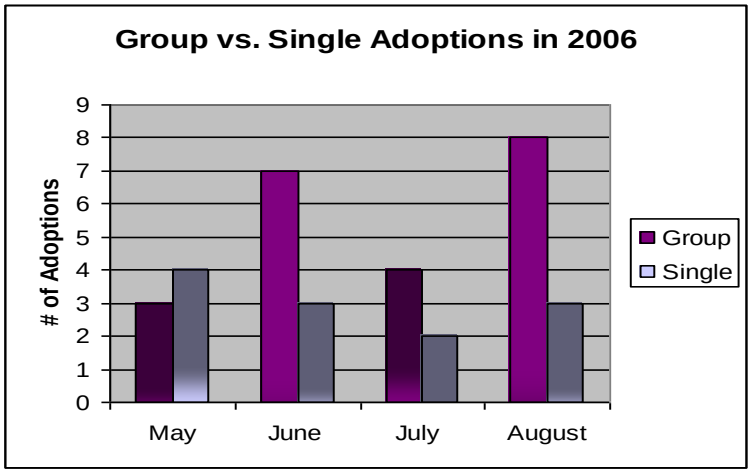
Table 2. Interactions of New Dog with Existing Group

	Control		Experimental	
	ID	IS	ID	IS
Group1	35	4	75	22
Group2	N/A	N/A	54	30
Group3	12	4	67	7
Group4	131	5	44	12

Graph 2



Graph 3.



An unexpected trend that presented itself through this study appeared to be the increase in adoption rates in grouped dogs vs. single dogs. In three of the four months observed there were almost twice as many adoptions out of groups than singles.

DISCUSSION

The results of this study are interesting and merit additional research. A larger number of groups could give further insight into the potential use of an introduction method that would reduce stressful and aggressive introductions of new dogs into established groups. The higher rates of interaction among experimental groups were seen most significantly in the behaviors of Sniff Dog, Play Bow, Pawing, and Mouthing. These behaviors are considered positive interactions and are associated with play behavior. "Playful" dogs may appear more adoptable to potential owners. A further look into the significance of grouping dogs is needed to set precedence for protocol changes in shelters employing single-housing.

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