McNair Scholars Research Journal   McNair Scholars

Fall 2013

McNair Scholars Research Journal Volume VI

St. Mary's University

Follow this and additional works at: https://commons.stmarytx.edu/msrj

The St. Mary's University
McNair Scholars Program

RESEARCH
JOURNAL

Fall 2013   **Volume VI**

ST. MARY'S UNIVERSITY

One Camino Santa Maria
San Antonio, Texas 78228

www.stmarytx.edu

A Catholic and Marianist Liberal Arts Institution

St. Mary's University
McNair Scholars Program

RESEARCH JOURNAL

Fall 2013 Volume VI

Table of Contents

The Ronald E. McNair Postbaccalaureate Achievement Program is a federally funded program that was designed to honor Dr. McNair by supporting and encouraging first-generation, low-income students from groups traditionally underrepresented in graduate education to pursue and earn doctoral degrees. St. Mary's University McNair Scholars Program has now received its second award, enabling the program to serve another cohort of deserving undergraduates. St. Mary's program is unique in that it includes students from Humanities & Social Sciences, the Bill Greehey School of Business and the school of Science, Engineering and Technology. Each scholar worked closely with a mentor from his or her specific discipline to complete an appropriate research project. Many of these mentors are faculty members at St. Mary's, but others are from outside universities and agencies. Each of these mentors deserves special recognition for their dedication to these scholars and their future.

For many of the individuals whose work is here presented, this is the first published work in what will be a long and productive career. We are so very pleased to provide a forum to showcase these works and look forward to following the careers of these students through their doctoral studies and beyond.

Jennifer Zwahr-Castro, PhD
Director, St. Mary's University McNair Scholars Program

Censored Data and Completion Methods

Aracely Alcala

Mentor: Javier Rojo, PhD
Department of Statistics; Rice University
Summer Institute of Statistics

Abstract

In survival analysis the Kaplan-Meier and Nelson-Aalen estimators are utilized to include censored data. When comparing the operating characteristics presented by the Kaplan-Meier estimator to the empirical estimator, that is in absence of censored data, we determined that the Kaplan-Meier estimator performs the best when including censored data. In the case where the last data point of a study is censored, the completion methods proposed by B. Efron, R.D Gill, Brown et.al. and Z. Chen and E. Phadia attempt to provide information that may lie beyond the last given point. After running various distribution combinations and censoring rates we noticed that the Kaplan-Meier estimator had the lowest bias and the Nelson-Aalen estimator had the lowest mean square error. Overall, the tail completion proposed by Brown et al. appeared the most often with the lowest bias and mean square error. In comparing the tightness of two bias bounds, we noticed that the bound proposed by B. Efron is a tight lower bound while for the bound proposed by R.D Gill is a loose upper bound.

1 Introduction

Survival analysis is concerned with the odds of a certain amount of time or more passing before an event occurs; these events are usually referred to as "deaths" as in the medical field survival analysis is used plot time to patients' death or the appearance of a disease [1] (though it can also be used to examine the lifetime of a machine for instance). Participants may be excluded from the study for a variety of reasons. Such reasons include a participant choosing to no longer take part in the study, experiencing an unexpected death not related to the study, or surviving to the end of the study. For example, consider a subject being observed for a time of death for cancer, yet dying from myocardial infarction [2]; this unex- pected death has the same effect as a

patient leaving the study as it is no longer possible to observe the death under study. How should the data gathered from subjects who experienced unexpected events be handled? These unpredictable events produce incomplete data and have been entirely eliminated from the experiment in earlier years. However, this changed in 1958 when Edward Kaplan and Paul Meier proposed the "product-limit estimator" which takes into account censored data [3].

The technical report will begin by defining censoring data, the Kaplan-Meier estimator, and Nelson-Aalen estimator. Section 3 will define four non-parametric completion methods proposed in the literature, later to be implemented and their bias and mean squared error compared. Then our three

research questions will be proposed and answered in section 5. Section 7 will propose ways to improve upon our results as well as further research questions. A copy of the R code used to answer our research questions can be found in the appendix.

2 Understanding the Basics of Survival Analysis

2.1 Censored Data

Censored data comes in two forms; right-censored and left-censored. Right-censored data occurs when data can no longer be gathered from a subject before the completion of the study. Examples include subjects dropping-out, experiencing a terminating event other than that which was desired, or the study simply coming to an end, meaning the desired outcome would not have appeared within the length of the study [4].

On the other hand, left-censored data occurs when a subject enters a study "late", or in other words the subject entered an already ongoing study and thus did not begin with the rest of the subjects. Left-censorship is rarely the case in clinical trials since the starting point tends to be defined by an event such as occurrence of treatment or procedure [1].

2.2 Survivorship Data

We chose to focus on the more common right-censored data because valuable information can be gathered from the starting point of the study to the point where the subject becomes censored. The sort of data that is recorded for these studies includes times of death, with an indicator as to whether they were "true" deaths or "censored" deaths. We can think of the true deaths, times , as coming from some true underlying survivorship distribution and the censored deaths, times Ci , as coming from some underlying censorship distribution, and each individual has both a true death and censored death associated with them that are independent of one another. In other words, in a sample of n individuals

$$T_1,...,T_n \overset{iid}{\sim} f(t), \quad F(t) = \int_0^t f(x)dx, \quad \text{Survivorship: } \bar{F}(t) = 1 - F(t)$$

$$C_i,...,C_i \overset{iid}{\sim} g(t), \quad G(t) = \int_0^t g(x)dx, \quad \text{Censorship: } \bar{G}(t) = 1 - G(t)$$

We see here that the survivorships are right-cumulative density functions (cdf's). This notation allows us to indicate the survivorship and censorship as probabilities, namely

$$\bar{F}(t) = P(T_i \geq t) \text{ and } \bar{G}(t) = P(C_i \geq t).$$

The reason only one time is recorded for each individual is because it is only possible to observe the event that occurs first. When observing a censorship, it is clear that it cannot be discerned when the individual would have died, but as no individual can survive to infin- ity it is known that they would have died at some point in time, it is just not known when it is past this censor time. The same goes for when an individual experiences a true death first, as the time at which they would have been censored cannot be known (this value just happens to rarely if at all be of interest in a survivorship study).Basically, we observe the distribution of Y , that is

$$Y_i = \min\left[T_i, C_i\right]$$

The Y_i's are ordered such that $Y_1'' \ Y_2'' \ ...'' \ Y_n$ and also associated with an indicator δ where

$$\delta_i = \begin{cases} 1 \text{ if } T_i < C_i \\ 0 \text{ otherwise} \end{cases}$$

Because of the independence mentioned previously, it is possible to define a function for the distribution of Y [5]. Namely

$$Y(t) = P\left(Y_i \geq t\right) = \bar{F}(t)\bar{G}(t)$$

Before the Kaplan-Meier estimator, censored data was completely disregarded. A key advantage of such elimination is simplicity; it is not as hard to analyze the data, meaning less time spent learning complicated computational methods for researchers not experienced in statistical analysis. However, the two main disadvantages in eliminating censored data are a loss in efficiency and the type of the bias gained [6]. The "loss of efficiency" occurs when studies with high percentage of censored observations begin to eliminate censored data [4]. An "estimation bias" is a result of eliminating censored data for reasons besides just being "incomplete data". Thus, unbiased estimates will be produced only if the censored observations are censored completely at random [4]. These two disadvantages do not inspire us to achieve simplicity; rather we want to focus on methods that will provide the least amount of bias and means squared error.

2.3   Product-Limit Estimator

The product-limit estimator, also known as the Kaplan-Meier estimator, is the product of probabilities obtained from many small intervals within the study. While focusing on small intervals at a specific time, censored data can be accounted for since the probability within each interval will grasp information from both censored and non-censored data. Three assumptions are made regarding the data set when the Kaplan-Meier estimator is used [7]. First, censored subjects have the same survival prospect as those who concluded the study. Second, all subjects of the study have the same survival probability. Third, an event occurs at a specified time. The product-limit estimator is defined by E. Kaplan and P. Meier as

$$\hat{\bar{F}}(t) = \prod_{t_i \leq t}\left[\frac{r_i - d_i}{r_i}\right]$$

Or similarly,

$$\hat{\bar{F}}(t) = \prod_{t_i \leq t}\left[\frac{1 - d_i}{r_i}\right]$$

where $d_i = \#\left(\delta_i = 1\right)$ at time t, $\lambda_i = \#\left(\delta_i = 0\right)$ at time t, and $r_i = n - \sum_{j=1}^{i-1} d_j + \lambda_i$,

or are simply the number "at risk" up until time t, a sum that excludes any deaths, true or censored, that occurred prior.

An alternative way to view the Kaplan Meier estimator is the product accumulation of

$$\frac{\text{Number of subjects alive from the start} - \text{Number of deceased subjects}}{\text{Number of subjects living at the start}} \quad [7]$$

Censored and non-censored data are part of the total "number of subjects living at the start" [7]. Censored data will be accounted for in the denominator until it reaches the interval; beyond that instance the data will become censored. After such interval, censored data becomes removed from further calculations of survival, in which the remaining data is still known.

2.4 Nelson-Aalen Estimator

The Nelson-Aalen estimator is a non-parametric estimator looking at the other side of sur- vival analysis, that is, defining a cumulative hazard rate (CHR) function to censored survival data. The estimator can be used to "estimate the *cumulative relative mortality*" such as the case of infectious disease being spread in a community [8]. Using the same

definitions for d_i and r_i as in the Kaplan-Meier estimator, Nelson-Aalen is usually defined in terms of the CHR as

$$\widehat{\Lambda}(t) = \sum_{t_i \leq t} \frac{d_i}{r_i}$$

Since we can relate CHR functions to survival functions with the simple identity $\widehat{\bar{F}}(t) = \exp\left[-\widehat{\Lambda}(t)\right]$ (as mentioned in Klein et al.'s text) [9], we have our survival function estimate

$$\widehat{\bar{F}}(t) = \exp-\left[\sum_{t_i \leq t} \frac{d_i}{r_i}\right]$$

3 Nonparametric Completion Methods

The two methods described in Section 2 for estimating the survivorship curve will drop down to a survivorship of 0% at the time of the last observed death during the study. However, when the last observed time is censored, the survivorship is not defined past that time. Literature proposes various methods to complete the Kaplan-Meier or Nelson-Aalen curve beyond the last censored point. There is much potential for an optimal completion being very useful even in cases when comparing two different groups as many test statistics only depend upon the times themselves and not the curve, such as the Wilcoxon-Mann-Whitney test statistic mentioned in the 1962 unpublished thesis of J.P. Gilbert [10]. This leads us to the four tail completions we chose to compare for the Kaplan-Meier and Nelson-Aalen estimators.

3.1 B. Efron

Bradley Efron's completion method suggests that if the largest observed death is censored then the survivorship should drop to zero [11, 12]. The underlying assumption is that the

subject will die immediately after the censored time, stressing a more conservative stance [9]. Since each data point is independent, previous data does not reflect what will occur beyond the censored point. By dropping the survival curve to zero, the estimator will become negatively biased at times beyond that censored time [9].

3.2 R. D. Gill

Richard D. Gill proposes that when the last data point is censored then that point should extend to infinity [12, 13]. The assumption is that the subject will survive indefintely since no specific time can be determined. Gill's completion method of extending the point leads to a positively biased estimator beyond the last censored observation [9].

3.3 Brown et al.

B.W Brown, M. Jr. Hollander, and R. M Korwar created an exponential curve completion for censored data with applications to heart transplant studies [14]. The curve completion can also be applied to other applications because the exponential shape approximates most survivorship curves at the extreme.

To describe this completion, let t_{max} be the largest observed time among the Y_i If it is a censored time, then let $\bar{F}_{\text{left}}(t)$ denote the survivorship curve evaluated to the left of t_{max} and denote evaluation to the right, providing the following completion estimate:

$$\hat{\bar{F}}_{\text{right}}(t) = \exp\left[\frac{t \ln\left[\hat{\bar{F}}_{\text{left}}(t_{\max}) \right]}{t_{\max}} \right]$$

3.4 Z. Chen and E. Phadia

The last completion method is proposed by Z.Chen and E. Phadia, which is an optimization aimed at minimizing the mean squared error [15]. The optimization involves computing a constant c that acts as a happy medium to Efron's and Gill's completion methods when the largest observed time is censored, dropping the final survivorship by a factor of c when it is between 0 and 1. When the c value is greater than 1 this completion will simply become the completion proposed by Gill, which makes sense as it is not possible for the survivorship to increase with time. Chen and Phadia do not comment on values below 0, presumably because c's computation (discussed shortly) relies upon the pdf 's and cdf 's of the underlying distributions (both the true deaths and the censored deaths), none of which will exhibit negative values when describing lifetimes.

We initially gave our attention to the simplified proportional hazard model expression, that is, when the survivorship curves for the true deaths and censored deaths can be presumed to exhibit proportional hazards. It is dependent upon the probability of getting true deaths as opposed to censored deaths - we will adopt their notation - γ - which can be estimated by the censor rate in the proportional hazards case but has an absolute value based upon the true underlying distributions.

It should be noted, however, that while γ always exists, only when we can assume proportional hazards between the survivorship and censorship can we say that

$$c = \frac{1}{2}\prod_{i=1}^{n}[\frac{i(i-\gamma)(i+\gamma)}{(i+2\gamma)[(i\boxminus\gamma)^2+\gamma(1\boxminus\gamma)]}]$$

where $\gamma = \#(\delta_i = 1) = \int_0^\infty F(t)g(t)\,dt.$ [15]

This γ quantity is useful in predicting the censor rate of a pair of known underlying distributions $f(t)$ and $g(t)$ as $1-\gamma = $ censor rate.

However, the condition that two proportional hazard equations must be used cannot be easily determined. Thus, in order to take into account distributions that are not proportional hazard we used the approximate value of the generalized case given by Chen and Phadia [15].

Let $H_1(t) = \int_0^t \overline{F}(x)g(x)\,dx, \quad H_2 = \int_0^t \overline{G}(x)f(x)\,dx,$

and $\varphi_j^k(t) = H_1(t) + \left(\frac{n-j}{n-j+1}\right)^k H_2(t).$

Then

$$c \approx \frac{\int_0^\infty \overline{F}(t)\prod_{j=1}^n \varphi_j^{(1)}(t)\,d\overline{F}(t)}{\int_0^\infty \prod_{j=1}^n \varphi_j^{(2)}(t)\,d\overline{F}(t)}$$

It is important to understand that in this notation for any function $w(t)$

$$\int_0^\infty w(t)\,dF(t) = \int_0^\infty w(t)f(t)\,dt \text{ and } \int_0^\infty w(t)\overline{F}(t) = -\int_0^\infty w(t)f(t)\,dt$$

which allows us to fully expand to produce the following equivalent statement:

$$c \approx \frac{\int_0^\infty \overline{F}(t)\prod_{j=1}^n\left[\int_0^t \overline{F}(x)g(x)dx + \left(\frac{n-j}{n-j+1}\right)\int_0^t \overline{G}(x)f(x)dx\right]f(t)dt}{\int_0^\infty \prod_{j=1}^n\left[\int_0^t \overline{F}(x)g(x)dx + \left(\frac{n-j}{n-j+1}\right)^2 \int_0^t \overline{G}(x)f(x)dx\right]f(t)dt}$$

4   Current Research

Recent literature places an emphasis in deriving new completion methods and alternative perspectives to improve the Kaplan-Meier and Nelson-Aalen estimators.

In an effort to obtain more accuracy, B. Zhang and Z. Hua propose a new completion and review eight nonparametric completion methods.   While Zhang and Hua are interested in proposing alternative completion methods, our aim is to analyze currently applied

completions to investigate in which situations these would be most efficient. Nonetheless, an alternative method in addressing the properties of the product-limit estimator is to truncate the estimator, which caps the estimator to events that are defined [16]. For instance, the "survival function for a Weibull random variable" can be truncated to the left, which pro- vides a "satisfactory fit for lifetime data" [17].

M. Guillen, J. Nielsen, and A. Perez-Marin, challenge these by proposing a more efficient use for the Nelson-Aalen estimator by focusing on "small samples encountered in real life" [18]. Their approach is called the "nave local constant estimator" which can be viewed as a "second order approximation to the Nelson-Aalen estimator" [18]. They have created an extension to the Nelson-Aalen estimator which claims to have an improved bias. When compared to the Nelson-Aalen estimator during small survival times, the nave local constant estimator purportedly provides an efficiency improvement well above 60% [19].

We will not be pursuing these approaches; we merely describe them here for context, showing that this is an issue actively trying to be solved.

5   Research Questions
With the concepts presented thus far in mind, our research moves on to answering three questions regarding survival analysis:

1. How much information is lost when entirely excluding censored observations?
2. How do the Kaplan-Meier and Nelson-Aalen curves with the various completions pro- posed by literature compare with each other? Is there an overall best choice?
3. How tight are the bounds proposed by Efron and Gill for the bias of various simulated data?

6   Answering Our Research Questions
Survivorship curve estimators such as the Kaplan-Meier and Nelson-Aalen attempt to deter- mine the true underlying distribution, reportedly much better than an empirical function of the non-censored times alone. A way to analyze how well these estimators perform is to simulate random samples from chosen underlying distributions of survivorship and censor- ship and take an average of the results to approximate the expected value. As the number of samples approaches infinity, the shape of the curve approaches the true curve that these estimators are producing. Since the underlying distributions are known, the true survivor- ship can be compared to the ones produced by estimators.

Bias and Mean Squared Error (MSE) are useful quantities with which to make such comparisons, the first indicating how accurate an estimate is while the second also taking into account the precision.

6.1   *Compare to Empirical Forms*
We simulated data to compare the Kaplan-Meier estimator to the regular empirical survival function. It should be kept in mind that when there is no censored data present in the study the product-limit estimator will simplify to the empirical survival function [9]. Thus, we ran the simulated data through three cases: Regular, Excluded and All. The "Regular" case refers to the instances where the censored data was not eliminated. The "Excluded" case is where censored data is eliminated from the data set. "All" is when every censored data point is converted into a real death, hinging on hoping that the censorship and survivorship are similar.

Both the Excluded and All cases reduce the amount of data, either by removing points or removing their meanings. Thus it is a concern as to how much information is lost by doing this.

6.1.1 The Simulation

We first selected distributions for both the survivorship and censorship and then drew random samples of varying size $n=25,100,300$. We let these be our T_o's and C_o's. Pairing them and "observing" the smaller of the two times, Y_o, and indicating whether it was censored or not, δ_i, we are able to simulate survival data.

After converting the data to fit with our three cases, it was then possible to perform either the Kaplan-Meier or Nelson-Aalen computations and produce our prediction curves, $\hat{\bar{F}}(t)$. An example is shown below of a single run.
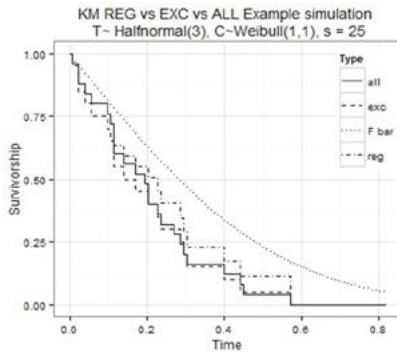
It is at this point that we are able to make comparisons to the true underlying distributions. We selected a set of percentiles $P=(0.05, 0.10,...,0.95,1.00)$ and found the quantiles Q from the underlying true survivorship distribution such that $\bar{F}(Q)=P$. From our simulated curve we evaluated $\hat{\bar{F}}(Q)$

We did three different simulations for each sample size, varying the number of runs $N=(100,1000,10000)$ An attempt was made to pick a variety of distributions so as to capture a wide range of censor rates

6.1.2 Results

Comparing these three cases, we noticed that with censoring rates ranging from 4% to 92% the Kaplan-Meier Regular estimator had the lowest bias and tied with the Nelson-Aalen Regular mean square error.

It should be pointed out that even in samples with smaller censor rates it was still observed that the Regular case far outperformed both the Excluded and All cases, even when the underlying distributions were similar. In addition, larger censor rates, while still holding the pattern, clearly indicate that taking censored data into consideration leads to a larger bias in the tails of survivorship curve estimates. This further aids in showing why it is so important to determine a good completion method for the Kaplan-Meier or Nelson-Aalen estimator.

A sample of plots are shown below.

Kaplan-Meier Bias with All, Exc., and Reg.
T~Half Normal(3) C~gamma(2,4)
s = 25 , n = 10,000, censor rate = .3521

Nelson-Aalen Bias with All, Exc., and Reg.
T~Half Normal(3) C~gamma(2,4)
s = 25 , n = 10,000, censor rate = .3521

Kaplan-Meier/Nelson-Aalen MSE with All, Exc., and Reg.
T~Half Normal(3) C~gamma(2,4)
s = 25 , n = 10,000, censor rate = .3521
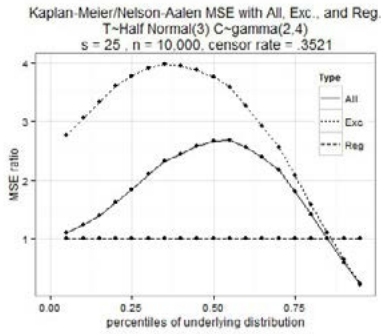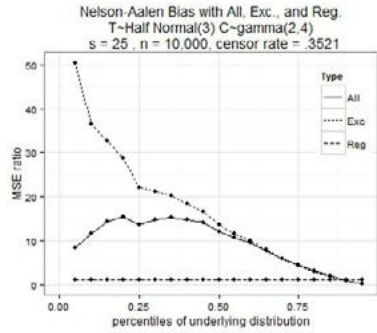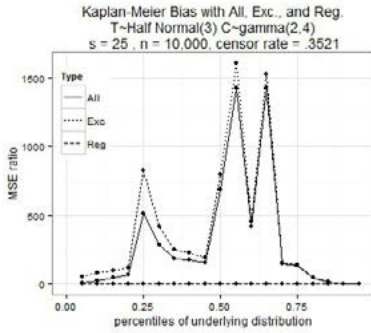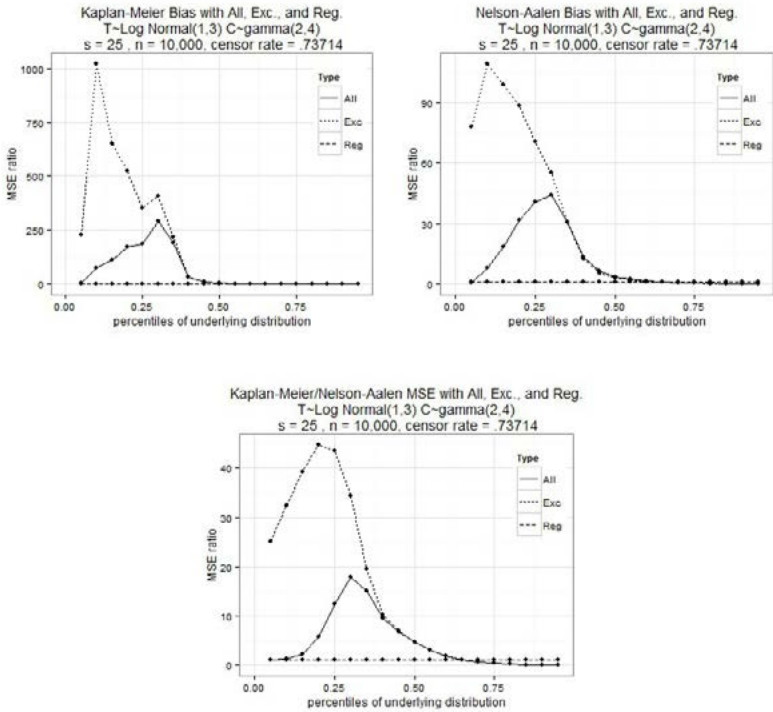
6.2 Tail Completion Methods

Using Rojo's classification of distributions dependent on tail behavior, we attempted to gather samples from various short-, medium-, and long-tailed distributions [20]. It should be understood that this was merely looked upon as a guide since there is still much discussion as to the classification of various distributions that are along the edge of the short-medium and medium-long boundaries. Bearing this in mind, we decided upon the following classifications:

Short-tailed	Medium-tailed	Long-tailed
Half-Normal*	Gamma	Half-Cauchy*
Weibull when rate > 1	Exponential	Lognormal
	Weibull when rate = 1	Weibull when rate <
		Pareto

*We use the "Half " version of the Normal and Cauchy here as they are symmetric distributions and for survival data it is necessary to have all times be positive values.

6.2.1 The Simulation

Similar to our simulation in section 6.1.1, we combined various distributions with

different shape and rate values. Each combination was run using a sample size of $n = 25$, 50, 100, 200, and 300, while the number of runs for each sample size was $N = 100$; 1,000; and 10,000. The difference here is instead of modifying the generated samples we modify how the functions operate when the last time is a censored time. To summarize, when the final time t_{max} is censored:

Gill: Leave the survivorship where it is at and beyond t_{max}.

Efron: Drop the survivorship to 0 at and beyond t_{max}

Brown et al.: Drop an exponential of the survivorship from t_{max} according to their rule.

Chen & Phadia: Multiply the survivorship by the constant c at and beyond t_{max} when $c \in [0,1]$ otherwise default to Gill's completion.

Note that for these simulations for the sake of computation time we used the underlying distributions to compute a value for c. For more on issues with c, refer to section 7.

An example of how a single simulation run looks like can be seen below. It only shows Kaplan-Meier, exluding Nelson-Aalen, for clarity. Nelson-Aalen was always higher than Kaplan-Meier.
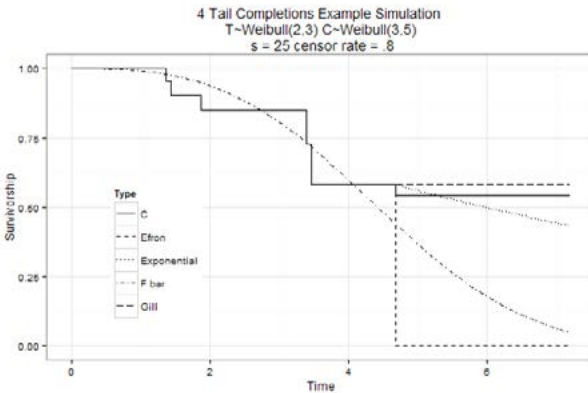
6.2.2 Results
The following tables indicate the best and second best choices for the bias and MSE. By best bias we mean the method completion with the lowest bias value that was appeared the most often in our combinations, and likewise with the best MSE.

Censor Rate	Bias	MSE
	SHORT-TAILED	
0%-30%	Kaplan-Meier: Gill & Chen/Phadia	Nelson-Aalen: Gill & Chen/Phadia
30%-60%	(Insufficient Data)	(Insufficient Data)
60%-100%	Kaplan-Meier: Brown et al	Nelson-Aalen: Brown et al

	MEDIUM-TAILED	
0%-30%	Kaplan-Meier: Effron & Brown et al.	Nelson-Aalen: Gill
30%-60%	Kaplan-Meier: Brown et al.	Nelson-Aalen: Brown et al
60%-100%	Kaplan-Meier: Brown et al.	Nelson-Aalen: Brown et al
	LONG-TAILED	
0%-30%	Kaplan-Meier: Brown et al.	Kaplan-Meier: Brown et al.
30%-60%	Nelson-Aalen: Brown et al.	Nelson-Aalen: Brown et al.
60%-100%	Nelson-Aalen: Brown et al.	Nelson-Aalen: Brown et al.

In the table above the estimator and method completion stated for the various tail distributions and censoring rates indicate the best completion. By "best" we mean the estimator and tail com- pletion appeared the most often with the lowest bias and/or MSE. For instance, for the censoring rate from 60-100% the best bias estimator was the Kaplan-Meier while the Nelson-Aalen estimator was the best MSE.

When focusing on the censoring rates, we noticed that various completion methods appear as most favorable for the censoring range of 0% to 30%. While for censoring rates that range from 30% to 100% the most favored completion is the one proposed by Brown et al. A possible reason for such diversity can be attributed to the type of distributions used; however, an exact reason cannot be easily determined.

By viewing this table specifically to the type of tail, that is by short, medium or long tailed, we notice that the Kaplan-Meier estimator performs the smallest bias and the Nelson-Aalen has the lowest MSE for short and medium tails. For long tailed the Nelson-Aalen performs the most often for the smallest bias and lowest MSE.

6.3 Efron's Bound and Gill's Bound
Both Efron and Gill give bounds to the bias of their proposals when considering the times after the largest time being a censored time. These are computed when considering the Kaplan-Meier estimate, thus the Nelson-Aalen estimator should not be expected to behave in accordance to these bounds. They are as follows:

Efron:

Efron defines his bound in terms of the right-cdf, stating

$$0 \le \bar{F}(t) - E\left[\hat{\bar{F}}(t)\right] \le \bar{F}(t)e^{-E\left[N_y(t)\right]}$$

where $N_y(t) = \#(Y_i \ge t) = n\hat{Y}(t)$

Since $E\left[N_y(t)\right] = nY(t)$ from Efron's paper [11] and $Y(t) = \bar{F}(t)\bar{G}(t)$, we find

$$0 \leq \bar{F}(t) - \mathrm{E}\left[\hat{\bar{F}}(t)\right] \leq \bar{F}(t) e^{-\mathrm{E}\left[N_y(t)\right]}$$

$$0 \leq \bar{F}(t) - \mathrm{E}\left[\hat{\bar{F}}(t)\right] \leq \bar{F}(t) e^{-n\bar{F}(t)\bar{G}(t)}$$

$$-\bar{F}(t) e^{-n\bar{F}(t)\bar{G}(t)} \leq \underbrace{\mathrm{E}\left[\hat{\bar{F}}(t)\right] - \bar{F}(t)}_{Bias\left(\bar{F}(t)\right)} \leq 0$$

What we have is a lower bound for the Efron completion. We transform this bound further to produce a bound in terms of percentiles (as opposed to quantiles) of the underlying survival distribution

$$-\bar{F}\left(F^{-1}(p)\right) e^{-n\bar{F}\left(F^{-1}(p)\right)\bar{G}\left(F^{-1}(p)\right)} \leq \mathrm{Bias}\left(\bar{F}(t)\right) \leq 0$$

where $0 \leq p \leq 1$.

Gill:

Gill defines his bound in terms of the left-cdf as

$$0 \leq F(t) - \mathrm{E}\left[\hat{\bar{F}}(t)\right] \leq F(t) P\left(\varphi(t) = 0\right)$$

where $\varphi = \#\left(Y_i \geq t\right)$ implies $P\left(\varphi(t) = 0\right) = P\left(t_{\max} \leq t\right)$ [13].

$$0 \leq \qquad F(t) - \mathrm{E}\left[\hat{F}(t)\right] \qquad \leq F(t) P\left(t_{\max} \leq t\right)$$

$$0 \leq \quad \left(1 - \bar{F}(t)\right) - \mathrm{E}\left[1 - \hat{\bar{F}}(t)\right] \quad \leq F(t) P\left(t_i \leq t\right)^n \text{ (Independence)}$$

$$0 \leq \quad 1 - \bar{F}(t) - \mathrm{E}[1] + \mathrm{E}\left[\hat{\bar{F}}(t)\right] \leq F(t)\left[1 - P\left(t_i \geq t\right)\right]^n$$

$$0 \leq \quad 1 - 1 + \mathrm{E}\left[\hat{\bar{F}}(t)\right] - \bar{F}(t) \quad \leq F(t)\left[1 - Y(t)\right]^n$$

$$0 \leq \qquad \underbrace{\mathrm{E}\left[\hat{\bar{F}}(t)\right] - \bar{F}(t)}_{Bias\left(\bar{F}(t)\right)} \quad \leq F(t)\left[1 - \bar{F}(t)\bar{G}(t)\right]^n$$

What we have is an upper bound to the Gill completion. We transform this bound further to produce a bound in terms of percentiles (as opposed to quantiles) of the underlying survival

$$0 \leq \mathrm{Bias}\left(\bar{F}(t)\right) \leq p\left[1 - \bar{F}\left(F^{-1}(p)\right)\bar{G}\left(\bar{F}^{-1}(p)\right)\right]^n$$

where $0 \leq p \leq 1$.

Below we have selected an example to illustrate the tightness and looseness of these bounds we observed. It is important to note that the graph is not scaled along the y-axis in order to properly portray the entirety of the bounds.
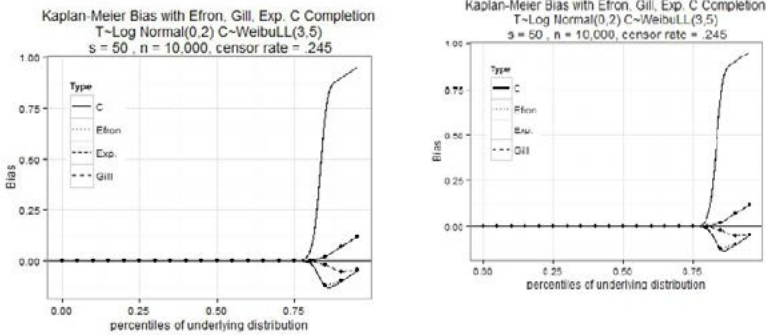
Overall, we noticed that the data tended to fall within the bounds proposed by Gill and Efron. Gill's bound was conservative in the sense that the bias values were rarely close to his upper bound. Meanwhile Efron's bound was observed to be very tight, especially for larger-tailed distributions or pairs with higher censor rates.

7 Additional Considerations

7.1 Improving Our Results

A more exhaustive exploration of various censoring rates amidst the different tail-types - short, medium, and long - or even expanding to be more exploratory in the edge-case tail-types might yield more confidence in which completion method works best in most cases. Alternatively, such rigor might reveal further exceptions to the "rule". As the debate over the classification of tail-types comes to more of a consensus such analysis may prove to be easier.

7.2 Further Research

7.2.1 That Pesky c

One of our challenges in this research was determining the c value proposed by Chen and Phadia. Though a simplified formula is available the issue of having to prove proportional hazards between the distributions of true and censored deaths arises (A very peculiar situation, as most of the time proportional hazards are of interest between groups of subjects, not the subjects' themselves). Tests exist for determining whether two different samples exhibit proportional hazards, but they are not necessarily appropriate for testing for this scenario, leading to using the more computationally intensive version. As not only both the underlying survivorship and censorship functions have to be estimated, so do their probability density functions, which means further sources of variation in how to compute c. Every level of estimation can cause a different c value to be computed. Further research could involve determining a test to indicate whether true and censored deaths exhibit proportional hazards or not, or less theory-driven dependency and more data-driven dependency on the value of c itself.

7.2.2 Best of Both Worlds

While analyzing our results we notice that the Kaplan-Meier estimator tended to have the smallest bias while the Nelson-Aalen estimator tended to have the smallest mean square error, as is supported by most literature on the subject. We suggest the creation of a completion method that utilizes a weighted combination the Kaplan-Meier and Nelson-Aalen estimators, perhaps dependent upon the censor rate or shape of the distribution, that minimizes the mean squared error and keeps the bias close to 0.

7.2.3 Changing the Clock

In Kaplan and Meier's original Product-Limit paper, the idea of their estimator holding even when a transformation of time is considered was introduced [3]. By transformation we mean taking the natural logarithm, square root, or some other function of the times. What would a resulting Kaplan- Meier or Nelson-Aalen curve represent when performed on such transformed data? (Completions included?) Also, would it even work with Nelson-Aalen in the first place? Furthermore, can the results be transformed back into something meaningful?

8 Acknowledgments

References

[1] S. Prinja, N. Gupta, and R. Verma. Censoring in clinical trials: Review of survival analysis techniques. *Indian Journal of Community Medicine*, 35(2):217–221, 2010.

[2] A. Kallen. *Understanding Biostatistics*. John Wiley and Sons, 2011.

[3] E. L. Kaplan and P. Meier. Nonparametric estimation from incomplete observations. *American Statistical Association*, 53:457–481, 1958.

[4] K.M. Leung, R.M. Elashoff, and A. Afifi. Censoring issues in survival analysis. *Annual Review Public Health*, 18:83–104, 1997.

[5] Rossa A. The nelson-aalen and kaplan-meier estimators under a sequential sampling scheme. *Communications in Statistics-Theory and Methods*, 38:3007–3098, 2009.

[6] E.A. Pena, R. L. Strawderman, and M. Hollander. Nonparametric estimation with recurrent event data. *Journal of the American Statistical Association*, 96(456):1299–1315, 2001.

[7] M.K Goel, P. Khanna, and J. Kishore. Understanding survival analysis: Kaplan-meier estimate. *International Journal of Ayurveda Research*, 1(4):274–278, 2011.

[8] O. Borgan. Three contributions to the encyclopedia of biostatistics: The nelson- aalen, kaplan-meier, and aalen-johansen estimators. *Ecyclopedia of Biostatistics*, May 1998:2,9,19, 1997.

[9] J.P. Klein and M. L. Moeschberger. *Survival analysis*: Techniques for censored and truncated data. Springer, 2nd edition, 2003.

[10] J. P. Gilbert. *Random censorship*. PhD thesis, The University of Chicago, 1962.

[11] B. Efron. The two sample problem with censored data,. *Proceedings of the Berkeley Symposium on Mathematical Statistics and Probability*, 4:831–853, 1967.

[12] B. Zhang and Z. Hua. Nonparametric demand forecasting with right censored observa- tions. *Journal Software Engineering & Applications*, 2:259–266, 2009.

[13] R.D. Gill. Censoring and stochastic integrals. *Amsterdam Mathematisch Centrum*, 124:1–178, 1980.

[14] B. Brown, M. Hollander, and R. Korwar. Nonparametric tests of independence for censored data with applications to heart transplant studies. AFOSR 14, The Florida State University, 1973.

[15] Z. Chen and E. Phadia. An optimal completion of the product limit estimator. *Statistics and Probability Letters*, 76:913–919, 2006.

[16] B. Gillespie, J. Gillespie, and B. Iglewicz. A comparison of the bias in four versions of the product-limit estimator. *Biometrika*, 79(1):149–155, 1992.

[17] M. L Moeschberger and J. P. Klein. A comparison of several methods of estimating the survival function when there is extreme right censoring. *Biometrics*, 41:253–259, March 1985.

[18] M. Guillen, J.P. Nielsen, and A. M. Perez-Marin. Improving the efficiency of the nelson- aalen estimator: the naive local constant estimator. *Scandinavian Journal of Statistics*, 34:419–431, 2007.

[19] A. M. Perez-Marin. Empirical comparison between the nelson-aalen estimator and the naive local constant estimator. *Statistics and Operations Research Transactions,* 32(1):67–76, 2008.

[20] J. Rojo and Ott. R. Testing for the tail behavior using extreme spacing. *Cornell University Library,,* arXiv:1011.6458vl:1–25, 2010.

Localization vs. Standardization; Developing Strategies for International Marketing

Lucia Alvarez

Mentor: Mathew Joseph, PhD
School of Business; St. Mary's University

Abstract

The wants and needs of the customers influence global market fluctuations. In order for companies to stay competitive in the market they are being pushed to a scale globally. This conceptual paper examines the existing literature on the topic of entering international markets. It provides an explanation of the difference between international marketing and global markets. It presents a contextual analysis of the international marketing strategies of localization and standardization by reviewing previous case studies, and identifying the advantages and disadvantages of each. It also discusses a feasibility structure concerning marketing strategies for different markets and demand. Informing whether to promote a global standard image or to take a domestic scope approach and customize products to fit the demands of the different local markets is also addressed. It finally presents the end of the dichotomy and shows how the demands are pushing for a combination of both strategies. Leading to proposing the planning of products categories using case study analysis based on the food industry.

Key words Marketing mix strategy, standardization, localization, international marketing, globalization

Paper type Exploratory research

Introduction

Cayusgil once said, "With rapid advancement of communication and transportation technology and increasing interdependence of markets, the concept of global marketing has received considerable research attention over the last decade." (Cavusgil 1993). Even though this was said almost 20 years ago, the research behind it continues.

The phenomenon of globalization in recent years has dramatically blurred the boundaries between countries. Communication technologies now allow people from across the world to share knowledge and ideas faster than ever. With the sharing of ideas comes a more universally accepted concept of good living standards. Consumers from different parts of the world feel that they need or want the same products, and cross-culturalization has enabled likes and dislikes to merge, making consumers from different parts more receptive, to a certain extent, to the same marketing techniques.

When a local company evaluates its operations and decides it wants to achieve profitability by increasing outside the boundaries of the local market, the option is to go global and become a multinational company, becoming a company that competes in more than one country (Vrontis 2007). When the company chooses to market overseas, the marketing department needs to develop a mix strategy, also referred to as the four P's (price, product, promotion, and place). The marketing mix strategy is the whole process a company undergoes when introducing a product to the market, therefore the strategy is crucial for a company's success (Mind Tools 2013). When developing the marketing mix the first decision that needs to be made is, whether the company wants to have a standardized marketing mix; meaning apply a sole strategy to all countries or a localized marketing mix, adjusting the P's depending on the country's market demand (Vrontis 2007).

When a company decides to enter an international market, it must take into account all the different socio-economical, political, and legal factors in the host country in order for the business to be successful. There are several internal and external groups of factors that should be taken into consideration when deciding the time and the strategy of foreign market entry (Hollensen 2004). Internal factors include company size, international experience, product/complexity and advantages of differentiation. External factors include socio-cultural difference between origin country and entry country, market risk/uncertainty of demand, market size and growth, direct and indirect trade barriers and power of competition (Domazet 2010).

Companies enter international markets for varying reasons. These different objectives at the time of entry should produce different strategies, performance goals, and even forms of market participation; yet, companies frequently follow a standard market entry and development strategy.

However, there are some cultural aspects with consumer groups that will always be particular to a certain region, age group, or gender. People make purchasing decisions depending on all those individual factors that constitute their personality, family of origin and culture and oftentimes these differences prevail & endure the effects of globalization. There are certain aspects of a consumer's buying habits that come from his/her background. For example, an individual will always be more likely to buy a brand or a taste that reminds him of a long-lived childhood or triggers memories of home.

Once a company has made the decision to go international, there are two main strategies applied when undertaking international marketing. One suggests that multinational companies should strive to create a unified and uniform global image of their product. On the other hand, the other strategy argues that adaptation to customer's demands is an essential component of international marketing; therefore companies should customize their products to each local market (Vrontis and Vronti, 2004). However, other studies suggest that the best option for multinational companies is to find a middle ground between the two and apply "mix" (Vrontis 2006).

Therefore, there are two forces continually influencing consumers on a global scale: culture and globalization. The question arises for marketers, which approach to take towards promoting a product? Is the answer adapting to consumer habits, or is introducing a new product a way of educating the consumer to adopt new purchasing habits?

The difference between globalization and localization is a tangible matter that

can be explained. Globalization refers to creating a uniform product and marketing strategy throughout the world, with its benefits being economies of scale and brand consistency (Monterey Institute of International Studies 2013). International adaptation, on the other hand, takes into account consideration of characteristics of customers and tailor-fitting the product to their demands. These terms are fundamentally linked to the concepts of standardization vs. localization.

Environmental factors that influence companies' decision to standardize or localize their marketing mix are: market size, economic factors, legal restrictions and cultural differences (Hogander and Steiring, 2012).

The market size is a key element to evaluate when analyzing the marketing mix. Companies tend to draw more attention to larger market and are more willing to adapt, since a larger market means higher demand and eventually larger revenue. (Terpstra and Sarathy, 2000). Companies need to pay close attention to economic factors. The income of the consumer determines their purchasing power and is relevant to the product sales of the company (Hogander and Steiring, 2012). In addition, the costs the company incurs when entering a foreign market including: taxes, interest rates, costs connected to regulations and infrastructure. These costs affect the product price since the expenses of the structure has increased.

The governmental and legal restrictions often affect companies' marketing mix. Johnson and Arunthanes's qualitative study completed in 1995, showed that policies and regulations prevent companies form selling standardized products. Governments use legal restrictions to assure success of their local businesses and to apply products standards for their citizens wellbeing. These restrictions are usually placed in the labeling or packaging. For example, the labels must include nutrition facts and to prevent the

use of lower local quality products (Johnson and Arunthanes, 1995).

One of the most influential factors is the cultural aspect of the market. Previous research suggests that the cross-cultural differences in a country's traditions and value systems have a direct connection with a company's strategies (Waheeduzzaman and Dube, 2004). It is of the utmost importance that the company researches the culture and what is expected from a company in the market of entry (Hogander and Steiring, 2012). Companies must take into consideration, for instance, that consumers in different countries have different expectations concerning guarantees, service delivery, complaints and refunds for defective goods (Usunier and Lee, 2009).

A significant aspect of the marketing approach is whether to standardize or localize products. In general, the best option will not always be choosing one or the other, but combining both to obtain the best results. Companies should approach each case individually, depending on the industry and region to decide which path to take, to assure profitability. The decision of standardization vs. localization is not an easy one, and much research is required prior to picking a route.

A number of researchers have explored the advantages and disadvantages of these two approaches to international marketing. However, most of the research conducted focuses on specific countries or regions rather than a global-wide analysis within a specific industry. This proposal suggests that a better way to analyze the results of globalizing vs. localizing is to categorize companies by industries and focus on what works for specific types of products. It becomes apparent that in some ways, people tend to be more conservative and individualistic regarding purchasing decisions of goods such as food, where likes or dislikes are directly linked to culture,

than in technology, for example, where a global standard has been set and everyone readily adopts products developed by a few big multinational firms. The clear difference across industries suggests that an approach analyzing these distinctions and the effective strategies for each product domain promises to reveal more accurate results.

Marketing Mix

In order to better understand the topics discus in this research, the contextual terminology must be clarified first. The next sections will introduce the relationship between standardization and localization within the marketing mix elements.

Product

The product is the most standardized of the marketing mix. This is explained by the globalized idea of creating and maintaining a unified image (Papavassiliou and Stathakopoulos, 1997). Sometimes adaptations of the brand name might be necessary due to undesirable meanings of the name in the host markets' language.(Melewar and Vemmervik, 2004). The packaging might also need adaptation, for example translation of the labels and information to meet host markets' legal requirements (Theodosiou and Leonidou, 2003). For example, Coca-Cola localized in brand identity for China (as evidenced from the visual below). The logo "Coca-Cola" is among the most recognized in the world with its standard red and white colors. Thus, the Chinese logo corresponds with the existing visual identity system of Coca-Cola. However, Coca-Cola did change the name to "ke kou ke le". These four individual characters have their own meaning, nonetheless they express the world wide concept of Coca-Cola. The combination of the first two characters mean "can eat, good to eat". The last two characters mean "can be happy". The characters are completely different, the Chinese translation of Coca-Cola means "delicious and happy", which in turn falls under the original concept that Coca-Cola has been advertising for generations (How Coca-Cola).

When Coca-Cola adopts a new package, the company makes sure to create an integration of Western and Chinese cultures by localizing the packaging. Understanding the target audience is evidently significant for any brand, in fact, it is essential for an international brand to know the needs of the consumers.

Coca-cola has always shown recognition to all consumers by paying more attention to the psychological needs of consumers rather than focusing on promoting the American culture. Their key elements toward their successes are as follows; cross-cultural communication, insistent of the brand value and localization.

Place

A standardization strategy is difficult to implement in the place of the marketing mix because when establishing a company in a foreign environment everything changes. The corporation needs to be willing to adapt and customize the usual operations. Even production may change for factors including: low availability of resources, importation of the inventory necessary for the host country, transportation facilities and ordering procedures (Hogander and Steiring, 2012). As noted by Theodosiou and Leonidou, storage and logistics tend to be more adaptable (2003).

Price

Research clearly shows that price is rarely standardized (Michell, Lynch and Alabdali, 1998; Vrontis, 2003; Vrontis and Papasolomou, 2005). This is due to factors such as; cost structure, purchasing power, competitors, legal restrictions, currency exchange rate and company overhead. The companies have set profit goals. In order to meet these goals, the firm must adjust the prices to maintain stability and make profit out of the foreign market. A standardized price strategy is not uncommon. Companies like Rackspace, a cloud computing company, offers the same price across the globe claiming to give the best support. Companies either standardize or localize prices Usually there is no mix in the factor of price. (Vrontis and Vronti, 2004).

Promotion

Due to cultural differences in the market, legal requirements, and technological advancements, fluctuate levels of standardization of promotion. This is common and sometimes necessary. The language barriers and lack of media in a foreign country may enable or hinder a company launching the same advertising campaign across their markets of operation (Hogander and Steiring, 2012). For example, Levi Strauss had to use local companies to be able to advertise within some host markets (Vrontis and Vronti, 2004). Promotional vehicles can be government regulated. The feasibility of applying the same strategy, maybe impossible because of geographic differences among countries and regions within countries. Chung (2007) conducted a study where multinational companies from Australia, Japan, and the United States were examined to see the impact of their marketing mix on market performance. The study concluded that culture has the strongest influence on the marketing mix. Chung (2007) advocates that advertising must be adapted to the host country to fit the values and traditions to obtain full persuasion of the consumers. The standardization strategy of promotion should only be considered if the markets share similar traditions and media infrastructures (Hogander and Steiring, 2012).

Standardization

The power of homogenized consumers has enabled multinational corporations to standardize products and services worldwide. The standardization has been a relevant subject since the early 1960's. When Elinder commenced the issue by pointing out the similarities among the European countries and presenting the idea of uniform advertising (Elinder 1961). In his article Elinder established that a uniform advertising strategy did not mean to "squeeze" all aspects into one, but to form clusters depending on language or nation, he claimed that advertising was limited by national boundaries (Elinder 1961). Since, the issue has evolved, at least 34 major studies have been conducted exploring further standardized advertising as it relates to the phenomenon of a standardized marketing strategy. The extensive research on standardization has evoked a variety of definitions or synonyms for the term. Medina (1998) defined the term standardization as "the process of extending and effectively applying domestic target-market-dictated product standards – tangible and/or intangible attributes – to markets in foreign environments."Amuah (2012) cited by Levitt (1983).

In order to understand standardization it is important to establish that, for the purpose of this research, the term is not utilized in the literal sense. Standardization does not necessarily refer to multinational companies providing identical products to all consumers (Ghantous 2008).

Standardization can be divided into two geographic sections:

1. The product is standardized on a global scale
2. The product is standardized depending on the geographical clusters. (Geographical clusters are national markets divided by demand).

Levitt can be seen as one of the most influential scholars in the field of standardization. His article, The Globalization of Markets has provided a background for multiple scholars. Levitt is a strong supporter of standardization, claiming that high-tech products have become the universal language of customers. The more technology evolves in communication and transportation, the more it enables standardization. This has created global consumer groups with homogeneous demands (Cavusgil 1993).

These global consumer groups are pushing companies to establish standardized marketing strategies in order to remain in the market. Levitt pin-points out a variety of examples from different industries such as the following industries: the food industry with McDonald's, Coca-Cola and Pepsi-Cola, the music industry with rock, the movie industry with Hollywood movies and the cosmetics industry with Revlon. Similary, Ohmae (1985) and Terpstra (1987) claim that the increase of global similarity must create a universal brand.

As Levitt explains, a multinational company will be effective if the focus is on "superior quality" and "cost structures." He believes companies "compete on the basis of appropriate value, the best combinations of price, quality, reliability and delivery for products that are globally identical with respect to design, function and even fashion." (Levitt 1983). Hence, consumers prefer to have a globally standardized product at a low cost, rather than paying more for a customized product.

The study by Vronits and Thrassou (2007), examines the level of standardization and adaptation in international markets aiming to help multinational corporations decide the degree of standardization and localization implementation of their marketing strategies. The study consisted of a self-administered survey given to 500

United Kingdom companies (constructing a research limitation for foreign companies). The authors explained that, since the companies ranged from a variety of five sectors: manufacturing, services, transportation & communication, construction and retail & wholesales, a self-administer test was the best option. This gave the scholars the ability to obtain specific insight depending on the industry and organizational structure. The response rate was of 24%, amounting to the response of 124 companies, which provided sufficient data for the study to proceed (Vronits 2007).

After summarizing the findings the authors created a model that presented the relationship between elements, reasons and factors affecting the marketing mix elements. The authors decided to call the process of deciding what factors affect the marketing mix elements the "AdaptStand Process", which is presented below (Vronits 2005).
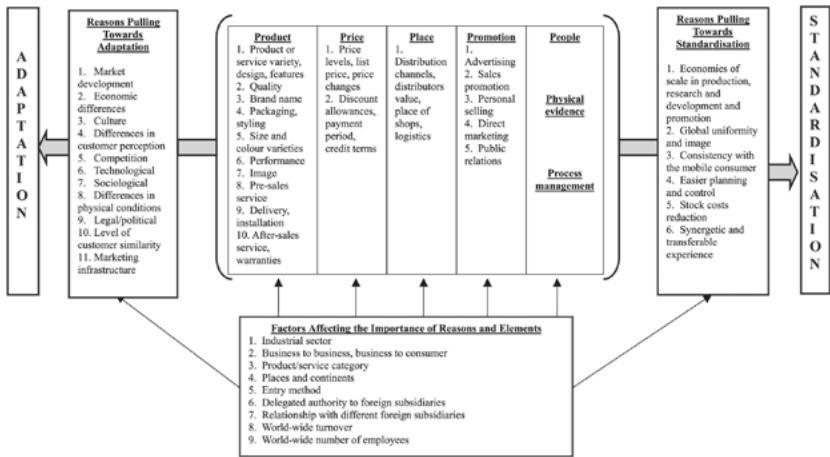
Source: Vrontis (2003, p. 286)

Nanda and Dickson (2007) developed a three-factor model of the standardization/ adaptation of global marketing strategy. Their model (shown below) explains the dynamics of standardization, however, the model has to be tested in order to verify the validation. The three variables included the homogeneity of customer's response to the marketing mix, the transferability of competitive advantage and the similarities in the degree of economic freedom.
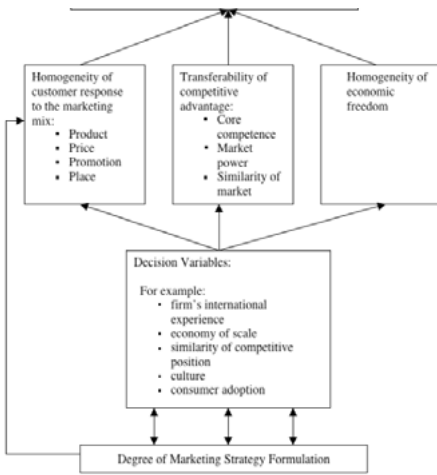
In regards to the homogeneity of the customers' response, the authors agreed with previous works on the assumption that homogenization of the market demand does affect standardization. However, they argue that no one has clarified what is implied when saying customers are homogeneous (Nanda and Dickson 2007). Is the research referring to the similarities in demographic factors such as income and age or the actual wants and needs of the customers? Keeping this in mind, the authors refer back to the marketing mix, examining how customers respond to the four P's based on Wedel and Kamakura (1998) study on how market segmentation can identify homogeneity in markets in response to the marketing mix. Previous research on the topic of homogeneity of customers affecting the marketing mix (Theodosiou and Katsikeas, 2001) and (Hofstede et al., 1999) adds support to Nanda and Dickson's (2007) argument.

When referring to the element of competitive advantage, the factor being equated has to be transferable, in other words, the competitive advantage must be consistent in both the home and the host country. For example, if a company in the

United States has a competitive advantage of superior product quality, the company must have the same product quality entering the Japanese market (Nanda and Dickson 2007).

When referring to the degree of economic freedom, Nanda and Dickson (2007) refer to the variation of market freedom. When a company enters a new market the environment might be different and the foreign country usually has a set of regulations and policy that limit the firm to their usual operations.

Buzzell (1968, 1995) states that in the past, dissimilarities among nations led multinational companies to view and design their marketing planning on a country-by-country basis. However, as Buzzell notes, this situation has changed and the experiences of a growing number of multinational companies suggest that there are potential gains to be obtained by standardizing marketing practices.

Additionally, developing and introducing a globalized strategy to the international markets can benefit companies in a variety of ways. Starting with ease of implementing and controling one strategy for all markets, rather than to keeping up with several. Incentives include: obtaining economies of scale at lower costs and consistency in their production line (Vrontis and Vronti, 2004). For example, is it is cost effective to produced 100 standardized white shirts compared to an adapted approach with 50 white shirts for one market and 50 black shirts for another. This allows for increasing margins and possibly lowering prices for customers (Hogander and Steiring, 2012).

It can be concluded that the advantages associated with standardization can be considered the disadvantages for companies using adaptation. On the contrary, the advantages associated with adaptation are disadvantages for companies using

standardization. The main arguments for standardization can be claimed to be the cost savings owing to economies of scale in research and development, manufacturing and marketing (Levitt, 1983).

Localization

"The business landscape is not homogenous but instead heterogeneous which makes adaptation necessary, at least when the view is international" -Burt, Johansson and Thelander (2011 p. 184).

The term localization can be describe as "the practice of adjusting a product's functional properties and characteristics to accommodate the language, cultural, political and legal differences of a foreign market or country." (Business dictionary) However, the accommodation to language and culture are not the ultimate goal. "True" localization is more than the translation of a website, is about making the product appear to be intentionally specialized for a specific market. Localization, with one thing in mind, meeting expectations: improving customer service and the ability to obtain the attention of every one in the local market. Supporters of localization believe that one of the vital requests for being an international market competitor is having the capabilities to adapt to the consumers. Thus, argue that the standardization strategy is only driven by low cost incentives and product focused strategy, instead of a costumer demand analysis (Douglas 1987).

Localization advocates argue that each market is unique, and that companies should take advantage of the specific marketing mix approach and tailor their products to suit local market needs. Localization pushes companies to become aware of the distinctions of each market macro- environmental factors, to different constraints like: language, climate, race, topography, occupations, education, taste, and to quite frequent conflicts resulting

from different laws, cultures, and societies (Hogander and Steiring, 2012). As mentioned before, globalization believes that the world has homogeneous demands and needs. The adaptation strategy recognizes that there are still differences in the markets and there is a need to customize the product in order to fit the market (Vrontis, Thrassou and Lamprianou, 2009). After their extensive research, Nanda and Dickson (2007) note that even in countries with similar cultures there are variances in demands for example, Europe.

International adapting strategies require researching and developing new marketing tactics and strategies for foreign markets (Vrontis). Companies who engage in localization want to become part of their customers' lifestyle. In order to do so, localization requires a series of individual market analysis based on the cultural differences, the legal systems and regulations of the country of entry and the economic sector.

The advantages include the company's ability to meet a range of differences in the markets (culture, beliefs, economic conditions, environmental conditions, demand rate, etc.). Adapting the products increases the value of the product, resulting in brand preference and creating loyal consumers. Consequently, producing larger market share, leading to higher revenues Adapting also creates a well-rounded consumer-oriented business, which correlates to maximizing profits (Hogander and Steiring, 2012). It will also make the company more competitive since the products are adequate to the demands of the market.

On the other hand, adaptation involves higher costs and lacks the benefits of

standardization (Vrontis, 2005). The advantages of standardization are the opposite of localization. In a customizing strategy a company has less control over

the price and over the consistency of their product.

Finding the Balance

To simply standardize a product across all markets is difficult to achieve, which is apparent from the earlier discussion of the need for adaptation in some industries. Among other things, the product life cycle might be different in international markets. Blue jeans, for instance, are in a rather mature stage in America, but are only starting to become popular in eastern countries. Therefore, certain measures of adaptation are required to enter international markets.

An example in apparel industry, as explained in the Gothenburg research (Hogander and Steiring, 2012). is Levi Strauss. Years ago, when the company started growing, it mass-produced its jeans to achieve economies of scale. But with time, the company started noticing drops in sales, and they realized the demand of consumers was different depending on the market. People in different countries found different trends appealing, so Levi Strauss had to learn the art of product adaptation in order to remain profitable.

The story of Levi Strauss illustrates that the questions concerning the marketing mix is not definite. Complete standardization is hard to implement successfully even on the supposedly homogenous jeans market. Target segmentation might be global, but market positioning and the elements of the marketing mix need adaptation to better correspond to varieties in macro and micro environmental factors between markets. The crucial question for marketing managers within international retailers like Levis Strauss, is how to find the appropriate marketing mix balance to be successful (Vrontis and Vronti, 2004).

For multinational companies to maintain a competitive edge internationally, it is vital for them to find a happy balance between standardization and localization. A comprehensive look at existing research suggests a conclusion that both marketing strategies contribute to a firm's successful product introduction into new markets. To achieve the maximum benefits possible a firm must effectively standardize the necessary marketing mix elements while customizing what it sees fit to adapt to market needs.

Success is therefore not dependent upon adaptation or standardization, but upon a combination of the two in order to find the right level of standardization and adaptation across the marketing mix elements and marketing strategies for each country.

Providing a foundation for further research

The on going debate whether multinational companies should standardize or localize the marketing mix elements in international markets is of importance and of long duration. Multinational companies who want to establish a place in the international world need to search for the balance between standardization and adaptation, as it is hypothesized that standardization vs. localization is not necessarily a dichotomous decision (Vrontis and Thrassou 2009). Furthermore, evaluating other studies reveals that there is a gap of information regarding how the food industry approaches standardization and adaptation. This implies that more qualitative studies regarding how the food business implements their marketing mix are needed.

The aim of this research is to investigate the complex relationship of the two extreme approaches and to evaluate the relative degree of significance of the marketing mix on strategy decisions. It is important to examine the two current strategic approaches used to understand how the food industry marketing mix works. It is

important to analyze how the food industry experts perceptions influence strategic application. The overall decision making process itself, which includes the gathering of marketing data from which decisions are made and what percentage of the decision is based on that data is also relevant future study.

Research methodology

The research design and research instrument comprising both open and close-ended questions and will be developed during the fall semester. Primary data will be collected through direct interviews to local companies and direct-mail survey questionnaires will be distributed to non-local companies. The companies will be selected based on the following features: geographic distributions and industry affiliation.

References

Buzzel, R.D. (1968). Can you standardize international marketing?, *Harvard Business Review*, no. 46, pp. 102-113.

Cavusgil, S. T., & Zou, S. (1994). Marketing Strategy-Performance Relationship: An Investigation of the Empirical Link in Export Market Ventures. *Journal of Marketing*, 58(1), 1-21.

Cavusgil, S. T., Zou, S., & Naidu, G. M. (1993). Product and Promotion Adaptation in Export

Chung, H.,F.,L. (2007). International marketing standardization strategies analysis: a cross-national investigation, *Asia Pacific Journal of Marketing*, vol. 19, no. 2, pp. 145-167..

Domazet, A., and Sendić, R. (2010). Theoretical controversies related to mode of entry and sequencing strategic decisions of the companies entering international market. Conference Proceedings: International Conference Of The Faculty Of Economics Sarajevo (ICES), 1-18.

Douglas, S. P., & Wind, Y. (1987). The Myth of Globalization. *Columbia Journal of World Business*, 22(4), 19-29..

Duncan, T., & Ramaprasad, J. (1995). Standardized multinational advertising: The influencing factors. lournal of Advertising, 24{3), 55-68.

Elinder, E. (1961), "How international can advertising be?",*International Advertiser December,* pp. 12-16.

Hofstede, G. (2001). *Culture's consequences, Comparing Values, Behaviors, Institutions and Organizations* Across Nations, Sage Publications, Thousand Oaks.

Hogander , M., & Steiring, M. (2012). *Swedish retailers' marketing mix in Norway*. (Master's thesis) Retrieved from https://gupea.ub.gu.se/bitstream/2077/29430/4/gupea_2077_29430_4.pdf

Hollensen S.(2004). Global Marketing, Prentice Hall, Financial Times. pp. 279-284.

How Coca-Cola adopts localization strategy from brand identity in china. (2013). Retrieved from http://linyingli.blogspot.com/2011/05/how-coca-cola-adopts-localization.htm

Johnson, J.L and Arunthanes, W. (1995). Ideal and actual product adaptation in US exporting firms, *International Marketing Review*, vol. 12, no. 3, pp. 31-46.

Levitt, T. (1983). The globalization of markets. Harvard Business Review, 61(3). 91-102.

Medina, J. F., & Duffy, M. (1998). Standardization vs Globalization: A New Perspective of Brand Strategies. *Journal of Product and Brand Management*, 7(3), 223-243.

Melewar, T.C. and Vemmervik, C. (2004). International advertising strategy, a review, reassessment and recommendation, *Management Decision*, vol. 42, no. 7, pp. 863-881.

Michell, P., Lynch, J. and Alabdali, O. (1998). New perspectives on marketing mix standardization, *International Business Review*, vol.7, pp.617-634.

Miller, N. D., & Gelb, B. D. (1996). Business advertising appeals as a mirror of cultural dimensions: A study of eleven countries. Journal of Advertising, 24(4). 57-70. 46.

Mind Tools. *The marketing mix and 4 p's understanding how to position your market offering.* (2013). Retrieved from http://www.mindtools.com/index.html

Monterey Institute of International Studies; Globe. *Globalization strategies*. Retrieved from http://globe.miis.edu/globalization_strategies.html

Mueller, B. (2004). Dynamics of international advertising. New York: Peter Lang.

Nanda, K.V. and Dickson, P.R. (2007). "The fundamentals of standardizing global marketing strategy", *International Marketing Review*, Vol. 24 No. 1, pp. 46-63.

Ohmae, Kenichi (1985). Triad Power: The Coming Shape of Global Competition. New York: The Free Press.

Papavassiliou, N. and Stathakopoulos, V. (1997). Standardization versus adaptation of international advertising strategies: towards a framework, *European Journal of Marketing*, vol. 31 no. 7, pp. 504-527.

Terpstra, V. and Sarathy, R. (1997). *International Marketing*, 7th ed., The Dryden Press, Fort Worth, TX.

Theodosiou, M. and Leonidou, C. L. (2003). Standardization versus adaptation of international strategy, an integrative assessment of empirical research, *International Business Review*, no. 12, pp. 141-171.

Thrassou, A.and Vrontis, D. (2006). "Asmall services firm marketing communications model for SME-dominated environments", *Journal of Marketing Communications*, Vol. 12 No. 3, pp. 183 202.

Usunier, J-L. and Lee, J.A. (2009). *Marketing Across Cultures*, 5th ed., Pearson Education Limited, Essex.

Ventures: An Empirical Investigation. *Journal of International Business Studies*, 24(3), 479-506.

Vrontis, D. (2000). "Global standardisation and/or international adaptation? a tactical marketing decision for multinational businesses in crossing borders and entering overseas markets", *Business and Economics for the 21st Century – Volume III*, Business and Economics Society International (B&ESI), pp. 140-51.

Vrontis, D. (2003). Integrating adaptation and standardization in international marketing, the AdaptStand modeling process, *Journal of Marketing Management*, vol. 19, no. 3 /4, pp.283-205.

Vrontis, D. and Papasolomou, I. (2005). The use of entry mode in identifying multinational companies' AdaptStand behavior in foreign markets, *Review of Business*, no. 26, pp.13-20.

Vrontis, D. and Vronti, P. (2004). Levi Strauss: an international marketing investigation, Journal of Fashion Marketing and Management, vol. 8, no.4, pp.389-398.

Vrontis, D., Thrassou, A. and Lamprianou, I. (2009). International marketing adaptation versus standardization of multinational companies, *International Marketing Review*, vol. 26, no. 4, pp. 477-500.

Waheeduzzaman, A. N. M. and Dube, L. F. (2004). Trends and Development in Standardization Adaptation Research. Journal of Global Marketing, Vol. 17, No. 4, pp23-52.

"Sartre and Camus: Discerning Truth in the Face of Secular Odds"

Jake Becerra

Mentor: James Greenaway, PhD
Department of Philosophy;
St. Mary's University

Introduction:

Pioneers in a Post-War France

On May 10, 1940 the Nazi party under Adolf Hitler invaded the nation of France. German armored units pushed through the French Army and Allied forces, pushing them into full retreat, leaving the French at the mercy of a highly effective German campaign. The Battle of France, also known as the Fall of France, culminated when German air superiority and military mobility, known as *Blitzkrieg*, overpowered an already strained French defense. On June 22, France surrendered to Germany and was occupied by the Axis Powers until 1944.

Many French men and women resisted Axis control by participating in counter-resistance measures to thwart off their enemies and assist colleagues in the fight to redeem France. Underground movements formed, including a guerilla class of militant fighters, secretive armament manufacturers, and journalists to fuel the war effort. Two militant participants were Jean-Paul Sartre and Albert Camus, two of France's leading thinkers in 20th century continental philosophy.

An estimated 45-60 million people were killed at the end of World War II, with countless lives lost, detained and relocated due to this great struggle.[1] The effect the war had on both Albert Camus and Jean-Paul Sartre would have a lasting influence on the philosophical works they would produce. As contemporaries, these two men pitted their philosophical perspectives against pre-WWII society, showcasing their thoughts in essays, journals, plays, and novels.

Sartre focused on the subjectivity of the human conscience, and Camus concerned himself with the effects of the external world in relation to the human condition. Camus found man's relationship with the world to be an absurd phenomenon; Sartre called this man-world relationship a response of human action in the midst of his own free will.

This essay will first distinguish the unique features of both Camus and Sartre's philosophy, and will highlight both similarities and differences between both. With regard to similarities, Sartre and Camus recognize a set of relations that may be characterized as the self to the-self, the self to the external world, and the self to others. With regards to differences, Sartre generally tends to focus his philosophy on the self to serve the self, whereby the external world and others act as impediments to keep the self from having total, unguarded freedom. On the other hand, Camus asserts

that such a self-serving philosophy limits the actual potential of the human being ("the conscious self").

Both men sought to understand the meaning of life through their works, and yet when comparing their theories, Camus' assertions maintain a greater moral truth in regards to the relationship the individual shares with his environment. Sartre, too, gets to the heart of this moral truth but preserves meaning to be an individual endeavor, one which considers the single person above all other features in life to be the most important in begetting a most fulfilled life.

Sartre's Systematic Search for the Self in the Face of Nothingness

Jean-Paul Sartre's philosophy rests on a secular philosophical model, a model whose characteristics resist religious and systematized structures. He sought to recast human experience in a way that focused individual self-consciousness alongside and against the external world. Figures of divine transcendence and systematic philosophies such as utilitarianism, rationalism and utopianism hold no bearing for Sartre. Instead, he asserted that the only absolute in life was that of the individual capacity to exercise freedom, a freedom which resides within the discerning minds of every conscious, self-aware human person. This self-aware creature is the human person, the "being-for-itself."[2]

The being-for-itself can best be identified when considering what it means to be conscious in relation to the external world. Surely, human beings are not the only conscious beings which exist in the world. Consciousness on the sentient is anything capable of sensing and responding to the external world.[3] Animals possess this capacity of consciousness. However, the distinguishing feature that separates humankind from every other conscious

being is our self-conscious capacity to recognize and discern; in other words, self-consciousness. Self-consciousness is anything that is not only aware of the external world, but also aware of its own relationship to the external world and our awareness of this awareness. The distinguishing feature of these two distinctions is that any living creature is conscious of its surrounding, being aware of the external and acting according to what its environment calls for. Basic consciousness means that one cannot knowingly *reflect* on this participation with the external world, but acts as their environment deems most appropriate in light of its circumstances.

The self-conscious creature is that which participates in the external world, but does so *knowingly*, and does so with the capacity to reflect and be fully aware of its capacity to act, to choose and to discern its course of action. Human beings are such self-conscious beings. As human beings, we act not only to survive and react to the external world, but we also act to thrive and manipulate the external as active participants in our environment. We become active influences to the world around us, and comprehend ourselves in relation to the external. Sartre makes this distinction when describing absolute freedom and the self-conscious capacity of human beings.[4]

Sartre argues that absolute freedom resides not in religious belief, but within human consciousness, itself. If a divine being is the source which grants human the capacity to act as free agents, then freedom, according to Sartre, is only a nominal fixture for every individual, a fixture whose actual freedom is not unconditional, but marginalized once freedom is attributed to the Divine. Sartre's "paper-knife" analogy in his work, *Existentialism and Humanism* best conveys the limiting features of freedom when attributed to religious belief.[5]

The "paper-knife" analogy compares the transcendental being to an artisan. According to Sartre, the mission of any artisan is to design a tool for a specific purpose. The artisan must first conceive the notion of what a paper-knife is. He thinks of what the paper-knife's function is to be and follows up by developing blueprints prior to the actual construction of his preconceived invention. The artisan creates the knife's dimensions, capabilities and alternative functions, and only afterwards constructs the knife so it may be actualized and come into existence. Similarly, the divine preconceives the function of every human being, knowing their inner dimensions, inner functions and alternative capabilities and only afterwards creates the individual human being once their blueprint has been drawn out. Sartre calls this deductive process "existence prior to essence."[6]

If the divine is responsible for human freedom then our essence is already fully mapped out, knowing what every human being's purpose is even prior to when we are each born into the world. If this is the case, then man possesses no absolute freedom, but only a nominal freedom since the individual is a preconceived idea prior to an actualization of this idea. Like the artisan who preconceives of a paper-knife, a Grand Creator designs human beings knowing full well what purpose we are to serve once created. If the conscious human being is truly free, then "man first of all exists, encounters himself, surges up in the world- and defines himself afterward."[7] Sartre contends that human beings, in order to be absolutely free, must first exist before creating an essence for themselves.

One cannot attribute the divine to absolute freedom if absolute freedom is to be at all possible for man. Individual human choice must stem not from a metaphysical precursor that dictates humankind, but within the human person, himself. "We are left alone, without excuse," Sartre declares.

Man is "thrown into this world [and] is responsible for everything he does."[8] It is inherent in every man to be his own dictator, his own creator to choose for himself, independent of any God or divine source. Thus, man is his own free agent, his own artisan.

But if man is his own free agent, where does this freedom reside? Sartre identifies the source of this freedom as human consciousness, itself. At the core of human consciousness, two types of freedom are made evident. The first is that every human is actively aware of his own freedom. We each possess the freedom to comprehend the external world, to actively choose the course of action we are to take and we can finally lead ourselves to action according to our own decision-making (all which takes place within our conscious minds). Once we recognize our own self-determined freedom, a second freedom arises: the freedom to recognize the negation of our own freedoms. Our cognitive ability to comprehend means that every conscious individual has the ability to discern a negation, an opposite to whatever is being posited. We can consciously decide to act one way, but in recognizing this one way, we can also recognize an opposite (A negation) to this perceived action-decision.[9] Possessing the ability to identify a freedom of negation means we allow ourselves to choose a counter position to what is initially perceived. Freedom resides in the conscientious choice we make, a comprehension of what is posited and what its antithesis is.

Sartre draws these two distinctions from Descartes. However, Descartes believes these freedoms are extensions given by a Divine source, a source bestowed upon humanity.[10] Sartre considers this feature to be limiting and is critical of Descartes for attributing freedom to a metaphysical source.

Since each individual is his own free agent, he decides for himself his own choices and acts based upon these self-determined decisions. These choices and actions stem from a consciousness uniquely his own. "To act is to modify the shape of the world; it is to arrange means in view of an end; it is to produce an organized instrumental complex such that by a series of concatenations and connections the modification effected on one of the links causes modifications throughout the whole series and finally produces an anticipated result."[11] Individual thought and action allows one to be an participant in forming his essence. By participating in the world, both as an influence an as result of previous actions that take place from within and without human consciousness. Only through action can a potential result and the formation of an individual's essence come to fruition.

When humans actively participate in forming our own essences, we must pay closer attention to our ability to discern the negation of our own freedoms. The ability to negate means we knowingly place ourselves at a distance from both our initial thoughts and the objects around us. The most distinguishing feature of human consciousness is the gap we create within ourselves. This gap is an imperative feature of the self-conscious human mind because only then can possibilities be at all feasible.[12] The environment itself would merely be a causal relationship between objects operating with the same space. It is only within the human mind that possibilities can be realized and it is our gap within us all and the external world that illuminates our ability to recognize such potentialities. We thus strive towards our desired possibilities, an there is a lack which is at the heart of consciousness because we must then comprehend and decide between our infinite potentials.

When a choice is made and the conscious individual human being decides to act based on his free will, he denies all other possible choices for the one he is to proceed with. By acting on this choice, all other forgone options become "nihilated." But these nihilated options are not alone when the conscious individual uses his introspective self-assessment to draw out a most accurate conclusion. One must also separate himself from the situation an environment which one's final decision will influence. In a sense, the individual must nihilate his own inwardness, as well as his external environment, in order to commit himself to a most neutral uncommitted decision.[13] Sartre asserts these conditionals to be necessary in order to commit one to make a most intelligible decision for the self. We must first spate our consciousness from our physical selves as a distinguishing entity. Once this is achieved, we must consider the object/consideration at hand, separating it from its surroundings. To do so, we must forgo any and all objects an thoughts irrelevant to the consideration at hand, thus nihilating them as well.

The individual physical body and all irrelevant thoughts become nihilizations and consciousness identifies and chooses between all infinite potentialities, the omitted potentials become nihilizations as well. The gap within the self, between the self and other objects, and forgone potentials become Sartre's nothingness.

However, most people do not commit themselves to a notion of nothingness. This is what he calls Bad Faith.[14] If one suddenly realized that one was responsible not only for what did, but for what one felt, and how in general one saw things, one might indeed wilt under so vast a burden of responsibility. One is, after all, greatly comforted by the thought that some features in one's life are inevitable."[15] Religion becomes the mechanism by which conscious individuals relinquish their responsibility to an absolute presence which dictates the causes and results of one's life. One lives in bad faith

by not recognizing the nothingness which surrounds them, but submits the self to a nominal existence under the veil of divine influence (e.g., the paper-knife analogy).

Bad faith exists not only in the transcendental relationship people create with the Divine, but also in the relationship we experience with ourselves and other conscious beings. One who refuses to recognize that one's own body, although a separate entity, still shares itself with the conscience one possesses is one who exists in bad faith. Sartre refers to this dimension as being-for-others, "[when] the self exists outside as an object for others. The for-others involves a perpetual conflict as each for-itself seeks to recover its own Being by directly making an object out of the other."[16] This means when the individual makes decisions, his decisions become either choices contingent completely on the body or completely for one's mental acumen.

For example, if someone was to attend a horror movie knowing full well he does not enjoy horror movies, he should realize he will not enjoy his experience. His hands will sweat and his heart rate will rise. This individual will recognize his body's response but will continually stay seated, ignoring his mental anguish and attributing these uncomforting feelings to purely biological factors. Bad faith exists when an individual cannot or refuses to associate his mental faculties with those of his physical self. In this case, the physical body becomes the other and the conscious individual fails to integrate the mental and physical selves as a cohesive whole.

Another form of bad faith exists when the conscious individual does not live for himself, but for other individuals. As opposed to the individual who divides the body from the conscience, the being-for-others separates himself from his own consciousness by submitting to another

individual. Using the same horror case, the individual attends the same horror movie knowing he will not enjoy the experience. However, this time he is accompanied by a friend who thoroughly enjoys horror movies. When the individual notices his accelerated heart rate and clammy hands, he decides to stay watching due to his friend who seems to enjoy the movie. In this instance, the body and mind are connected, but the individual submits to his friend, the other. Bad faith exists once his conscience is conditioned to adhere to the pleasures of the other.

As conscious individuals we must, as all times, decide according to our self-conscious faculties. It is only in recognizing and applying these faculties that freedom is at all possible. However, we must identify that our free will is only attained though the conscience, and to forfeit our faculties though bad faith, whether by adhering to religion, failing to honor ourselves, or trying to appease others, then free will is no longer attainable. Sartre says being-for-itself moves beyond bad faith and does not fall into the trap of being-for-others. The being-for-itself must exist in the world of nothingness and take account of his actions in light of his own decisions and actions. He must be his own master and not fall victim to his own freedoms.

Camus and His Struggle for a Systematic Truth

Albert Camus' philosophy is less a consideration of one's self-consciousness than it is a relationship focused on the human person in relation to the world one participates in. It is in this relationship between the self and the external world that Camus identifies the notion of the absurd, a key component to his philosophy. Let us refer to it as Absurdism.

Albert Camus first explored the notion of the absurd in his work, *The Myth of*

Sisyphus. Defined as, "something false or self-contradictory," absurdism recognizes, "something unreasonable, meaningless… something which fails to make sense."[17] The absurd itself is not strictly a nihilistic definition, but rather a state of existence which all people are subject and operate according to it. Camus insists that in spite of our world comprising of this absurdist enterprise of external events, man is not subject to its surrender, but must rather rebel against these circumstances in order to not fall victim to its ways.

Camus' notion of the absurd was introduced at a time when France and the rest of the world were dealing with the fallout of World War II. Entire cities were decimated, populations and cultures experienced a sort of exodus when armies moved in on native soils, and countless lives were lost in this great conflict. The absurd became commonplace for some impacted by this struggle, and absurdity was the only feasible conclusion in the midst of so much chaos. "His fundamental assumption that there was no hope, that life had no meaning and his adamant refusal to take refuge in 'philosophical suicide' in some transcendent entity or God, eloquently articulated the innermost feelings of millions."[18] The absurd epitomized all the horror France and the rest of the world was trying to make sense of.

The existence of a Divine presence, God, is an absolute assertion for Camus, an assertion which cannot be fully deduced as an absolute certainty. The contrary nature of life is similar to Sartre's notion of absolute freedom and its negation. Camus uses truth and the feasibility of its negation as proof that no human can know with absolute certainty the existence of an absolute God. Camus quotes a passage from Aristotle:

> The often ridiculed consequence of these opinions is that they destroy

themselves. For asserting that all is true, we must assert the truth of the contrary assertion and consequently the falsity of our own thesis (for the contrary assertion does not mean that it can be true.)And if one says that all is false, then that assertion itself is false. If we declare that solely the assertion opposed to ours is false or else solely that ours is not false, we are nevertheless forced to admit an infinite number of true or false judgments.[19]

Camus called this contradictory concept a "vicious circle" that some people failed to recognize in the absurd because they became satisfied with their own personal truths, a reconciliation with the self which withdrew any serious contemplation of the self relating to the contrary nature of existence. "That nostalgia for unity, that appetite for the absolute illustrates the essential impulse of the human drama… we fall into the ridiculous contradiction of a mind that asserts total unity and proves by its very assertion its own difference and the diversity it claimed to resolve."[20] Camus asserted that what we actually know from what we supposedly know are two different truths, one built on actuality and one built on presumption. He was not denying that there very well may be a Divine source to meaning and human existence, but as long as a clear contradiction (or a negation as Sartre would say) was conceivable, then assuming to know tentatively is to not fully have a grasp on what life presents us. He groups political theories and other philosophies into this nostalgia, for they too have a contrarian alternative from what they represent. We must first recognize the absurd and forgo any conclusions which cannot be fully supported by what is evident to us in the immediate world around us.

Camus insisted life was not meaningless, even though life could deal such

incomprehensible blows as the French experience of World War II which presented life as absurd to the individual and the greater whole. "Hitherto, and it has not been a wasted effort, people have played on words and pretended to believe that refusing to grant meaning to life, necessarily leads to declaring that it is not worth living. In truth, there is no necessary common measure between these two judgments [the absurd and meaninglessness.]"[21]

The absurd itself was evident in man's quest for meaning in life: as much as we searched for this greater meaning, no comprehensible answer could adequately address the problem of meaning now that religion had become eclipsed by absurdity. He first examined the sciences to find out if there could be a structural order to the world, a materialism embedded in all our actions. Science spoke of humanity in terms of atoms and electrons in a type of reductionist method which declared we were all comprised of these microscopic particles and it was these particles that ruled our lives. However, that was not enough for Camus. If this was the case, then what resided beyond the atom and the electron? Where was the source of all these particles which governed humanity? He essentially took materialist deductive theory and amplified it the next degree. "All this is good and I wait for you to continue. But you tell me of an invisible planetary system in which electrons gravitate around a nucleus. You explain this world to me with an image. I realize that you have been reduced to poetry… everything ends up in hypothesis."[22] Science could not answer the greater meaning to life for Camus because it left one to fall into mere speculation after a certain deductive point.

The absurd did not only arise in the sudden shock of unforeseen events, like what World War II presented to countless civilizations. The absurd was made evident even in the humdrum of daily life. Mundane existence brought out the absurd. When one enacted the same daily routine, whether it was to rise at an exact time, take the same route to and from work, have dinner by this particular hour, only to fall asleep and repeat oneself for the next day's morning commute shows the absurdity life presents itself. Time became the next subject in his search for meaning.

Time is "not our helper but our worst enemy."[23] Camus noticed that time is nothing more than the vehicle or conveyer belt which ushers all humans to their final resting point, death. Death was nothing more than the final checkpoint which all humanity had to submit to. Our relation to time was not some give-and-take relationship but rather a one-sided take-and-take-some-more motion until we were left with no more time and death was the final measure we could give to this great monster. The absurd did not have to come with the formation of troops knocking on the heels of a fearful many, it is present in the monotony of a mundane existence. Time is no friend of humanity, but rather a reminder that we all meet the same end whether we act in compliance to it or not. Time in itself is absurd in relation to man.

Death itself became the next obstacle in Camus' understanding of man's place in the world. No matter how far our ambitions were, no matter what goals we established and what dreams we hoped to give birth to, death was our great equalizer. It became the greatest foe of all. We could certainly be reduced to causal effects of materialism through scientific inquiry, or we could submit to the to-and-fro of existence anchored in daily schedule, but even if we were to recognize the absurd in such living and choose to break free of these plotted courses, death would be the only check that could drop all one's ambitions to the floor in one sweep. We all live in the shadow of

death.[24] Camus' main character in his novel *The Stranger* exemplifies this point.

Mercault, the lead protagonist in *The Stranger*, is sentenced to death for a crime he only half-heartedly committed. The trial is conducted and Mercault shows no true emotion when the sentence is declared. He realized that his whole life led up to this point, that his actions were the result of his choosing and that whatever was to come next was nothing more the effect of living in a world that showed no mercy or reason despite many others' attempts to structure a foundational existence around it. Just before his execution, Mercault exclaims, "I opened myself to the gentle indifference to the world."[25] Even in Camus' characters, the absurdity of life could have a strangle hold on all people, even if the result of life made no sense despite the order we, as human beings, try to arrange it in.

The world itself was not absurd. Absurdity arose when man entered the world and participated in it, when human reason tried to explain his own existence in spite of the happenings which appeared out of his control. Human need to explain or unearth a universal order to the greater scheme of things was only nominal endeavor when seeking answers from a quiet world. All that could be actualized was only fragmentary visions of what may be some greater truth, but absolute truth could never be attainable. Thomas Hanna called this relationship a "contradiction between a given state of affairs and reality itself, between one's intentions and the given possibilities, between an action and a world not in accord with this action."[26] Action itself is the result of some human reasoning, and when the world interacts with this action, the absurd is actualized. The human quest to explore and understand this relationship cannot come into fruition when pitted against an indifferent external world, so we must divorce ourselves from trying to create an explanatory structure from the contradictions we face.

If one is to adopt Camus' notion of the absurd, then there is no God, no absolutes, no philosophy which supports the loss of faith, and there may very well be no life after death. One must next ask, "why not commit oneself to his own physical extinction?" When one does commit physical suicide– as opposed to the above-mentioned philosophical suicide– there is an inherent recognition of life's absurdity and the only viable option is to take one's own life as an escape from that which makes no conclusive sense. As appealing as physical suicide is to the absurdist, he too must recognize the folly in submitting to this general appeal. "Since life is devoid of significance, it follows that death too must be so. It further follows, to Camus' mind, that he who commits suicide disavows the absurd, for he acknowledges at least the possibility that death, by contrast to life, may have meaning."[27] If one was to submit to physical suicide, then he would be admitting an absolute truth in that death was the final solution. In this case, the best we can do is live amongst the absurd and fight against it in the midst of so much unexplainable tragedy.

Instead of relying on the false hope of systematic philosophies and religious faith in the divine, or committing physical suicide, we must continue on in this struggle with the absurd. Camus calls this struggle a revolt, and it is in this revolt that humans are able to give life its value.[28] The character Sisyphus exemplifies why this struggle is always a revolt. When punished by the gods to spend eternity pushing a stone up a hill only to see it rolls down the other side, Sisyphus can choose to live in anguish, continually pushing this stone ,or he can willingly continue pushing in defiance of those who condemned him. Camus' philosophy is epitomized in Sisyphus' decision to keep pushing this burden in

spite of knowing that he will have to repeat the process infinitely. In the midst of so much anguish, he chooses to revolt against these opposing forces as a way to prove his defiance in the face of absurdity, as a final measure to assert his freedom to prove his spirit will not be crushed.

Camus' philosophical assertion that man was only free once he embraced and revolted against the absurd, by implication, meant there were no differences from one action over another. There were no axioms, boundaries, or absolute values to abide by since indifference and absurdity were the only guarantees apparent in the external world. "The fact that there are no given, universal values or principles must not be allowed to reduce all actions… to equivalence."[29] Camus asserted that life could not merely be a quantitative existence whereby nothing really mattered beyond living, itself; that is, where every action in life is considered to be measurably the same, no matter what kind of action it is.

The Nazi occupation of France and all the atrocities which stemmed from this great horror was constantly at the forefront of Camus' mind and his philosophy. He needed to figure out if his philosophy could, in fact, break from an amoral or quantitative stance to a qualitative one whereby a certain moral code could be fleshed out in the face of such evil. In his essay *The Rebel*, Camus came to the conclusion:

> "One cannot find logical consistency in murder, if one denies it in suicide. A mind that is imbued with the idea of the absurd will doubtless accept murder that is fated; it could not accept murder that proceeds from reasoning. In view of the confrontation which they both render impossible, murder and suicide are the same; one must accept them or reject them both."[30]

Camus came to the conclusion that freedom did have limits, that there were boundaries we must not cross. Since murder and suicide were not permissible, then what could be left? Camus found that man acts in the name of certain values, which are still indeterminate but which he felt are common to himself and to his fellow man. Solidarity amongst humankind was his last attempt before his sudden death. He was unable to continue hashing out this theory. It was left incomplete.

Sartre and Camus: At Odds

Freedom for Camus stems from a different source than Sartre. Freedom for Sartre is an internal discovery by which we must break down external influences and be truly at one with our unlimitedness. Camus' freedom is made self-evident once we acknowledge the absurd in life. "The man who revolts against the absurd begins to experience genuine freedom. There are no restraints on his actions. He knows that there is no future. There is no being superior to him. He is his own master. Man is eminently and unqualifiedly free."[31]

Camus' assertion that freedom must have limits was in contrast to Sartre's belief that freedom in itself was an unlimited notion. While both men were working for the Resistance movement in German-occupied France, they had lunch at a café where the idea of freedom became the afternoon's topic. Sartre maintained that man had infinite freedom, that there were no restraints on what he did. Camus argue that freedom must have limits on the type of action man could perform. Camus said to Sartre, "If freedom is really infinite, if it has no limits, then you can turn me over to the Nazis." Sartre, who worked for the underground like Camus, said he could do something so despicable. Camus famously replied, "Obviously then, freedom *must* have certain limits."[32]

By the end of World War II, Sartre was a proponent of Communist ideals, citing that "Communism is the key and future of all hope if man is to remain in the circle living ends, for only in this principle can the betterment of all means be met if the individual is to maintain any hope for the future."[33] As the world reeled from the ways of war, Sartre became a proponent of Communism, finding its Marxist philosophy to be the new corner stone by which all present and future political structures should be based. However, Camus found that Sartre and many French communists alike were flirting with an unsophisticated attempt at conceiving a system which could not be fully actualized. "[Communism] epitomized a naïve, utopian and ultimately conservative intervention in a time when all structures have proven folly to the likes of mayhem and despair."[34] Freedom was not a matter of forgone ideals for Camus. If nothing else, a structural base to designate all future hopes of creating a better society through Sartre's pre-deterministic hopes in Communism were not feasible in light of the second Great War and the absurdity in trusting man to act as moral agents in the wake of this sweeping political trend.

Stalinism and Maoism both tried to weave Communist ideals into their political systems, a move Sartre supported. However, Camus found that by forcing whole societies to shift their commercial and political interests to the right, they were also being forced to shift their overall personal interests in a direction that some may, otherwise, find disconcerting (at best.) Camus stated, "The world cannot expect its tired masses to suddenly shift from one upheaval to another with the flip of a switch, even if the switch is ignited with pain and suffering. Only a despotic overseer can force the hands of millions through fear and oppression. This new war is not about choice, and only furthers the oppression which many fought to eradicate in this most recent war."[35]

The role of violence became a necessary component to Sartre. "If true justice is to be done, then no ways or actions are too great in seeing that the hopes for our existence become actualized for the sake of the whole." Sartre sought a quantitative future for France, becoming a member and advocate of the French Communist Party, and contended that the quality of life should be second to the necessities of the greater whole. In other words, the human person must sacrifice his individual freedoms for the greater society. Camus contended that to forgo one's freedoms, to let them fall into the hands of government, was but one error away from allowing chaos to rise and allow the first half of the twentieth century to rear its ugly head.[36]

Conclusion

Albert Camus contended that one's life was not necessarily based on the number of years a person live, but how he lived according to the number of years he served his existence. Sartre, too, adhered to this notion, but felt the individual, in being the master of his own existence, should shift his ideals for the greater whole (Communism being the ideal). Camus could not support the idea of the self forgoing his freedom for any structural entity, whether political or philosophical alike. As the U.S.S.R. swept across Eastern Europe, killing countless millions for the sake of Communism, Camus' point about allowing a despotic government to control, and ultimately take, the lives of millions was made clear. "When one gate is breached, it is only a matter of time before all other fortifications falter. The only way to remain vigilant," according to Camus, "is to uphold the individual right to think and choose for one's self. If an oppressor comes breaking down gates, refuse him at all costs."[37]

Camus' philosophy is an incomplete philosophy. He worked on finding out why people should strive for a better quality of life and began by asserting that murder and suicide implied a certainty that simply living was not enough. However, before he could follow up and expand his ideas, he was killed in a car crash, cutting his life short and leaving his philosophical inquiries incomplete.

Sartre later refuted his Communist ideals after the U.S.S.R. invaded Hungary in the late 1950s. He was still a proponent of Marxism, but saw that the cost of enacting such a political philosophy was too great in determining the future of humanity. "This is proof that no matter the resolve of entire nations, the will of the people must remain true an strong if absolute freedom is to remain at the heart of our consciousness."[38]

Albert Camus and Jean-Paul Sartre were two of France's leading thinkers in the 20th century. Both have become staples in classrooms around the world for their literary prose and philosophical insights. They were each awarded the Nobel Peace Prize and were credited for their work during the French resistance movement, as well as their scholarly work in the field of Existentialism. Together, they restructured secular thought and contended that freedom resided in life, despite the absence of a divine being. Where they differed was on the implications freedom had on the human person in light of his situation in the world. There was no substitute for man, but himself and his own consciousness in the face of the chaos around him.

[1]   "The Ways of War." Europe during the Twentieth Century. Ed. Neil James. University of Missouri Press: Missouri, 2002. 158.

[2]   Sartre, Jean-Paul. *Being and Nothingness*. Citadel Press: New York, 1956. 548.

[3]   Armstrong, D.M. "What is Consciousness." *The Nature of Mind and Other Essays*. Cornell University Press: New   York. 1981. 721-728.This article distinguishes human consciousness from other conscious creatures, a hallmark to Sartre's philosophy. Armstrong does a concise job at explaining the differences between humans and other creatures.

[4]   Barnes, Hazel E.. "Sartre's ontology: The revealing of making of being." *The Cambridge Companion to Sartre.* Cambridge University Press: New York, 1992. 15-27. Barnes creates a link between Sartre's self-conscious human being and the freedom which stems from it.

[5]   Sartre, Jean-Paul. *Existentialism and Humanism*. Haskell House: United States of America, 1948. 26-28

[6]   Ibid.

[7]   Ibid.

[8]   Sartre. 34

[9]   Warnock, Mary. *The Philosophy of Sartre*. Hutchinson: London, 1971. 45-50

[10]   Ibid.16.

[11]   Sartre, Jean-Paul. Being and Nothingness. Citadel Press: New York, 1956. 409.

[12]   Warnock. 44

[13]   Fretz, Leo. "Individuality in Sartre's Philosophy." The Cambridge Companion to Sartre. Ed. Christina Howells. Cambridge University Press: New York, 1992. 73-75. Neutrality and indifference are at the heart of Sartre's philosophy. Fretz says it best by coming to this core as concisely as possible (Sartre has a habit of over-embellishing, while Fretz gets to the point).

[14]   Sartre, Jean-Paul. *Being and Nothingness.* 547.

15   Warnock. 52.

16   Sartre. 548.

17   Martin, Robert M. *The Philosopher's Dictionary*. Broadview Press: Mississauga, Canada, gg2003. 12. This serves to define absurdism.

18   Grenier, Daniel. "Albert Camus". *Existentialism: Beyond Faith*. University of Maryland: gggBaltimore, 1987. 354.

19   Camus, Albert. *The Myth of Sisyphus*. Vintage International: New York, 1993. 16-17.

20   Ibid. 17-18.

21   Ibid. 84.

22   Ibid. 109-112

23   Ibid. 130-138

24   Grenier. 357.

25   Camus, Albert. *The Stranger*. Vintage International: New York, 1989. 122.

26   Hanna, Thomas. *The Thought and Art of Albert Camus*. H. Regnery Co: Washington D.C., 1958. 12.

27   Peterson, Carol. *Albert Camus*. Frederick Unger Publishing Co.: New York, 1971. 54.

28   Grenier. 364.

29   Davis, Colin. "Violence and Ethics in Camus." *The Cambridge Companion to Camus*. Ed. Christina Howells. Cambridge University Press: New York, 1992. 110.

30   *Camus, Albert*. Vintage International: New York, 1993. 14.

31   Grenier. 366.

32   Bree, Germaine. *Camus and Sartre*. Delta: New York, 1972. 158.

33   Sartre, Jean-Paul. "Response a Albert Camus." 352.

34   Forsdick, Charles. "Camus and Sartre: The Great Quarrel." *The Cambridge Companion to Camus*. Ed. Edward J. Hughes. Cambridge University Press: New York, 2007. 121.

35   Ibid.

36   Bree, Germaine. *Camus and Sartre*. Delta: New York, 1972. 200-212.

37   Ibid. 245-246.

38   Aronson, Ronald. "Sartre on Progress." *The Cambridge Companion to Sartre*. Ed. Christina Howells. Cambridge University Press: New York, 1992.

The Influence of Brand Personality and Guilt in Cause Related Marketing

Crystal Castaneda

Mentor: Mathew Joseph, PhD
School of Business; St. Mary's University

Cause-related marketing campaigns are a widely used method in companies that provide a competitive advantage. Research has shown that both brand personality and guilt appeals have been effective strategies that have gained positive results after a cause-related marketing campaign. However, brand personality and guilt appeals strategies have been measured independently form each other. For this reason, the paper examines secondary research that helps bridge the influence, and impact of the two strategies. Specifically, it shows the contribution, risks and positive effects of brand alliance, and guilt appeals. With the research presented, companies are given implication strategies that suggest competitive advantage through cause-related marketing campaigns. To do this efficiently, brand alliance between a non-profit organization and a for-profit organization must include two strong brands, additionally; guilt appeals should be implemented moderately.

Introduction

When consumers think about companies like American Airlines and the Susan G. Komen Foundation, they would most likely see these two brands as two independent strong brands. (Steve Hoeffler, 2002) The effect of these two brands joining together to support a cause was a successful example of brand alliance. Brand alliance is also known as co-branding, and when done successfully the results of cause related marketing (CRM) campaigns are positive. Likewise, pictures of the earthquake from Haiti, evokes an emotional reaction on many consumers, this is an example of the guilt appeals that CRM uses to have successful campaigns. CRM is only effective if the cause is furthered through the support of the customers, these two strategies are efficient in inducing customers to participate in the campaign.

Literature Review

Non- Profit and For- Profit Organizations

This research will hone into two types of organizations, a Non- Profit Organization (NPO) and a for- profit organization. A NPO functions in the same way as many of the for-profit organizations. One of the primary differences is that, in a NPO, after normal operating expenses are covered, the profits are used to serve a public interest. NPO's are established to further a cause, and the profits that a NPO generates are used to serve the cause that the organization supports. Usually NPO's are registered as a 501(c) (3) which is given a federal tax exempt status. (DeMartinis, 2005) That is, when for-profit companies donate to NPO's they receive a tax exemption. The federal tax exempt status that companies receive from donating to a NPO is mutually beneficial to both NPO's and for-profit companies.

The NPO receives funding for the cause they support, and the donating company receives a tax exemption. Additionally, this "donation" helps the company be perceived as charitable. (Bottiglieri, 2011) NPO's exist to serve a specific cause or purpose, their existence helps aid a specific problem locally, nationally, or even globally. One example of that is the Susan G. Komen Foundation. A portion of their revenue comes from donations that people and/or corporations make to support the breast cancer research. An example of a company that works for profit would be McDonald's, all the revenue that comes in, is profit. Although these are different types of companies they function in similar ways to gain success.

Brand Functions
When we go into the store and we want to look for canned soup we will usually spot Campbell's, but if we were in a budget that day, we would look for the generic brand. Generic brands are strategically placed right next to the leading brand, and this is done for particular reasons. The brand serves a as a means to facilitate orientation, and choice. (Voeth, 2008) Specifically, if we look at the example we can see how the prior knowledge to the Campbell's brand served as a means to find canned soup. (Steve Hoeffler, 2002) Then once the consumer is oriented to the type of product they are looking for they can make a choice. The process of making a choice is facilitated when they look at the brands. This is because a leading brand, like that of Campbell's, would depict quality, and if the customer needs something that is inexpensive they can go for the generic brand next to the leading brand. (Voeth, 2008)

Brand Personality
Let's imagine two college students one is eating Healthy Choice, the other is eating Campbell's (both strong brands in canned food items (Barbara Lafferty, 2004)).

When we look at the two students, we can see that each type of brand suggesting something different, and we might take the prior knowledge we have of the brands and assume the individuals have different personalities because they chose different brands. When we look at Campbell's we can see that the personality of the brand might connote quality, while Healthy Choice may suggest something original, or organic. There is the Asker Brand Personality Scale, which has been a very reliable source for over a decade. The scale measures the type of personality that a brand transmits. The only problem is that the scale was first intended to cater to for-profit organizations. In study done by Markus Voeth and Uta Herbst, the scale was not transferable to German, Japanese, or Spanish markets, this was because the target market (population/group they are marketing their product to), had different cultures which entails different personalities. With this in mind, they realized there would be a need for a "Brand Personality Scale for the Non- Profit Sector." (Voeth, 2008)

For- Profit Brand Personality
There is a brand personality scale that caters to companies here in the U.S. this scale was designed by Aaker in the 1990's. When we look at the characteristics that are involved in the scale we can see that there are five basic personalities, as shown in Table 1. The idea is that "brand personality is based on the assumption that people tend to personify objects." (Voeth, 2008) In other words, when consumers purchase a product with a specific brand it is because they find certain characteristics that they can relate with to the product.

TABLE 1 Brand Personality for the For-Profit Sector

Sincerity	Excitement	Competence	Sophistication	Ruggedness
Down-To-Earth	**Daring**	**Reliable**	**Upper Class**	**Outdoorsy**
family-oriented	Trendy	secure	glamorous	Masculine
small-town	exciting	Hard-working	good looking	Western
Honest	**Spirited**	**Intelligent**	**Charming**	**Tough**
sincere	cool	technical	feminine	Rugged
real	young	corporate	Smooth	
Cheerful	**Up-Ta-Date**	**Successful**		
sentimental	independent	leader		
friendly	contemporary	confident		
Wholesome	**Imaginative**			
original	unique			

(Voeth, 2008)

Non- Profit Brand Personality

In the NPO sector there is a different target market. The customers that usually purchase products (either a good, service, or idea) that are related to the NPO sector have different characteristics that they identify with; we can see these characteristics in Table 2. (Voeth, 2008) When we think of this idea we can see why an individual who purchases fair-trade items form a NPO would find it difficult to purchase a garment from Abercrombie and Fitch (A&F). This is because they might relate to a NPO's fair-trade item because they support the mission of the organization, and feel that there should be justice and equality. While in A&F, they use sweatshops and they are in the business for- profit.

TABLE 2 Brand Personality Scale for the Non-Profit Sector

"Social Competence and Trust"	"Emotion and Assertiveness"	"Sophistication"
Humane	**Spirited**	**Charming**
non-commercial	exciting	cheerful
just	imaginative	good looking
social	outdoorsy	glamorous
sympathetic	adventurous	trendy
solidary	daring	upper class
fair	young	
fostering	unique	
trustworthy	**Persevering**	
honest	lough	
sincere	courageous	
responsible	critical	
authentic	international	
real		
non-party/ neutral		
peaceful		
Secure		
careful		
reliable		
effective		
experienced		
professional		
friendly		

(Voeth, 2008)

Cause Related Marketing as a means to Build Brand Equity

Brand Equity for NPO and For- Profit.

The Brand personality for both the for- profit sector and non- profit sector have been examined. Because there is different perceptions of both individually, we can also look at the value, or equity that each holds individually. The equity of a brand consists of different factors like brand awareness, brand image, and brand credibility. Brand awareness is the consumers "ability to recall and recognize" the brand's logo, symbol, or name. The brand image is the perception that customers have in their minds about the brand, this includes the personality that the brand carries and the perception the consumers have of the people who are associated with the brand. Lastly, the credibility of the brand includes the trustworthiness, expertise, and likeability of a brand; in other words, the perceptions and judgments individuals have of the brand. (Steve Hoeffler, 2002) These are all important since they include factors that determine the brands reputation. Apple is a good example of this since it is successful in acquiring the factors that help build it's brand equity.

Cause Related Marketing (CRM)

Cause- Related Marketing (CRM) is defined as "the process of formulating and implementing marketing activities characterized by an offer from the firm to contribute a specified amount to a designated cause." This has been a practice that has been implemented by many firms and has proven to be successful. (Ilaria Baghi, 2012) CRM can be achieved in three different forms. One way is by getting a for-profit organization to create a programme that furthers a cause, a great example of this is the Ronald McDonald House of Charity. Another way is when the for- profit organization links to a social cause (the firm fights an already existing social cause). A great example of this is American Express against Hunger.

The third way to achieve a CRM, and the most effective, is by combining a NPO and a for- profit organization, also known as co- branding, or cause- brand alliance. (Barbara Lafferty, 2004) We can see this when the two established organizations (NPO and for- profit) join together to further a cause, like American Airlines and Susan G. Komen Foundation. (Steve Hoeffler, 2002) (Ilaria Baghi, 2012)

Cause- Brand Alliance

Cause- Brand Alliance (CBA) is the most effective form to a CRM programme. This is because there are two established firms involved. The establishment of the two firms brings in two different types target markets. As a result, the NPO brand personality and the for-profit companies brand personality would transfer some of their brand perceptions over to the other. (Barbara Lafferty, 2004)This is a way to achieve maximum brand equity, implying that both the existing presumptions of a strong for- profit brand and a strong non- profit brand have come together to help a common cause. (Doerr, 2012) This is because the individual personalities of the firms will come together in the campaign with enables more people to see the alliance of the firms. The for-profit brand would now be perceived as a humanitarian one, and personalities form the NPO scale would transfer over to CBA programme. The NPO would also benefit because usually the for- profit is more known than the NPO, and this would increase the target market of the NPO. In the case the Susan G. Komen foundation and American Airlines brand alliance, the campaign proved to be successful because of the perception of the individual brands prior to the alliance was strong. When they embarked on a CBA they gained new brand personalities that transferred over from and to each other. (Sayed Fatholah Amiri Aghdaie, 2012) (Steve Hoeffler, 2002) (Barbara Lafferty, 2004)

Guilt in CRM

Although the CRM has been effective, and brand personality is a factor and contributor to this result there is one element that has also been used in CRM. Guilt appeals are often used in CRM's because they are effective. (Basil, 2008) Is the contribution of the consumer because they strongly feel they connect with the cause or because they feel guilty? There are guilt appeals that can be found in CRM according to Chang, she has been studying how CRM has actually used guilt appeals to get people participating in the programme. (Chang, 2011) As mentioned, CRM has been successful, and brand personality plays a big role on the purchasing of items.

Is the main reason people participate because they feel guilty, or because they feel the CBA personality identifies with them? In Chang's study we can also see that often costumers participate because they do not want to be looked down upon for not purchasing an item from a CRM campaign. In fact, consumers like to be socially acceptable and purchasing a CRM item is socially acceptable. (Kim N., 2012) (Chang, 2011) (Jae-Eun Kim, 2012)

Proposed Methodology

This research shows that costumers are influenced by the brand personality of the product and the guilt appeals that are used to induce the purchase of the product. What this research would like to expand on is which of the two influences [whether brand personality or guilt appeals] has a greater influence when buying a CRM product.

There will be a pilot study done that will describe a scenario, where participants will be asked to answer several questions. The participants that will be picked for the pilot study will be picked at random, but they will be ranging from the ages 18-28. This age group has been chosen because they are all generation-y individuals. Past research suggests that this age group convey characteristics that are similar in "their values, attitudes, preferences, and buying behaviors." (Karen H. Hyllegard)

The questionnaire would consist of a scenario in which consumers would be asked a series of questions that would determine the primary reason they would buy the cause-related product. With the questions provided the research will try to show that there is a greater influence weighing in one of the strategies [brand personality or guilt appeal] that is the primary influence for consumers to purchase CRM products. The questionnaire would be assessed through the social media, in an electronic form.

Discussion

It is evident that both strategies are successful. As mentioned, they each serve a purpose and they provide the success necessary in CRM's. Both, the brand personality form the two companies engaged in the CRM campaign and the guilt appeals used in their campaign will impact the success of the campaign as a whole. However, they both carry different risks, in brand personality the risks can be foreboded if enough information is known about the brand's personality. (Sayed Fatholah Amiri Aghdaie, 2012) (Barbara Lafferty, 2004) The strongest characteristic in brand personality is that of brand credibility, it gives consumers a sense of trustworthiness and expertise. (Sayed Fatholah Amiri Aghdaie, 2012) If the brand is weak then there will be a smaller success rate in the campaign.

On the other hand, guilt appeals carry a higher risk. If there is a campaign where consumers feel overwhelmed by the guilt appeals, the results might show that the campaign distanced the consumer. Likewise, if there is not enough guilt appeal the campaign might also have little or no success. If there are not enough guilt appeals then the consumer would not want to purchase the product. (Basil, 2008)

In summary, brand personality in brand alliance, and guilt appeals serve as a way to yield positive results in a CRM campaign. When a consumer purchases an item there are certain emotions that might pass through, and/or preferences for brand personality affiliations. For companies to have successful CRM campaigns it would be helpful if they knew which strategy would encourage more consumers to participate.

References

Barbara Lafferty, R. G. (2004, July). The impact of the alliance on the partners: a look at cause- brand alliances. *Psychology & Marketing*.

Basil, D. Z. (2008). Guilt and Giving: A process model of empathy and efficacy. *Psychology & Marketing Vol. 25* (1), 1-23.

Bottiglieri, W. A. (2011). The regulation of non-profit organizations. *Journal Of Business & Economics Research*, 51-60.

Chang, C.-T. (2011). Guilt appeals in cause-related marketing. *International Journal of Advertising*, 587-616.

DeMartinis, R. (2005). What is a nonprofit organization? *Nonprofit & Fundraising Resources*.

Doerr, A. &. (2012). Marketing alliances between non-profits and businesses: Changing the Public's Attitudes and Intentions Towards the Cause. *Allied Academies International Conference: Proceedings Of The Academy Of Marketing Studies*, 17-20.

Ilaria Baghi, V. G. (2012). For-profit or non-profit brands: which are more effective in cause- related marketing programme? *Journal of Brand Management*, 219- 231.

Jae-Eun Kim, K. K. (2012, February). The impact of moral emotions on cause-related marketing campaigns: a cross cultural examination.

Karen H. Hyllegard, R.-N. Y. (2011, February). The influence of gender, social cause, charitable support, and message appeal on Gen Y's responses to cause-related marketing. *Journal of Marketing Management*, pp. 100-123.

Kim N., S. Y. (2012). Consumer evaluations of social alliances: the effects of perceived fit between companies and non-profit organizations. *Journal Of Business Ethics*, 163-174.

Nowak, L. &. (2000). Marketing alliances between non-profits and businesses: changing the public's attitudes and intentions towards the cause. *Journal Of Nonprofit & Public Sector Marketing*, 33.

Sayed Fatholah Amiri Aghdaie, H. R. (2012, April). Analysis of impact of brand credibility perceived quality on consumers evaluations of brand alliance. *International Journal of Markeiting Strategies*.

Steve Hoeffler, K. L. (2002). Building brand equity through corporate societal marketing. *Journal of Public Policy & Marketing*, 78-89.

Voeth, M. &. (2008). The concept of brand personality as an instrument for advanced non-profit branding--an empirical analysis. *Journal of Nonprofit Sector Marketing*, 71- 97 doi: 1300/ JO54v19n01-04

Describing the Characteristics that Define the Relationship Between a Mother and a Calf as a Possible Attachment

Yesenia Castaneda

Mentor: Heather Hill, PhD
Department of Psychology; St. Mary's University

Can the interactions between a beluga mother and calf be described as an attachment bond or can it just be seen as an imprinting bond. In this study we looked at four mother-calf pairs for the first two years of life of the calf. Thirty-eight and a half hours of video coding were transcribed for calf exploratory behavior, mother-calf swims, safe haven, and secure base. The results indicated that calves used their mothers as their safe haven and secure base as they went into their second year of life. These attachment behaviors corresponded to the increase of exploratory and solitary behaviors of the calves during the second year. From the thirty-eight and half hours nine of those hours the calves engaged in exploratory behavior and twenty-four hours in mother-calf swims. The frequency of how many times safe haven and secure base was seen recurrently in the second year of life of the calf. These results give indication on how to house these animals, how to care for them and the most accurate conditions for them to have a normal development. The results show that there is an attachment relationship between the mother and calf. The mother not only provides protection and nourishment for the calf but also psychological comfort.

Describing the Characteristics that Define the Relationship Between a Mother and a Calf as a Possible Attachment

Most offspring with a period of dependency are less likely to survive if parental care is removed. In species in which imprinting occurs, mothers that are separated from their offspring during the critical period will reject offspring as they did not imprint upon the offspring. Thus, that offspring will fail to survive due to the lack of protection and nourishment (Ainsworth, 1989). Similarly, human mothers separated from their infants for long periods of time will not show the same tenderness or commitment to their infants, which will likely lead to difficulties in all aspects of the infant's development. All types of animals provide parental care with varying degrees. Some insects, such as burying beetles, genus species, provide elaborate forms of care for their offspring ranging from securing nourishment to redirecting them from dangerous situations and predator (Eggert, Reinking, & Müller, 1998). The larval survival of burying beetles was significantly higher when parental care was involved than

when it was absent as the larva grew faster and bigger (Eggert, et al., 1998). While some animal parents engage in more complex forms of parental care such as teaching or intervening, others limit their care to more basic behaviors such as, egg guarding, nest guarding, or food procurement. Clearly the longer the offspring dependency period, the more involved the parents are (Ainsworth, 1989). These long periods of dependence and offspring care provide opportunities for bonds to develop beyond the simple purpose of protecting the physical well-being of offspring.

Originally the bond between animal offspring with periods of dependence and their mothers was thought to be driven by a biological force (i.e., to provide nourishment and to protect the offspring from environmental threats). The process of imprinting was proposed to explain the bond between mothers and their offspring (Immelman, 1975). Imprinting is a rapid learning process by which a newborn or very young animal establishes a behavior pattern of recognition and attraction to another animal of its own kind or to a substitute or an object identified as the parent (Greenberg & Haraway, 1998). Konrad Lorenz (Greenberg, & Haraway, 1998) recognized five characteristics that distinguished the imprinting process from any other associative learning: 1. Imprinting occurs only during a critical period, 2. most imprinted bonds are irreversible, 3. the bond affects behaviors as the individual matures, 4. the bond facilitates the learning of species typical behaviors, and 5.the imprinted bond is not due to reinforcement. Imprinting occurs in a variety of animals, including birds and mammals (Greenberg & Haraway, 1998). For example, a European female will select a specific host bird to rear during the critical period of imprinting (Immelmann, 1975). Thus, the newly hatched birds will bond with the surrogate mother and

approach the imprinted figure and maintain close proximity to that surrogate bird and not to its biological mother (Rajecki, 1973). Mothers will care for any young that is in the nest at the moment . When the imprinting process takes place with precocial birds they found that maternal care is rarely selective. Mothers will care for any young that is in the nest at the moment. Unlike birds, most domestic ungulate mothers develop exclusive care for neonates that have been familiar to them since parturition. Ungulate neonates must be marked by the mothers so that mothers recognize their odor and imprint upon them. Any young animal that is unfamiliar to an ungulate mother will be rejected often with aggressive behaviors (Poindron, Lévy & Keller, 2007).

While the idea of imprinting contributed to the understanding of the development of a mother-offspring bond, it was questioned by the research of Harry Harlow (as reviewed by Craig, 2000). Harlow tested the hypothesis that the mother-offspring bond was due to the nutrition provided by the mother. In a variety of experimental studies with rhesus monkeys, genus species, he discovered that the infants preferred to be with a cloth-covered surrogate monkey mother over a wire-mesh surrogate monkey mother despite being hungry. His initial observations were confirmed by the infant monkeys' responses to threatening stimuli, that is they preferred to seek comfort from the cloth-covered surrogate monkey (Craig, 2000).

Initially, Harlow was unable to explain the preferences of the rhesus monkey infants. His social isolation studies provided some insight into how being reared in the absence of a mother affected infant and adult development. The results of these studies indicated that monkeys that were only isolated for short periods of time quickly recovered and lived normal adult lives, whereas monkeys that were isolated for

prolonged times suffered certain difficulties and did not adapt functionally to social life in monkey colony. Moreover, the females that had been isolated for long periods of time from other monkeys were abnormal in their social behaviors and abusive towards offspring. These studies suggested that social interactions and parental care of offspring are critical components for a typical development. Thus, the mother-infant relationship was important, but the mechanism was still unclear particularly for humans (Seay, Alexander & Harlow, 1964).

The research and theory development of John Bowlby and Mary Ainsworth helped establish another explanation for the development of the mother-offspring bond (Craig, 2000). Influenced by imprinting theory and Harlow's research, attachment theory is based on the belief that the mother-child bond is the essential and primary force in infant development. An attachment is defined as an affection-based tie that one person or animal forms with another individual and endures across time and contexts (Craig, 2000). Bowlby initially suggested that the primary reason attachments developed was to secure the survival for helpless infants by protecting them from dangerous situations (Miller, 2002). Thus, the signaling behaviors (e.g., crying, smiling) displayed by human babies are used to communicate their needs to the caretaker. While these signaling behaviors are initially performed in the presence of any human adult, over time infants become more discriminative to whom they direct their displays. The time at which infants begin to show these preferences corresponds to their development of a clear-cut attachment (Craig, 2000).

Mary Ainsworth extended Bowlby's ideas on attachment, discovering that infants changed their behaviors depending on the presence or absence of certain people and threats. Ainsworth documented the developmental sequence of attachment formation (Craig, 2000). She suggested that attachment behaviors developed in four phases: 1. undiscriminating social responsiveness, 2. discriminating social responsiveness, 3. genuine attachment to the primary caretaker, and 4. a goal-corrected partnership in which this first attachment relationship provides the foundation for future interactions with others as these interactions will contain some of the same qualities as the first one (Craig, 2000).

While attachments are biologically driven (i.e., human infants are prepared to form bonds with any available human), they are more complex than the bond developed through imprinting or the basic parental care provided by other species. As demonstrated by Harlow's work with rhesus monkeys, infants who were scared, threatened, or fatigued sought a psychological comfort from their attachment figure. This work was supported by the studies with human infants who had formed a clear-cut attachment as they refused to be comforted by anyone who was not their attachment figure. Thus, the signaling behaviors of both the infants and adults are synchronized into an "attachment behavioral system". That is when infants cry adults will pick them up and display comforting behaviors until the infants are soothed, or when infants laugh adults will look at the infants and smile back or interact with the infant.

Behavioral systems consist of behaviors that are synchronized to reach a goal and adaptive in function. Attachment theory proposed that three behavioral systems are critical to the formation of an attachment: the caregiving system of a parent, the attachment system of the infant, and the exploratory system of the infant. The goal of the caregiving system is to protect the infants and keep them close during times of threat or danger. The responses of the caregiver are often correlated with strong emotional feelings, including the desire to remain close to the offspring and feeling

anxiety or anger when that proximity is threatened (Solomon & George, 1996). The attachment system of the infant is centered on the idea of keeping close proximity to a caregiver and feeling secure. The attachment system of the infant changes with age and the surrounding environment, such that as the infant ages proximity incorporated both physical distance and psychological distance (secure base & Safe haven). By the first year of life, human children are mobile and able to fully explore their environment. Thus, when in a novel environment or around a novel person, children will search or protest until they find their attachment figure if their attachment system is engaged. If the attachment system is elicited, exploration will be reduced until the attachment figure returns. Once the attachment figure returns most one year olds will first seek proximity or contact than continue with their previous activity before the attachment figure had left (Sroufe & Waters, 1977). In a study done before they were investigating the mother-infant interactions for the first year of life. The mothers and infants were being observed for infant exploring, infant looking at mother, and maternal smooth. Infants that were only one month old did not have a preference on who paid attention to he/she when in a moment of distress. However, once the infant was six or nine months they had a preference to their mothers face. The infant exhibited anxiety when around a face that was not their mothers. Finally once their mother came and soothed the child they returned to previous activity. (Isabella et al., 1989). When an infant is in a new environment and engaging in an anxiety provoking situation, an aggressive interaction, a threat, fatigue or illness will trigger the safe haven behavior and will cause them to retreat to their mother. However, when an infant is playing either alone or with a stranger and their mother is around the same general area , they will trigger a secure base behavior by either looking towards their mother, minimizing the distance between them and their mother or making some type of contact with their mother.

Ainsworth empirically validated the presence of attachments in humans and identified three types of attachment styles (Ainsworth, 1964). With the development of the laboratory-based experimental manipulation of the strange situation, Ainsworth was able to differentiate between different attachment types. Using eight different scenarios that lasted about three minutes long for all except for the first one, Ainsworth tested the responses of 12-month-old children. The situations involved the infant being in an unfamiliar room filled with toys, a stranger and two separations and two reunions with the mother. In one separation, the infant is left alone with the stranger whereas in the other separation the infant is left completely alone. The strange situation begins with the mother in the room with the infant and a stranger. While exploring the room and the person, the infant will periodically turn and look at mom, secure base behavior. During the first separation from the mother, the question becomes how infants respond to the separation from their mother. Some infants will move toward the door crying after their mothers while others do not even seem to notice their mothers' absence. Upon the mothers' return, the question becomes how do the infants respond to her arrival. If securely attached, the infants will be calmed by their mother and resume their exploration. If insecurely attached, a different set of responses will emerge. Many studies have replicated Ainsworth's original results, supporting the idea that the bond between a mother and an infant was not just biological but psychological since the infant only felt safe and secure with its mother (Londerville & Main, 1981).

Many researchers have applied the framework of attachment theory to the caregiving and offspring development of

nonhuman animals, including primates, kangaroos, elephants (Mann, & Smutts, 1999). With a period of extended offspring care, complex cognition, and a social society, cetaceans are one species that may develop attachments between offspring and their mothers. Belugas (*Delphinapterus leucas*), species, or white whales, are small to medium whales living in the Arctic and sub-Arctic waters. They are highly affiliative and often form large herds during social gatherings (Krasnova, Bel'kovich, & Chernetsky, 2006). Females bear their calves in shallow estuaries during the summer months when the waters are warmer and food sources are plentiful (Krasnova, et al., 2006). Beluga calves are reared solely by their mothers for two to five years, depending on the appearance of the next calf or the weaning process. The mother-calf bond is considered as one of the strongest and enduring relationships in cetaceans, as indicated by the amount of time calves spend with their mothers and the proximity with which they stay to their mothers.

The development of the bond between beluga calves and their mothers has not been studied extensively. Two studies of a beluga population in the wild (Krasnova et al., 2006; 2009) and one study of two beluga calves in human care currently exist. Examining the behavioral development and maternal care of belugas in human care during the first year of life (Hill, 2009) produced several outcomes corroborating the research performed on wild belugas (Krasnova et al., 2006; 2009). First, mother-calf swims decreased over the first part of year of life but then increased again at the end of the second year of life for both calves (Hill, 2009). Much of their early time was spent in an echelon position or side by side position. However, once they reached three to four months, the calves displayed a preference for an infant swim

position. These behaviors replicated those observed by Krasnova et al. (2006), The calves also initiated the majority of the reunions with their mothers during the first year of life, suggesting that calves were responsible for the proximity maintenance with their mothers. As the calves matured, they displayed more solitary behavior and engaged in social interactions with each other (Hill, 2009). This increase in independence could therefore lead to increased opportunities to develop an attachment or a dependence on their mothers during threatening situations.

Also of interest were the difference in maternal behaviors exhibited by the two beluga mothers. While both mothers swam with their calves and initiated some reunions with their calves when in danger, one of the mothers engaged in more maternal behaviors than the other (Hill, 2009). These caregiving behaviors are reminiscent to those displayed by human mothers who have formed attachments to their infants. Alternatively, they may simply represent behaviors that the mothers demonstrate as part of their biologically-determined species-specific behavior repertoire. If the bonds formed by mother belugas to their calves are attachments, we would expect variation in maternal responses to calf behavior and contexts (e.g., some mothers may be more vigilant of their calves' actions than other mothers). Although the two beluga mothers in human care suggested individual differences in maternal responses, they only represent two belugas in a controlled environment. Research with bottlenose dolphins (*Tursiops truncatus*), has suggested that bottlenose dolphins may in fact have different maternal styles (Hill, Greer, Solangi, & Kuczaj, 2007). When maternal behaviors were examined across the first year of life for seven dolphin mothers, the results indicated that the dolphin mothers cared

for their calves in many similar ways with the exception of certain behaviors including herding, discipline, and the degree of proximity maintained to the calves (Hill et al., 2007). This variation in the amount of control and maternal care behaviors exhibited by dolphin mothers in human care supported previous research indicating that Indian Ocean bottlenose dolphin mothers (*Tursiops aduncus*), in the wild also demonstrated different maternal care profiles (Mann & Smuts, 1997). Additional research with Indian Ocean bottlenose dolphins has indicated that variations in maternal care influenced future social relationships (Gibson & Mann, 2008).

The purpose of the current study was to examine the interactions between beluga mothers and their offspring in human care during the first two years of life to ascertain if the bond that forms between them is an imprinted bond that simply facilitates the survival of the calf through basic care and protection or if it is an attachment bond that provides both the physical needs and the psychological comfort of the calf during times of distress and exploration. Archived video footage collected across the first two years of life of four mother-calf beluga pairs was coded to address the following questions:

1. What activities do the calves spend their time on average from year one to year two?
2. Are there preferences in mother-calf swim types across year one and year two?
3. How long does a calf last in an independent swim, pair swim, affiliative swim and, and aggressive interaction?
4. Do calves show increasing independence as they mature or is it consistent from year one to year two?

5. Who initiates (mother/calf) the reunions when in a mother-calf interaction?
6. Do calves demonstrate secure base behavior and safe haven across year one and year two.

Method

Subjects

Four mother-calf pairs of belugas housed at Sea World San Antonio in Texas were the subjects for the current study. The oldest calf, OLI, was born on June 23, 2006 and was male. The second calf, GRA, was born on June 26, 2007 and was also male. The third calf, QIN, was born on July 31, 2008 and was female. The last calf, BEL, was born on June 12, 2009 and was a female. Two of the mothers, MAR and SIK, were rearing their first calves beyond the first year, while the other two mothers previously reared their successful calves through weaning. Finally, OLI's mother, TIN, passed away when OLI was only 19 months old. All four mother belugas have been in human care within two years of their birth in the wild.

Measures

Thirty-eight and a half hours of video coding were transcribed for the first two years of life for the calves. Variable of interest included animal name, calf age in months, video date, session time, mother-calf interactions, calf-calf interactions, solitary activities, initiators of reunions, and two types of attachment behavior, secure base and safe haven. Mother-calf pair swims were divided into three categories: echelon, infant, and pair swim. Table 1 summarizes the operational definitions for each variable of interest. Each variable was coded for frequency and duration. To account for the sessions of unequal time all frequencies and durations were also converted to rates (frequency/session time) and proportions (duration/session time) when appropriate.

Procedure

Thirty-eight and a half hours of archived video footage were used to examine the bond between the four mother-calf pairs. Video sessions previously recorded by different observers ranged between 10 to 15 minutes in length. Four videos every other month were selected for coding. The videos were selected based on the quality of the visibility ascertained by an independent coder. Once selected, each video was coded by a single coder for behavioral parameters. A transcription of the video was created upon the viewing of each video so that the frequency and duration could be recorded for mother-calf swims, solitary behaviors, social interactions, reunions, and attachment behaviors. The initiator, and receiver of each social bout

Table 1

Operational Definitions for Target Calf Behaviors

Target Behavior	Operational Definitions
Mother-Calf Pair Swim	Mother and calf swim within 1m of each other and are synchronized.
Mother-Calf Infant	Calf swims directly below the mother, positioned near the mammary.
Mother-Calf Echelon	Calf swims parallel to the adult, near the dorsal ridge and slightly staggered and maintains position for at least three seconds.
Mother-Calf Affiliative	Mother and calf float within the same general area of each other.
Calf-Calf Affiliative	Calf and other available calf float within the same general area of each other.
Solo Swim	Calf swims independently of other available swims.
Solo Float	Calf remains motionless in one location independently for three or more seconds.
Solo Play	Calf plays independently, with water, toys, or motor involving one's body.
Secure Base	Amount of separation between mother and calf, reunions, orientations, and contact.
Safe Haven	Reunions between calf-mother during anxiety provoking situations, aggressive interactions, threats, fatigue and illness.

was also documented. Any events in which the initiator was ambiguous were marked so that information could be excluded from the analysis involving initiator of social bouts. To be as accurate as possible every second of the session time was accounted for in the video. Thus when the focal mother-calf pair was out of view of the camera for longer than 10 seconds then this period was considered as non-visible time and the time was then removed from the total session time creating a new variable labeled usable time. Thus all the data that was transcribed from the videos was with usable time.

Results

Table 2

Means and standard errors of means for each major interaction

Interaction	Year 1		Year 2	
	n	M(SEM)	n	M(SEM)
Independent	58	35.58(0.61)	70	45.79(0.46)
Pair	91	75.24(0.71)*	85	50.98(0.40)*
Affiliative	68	26.91(0.45)	59	17.56(0.32)
Aggressive	9	.82(0.12)	13	.70(0.03)

Note: Means and standard errors of means with the same super script indicated a significant difference with a $p<.05$.

A series of 2 (year) X 4 (mother-calf pair) factorial ANOVAs compared mother-calf activity from year one to year two across four mother-calf pairs for the dependent variables independent swim, pair swim, affiliative swim, and aggressive interaction. No significant interaction or main effects were found for independent swim. For pair swim, no significant interaction or main effects for mother-calf pair were found. A significant difference was found between pair swim in the first and second year of life, $F(1, 3) = 9.60$, $p=.002$, $\eta^2=.05$. For affiliative swim no significant interaction or main effects were found. For aggressive interactions no significant interaction or main effects were found. See Table 1 for means and standard errors of means (SEM).
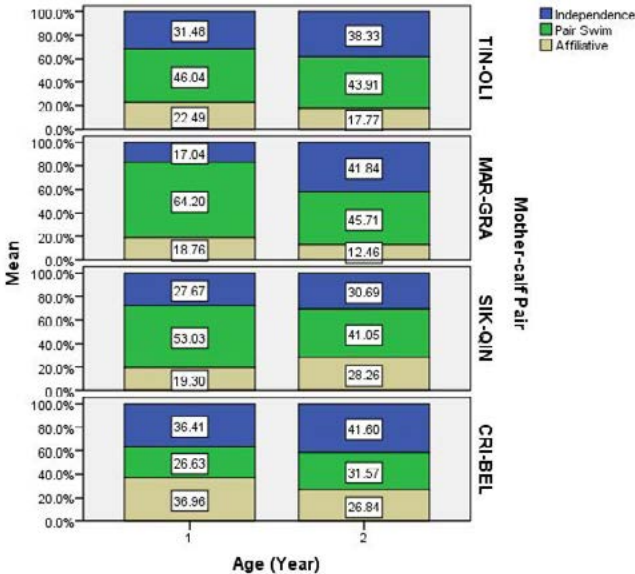
Figure 1. Activity Budget demonstrates how much time each calf spent in three major categories of calf behavior.

Specific Categories

Durations. A one-way ANOVA was used to compare how long each type of mother-calf interaction lasted for year one and year two. The results indicated a significant overall effect for type of mother-calf swim and duration, $F (1, 2) = 3.61$, $p=.028$, $\eta2=.01$.) Dunnetts T3 Post Hoc analysis indicated that mother-calf echelon swim was significantly shorter in duration than mother-calf infant swim and mother-calf pair swims. In contrast, mother-calf infant swim was on average the same length as a mother-calf pair swim. See Table 2 for means and standard errors of means (SEM) for all three types of mother-calf swims.

Table 3
Descriptive statistics for duration of mother-calf swims

	N	M	SEM
Mother-calf Swim			
Echelon	124	67.71	0.88
Infant	195	108.21	0.66
Pair	377	101.96	0.41

The mean length in time the calf spends in an affiliative interaction with its mother present for year one ($M=51.12$, $SD=75.02$) and year two ($M=53.53$, $SD=71.10$) was examined using an independent samples t-test. The t-test indicated that the means did not differ, $t(258) = .25$, $p>.05$. The mean length in time the calf spends in an affiliative interaction without its mother present for year one ($M=26.66$, $SD=57.10$) and year two ($M=26.22$, $SD=26.73$) was examined using an independent samples t-test. The t-test indicated that the means also did not differ, $t(240) = .08$, $p>.05$. A visual analysis of the mean suggest that mother-calf affiliative interactions may be longer than calf affiliative interactions with other animals. See Figure 1 for overall time spent in an affiliative swim with or without calf's mother.

The mean length in time the calf spends on an independent bout for year one ($M=30.01$, $SD= 47.68$) and year two ($M=68.64$, $SD=113.17$) was examined using an independent samples t-test. The t-test indicated that the means differed significantly, $t(794) = 6.38$, $p>.05$. Thus, confirming that the calf's age is related to how long the independent bout lasts for each year. The results indicate that once the calf goes into year two they have longer independent bouts. Figure 1 for overall time spent in independent activities..

Initiator of interactions. To determine whether there was a relationship between the initiator (mother/calf) of a mother-calf interaction and the age of the calf (years), eight different chi-square test of independence were conducted. As summarized in Table 2 the results indicated that a significant relationship existed for the initiator and the type of mother-calf interaction for each year. The calves initiated significantly more mother-calf interactions for all four categories each year. See Table 4 for frequencies and chi-squares for all calf interactions involving calf's mother.

Table 4
Initiators of Mother-Calf Interactions

Interaction	TIN	OLI	MAR	GRA	SIK	QIN	CRI	BEL	χ^2	p
				F						
Echelon										
Year 1	1	1	1	9	0	3	7	1	138.00	<.001
Year 2	2	2	0	0	0	0	2	6	36.00	<.001
Infant										
Year 1	0	2	0	3	0	12	0	3	60.00	<.001
Year 2	0	11	0	4	0	10	4	7	144.00	<.001
Pair										
Year 1	10	6	7	14	6	23	5	13	616.00	<.001
Year 2	1	9	2	16	5	29	11	12	565.63	<.001
Affiliative										
Year 1	3	6	8	17	8	18	7	35	721.00	<.001
Year 2	6	4	1	13	4	9	8	7	367.20	<.001

Note: The available data for TIN ended at 19 months for OLI.

Attachment Behaviors
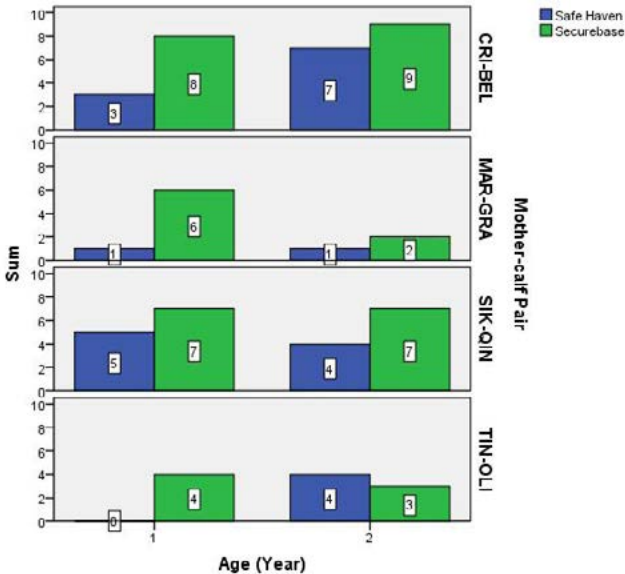
Figure2. Frequencies for Safe Haven and Secure Base interactions for each mother-calf pair for the first two years of life.

To determine whether there was a relationship between secure base behavior (present, absent) and calf age (year 1, 2), four chi-square tests of independence were conducted. Secure base interactions occurred for all four calves, with OLI displaying seven secure base interactions, GRA displaying eight secure base interactions, QIN displaying 14 secure base interactions, and BEL displaying 16 secure base interactions. All four calves failed to show a significant relationship between secure base behavior and age (χ^2(N=611) =0.14, p>.05, χ^2(N=629) =1.01, p>.05, χ^2(N=.04) =497, p>.05, χ^2(N=589) =2.52, p>.05). These results suggest that secure base interactions were displayed across both years for all calves. See Figure 2. (Secure Base indicated by the *green bar*).

To determine whether there was a relationship between safe haven behavior (present, absent) and calf age (year 1, 2), four chi-square tests of independence were conducted. Safe haven occurred for all four calves, with OLI displaying four safe haven events, GRA displaying two safe haven events, QIN displaying nine safe haven events, and BEL displaying 10 safe haven events. Three of four calves failed to show a significant relationship between safe haven and age (χ^2(N=629) =.05, p> .05, χ^2(N=497) =.24, p> .05, χ^2(N=589) =3.00, p> .05). OLI showed a significant relationship between safe haven and age χ^2(N=611) =4.04, p>.05. These results suggest that safe haven was displayed across both years for all calves. See Figure 2. (Safe Haven indicated by the *blue bar*).

Discussion

Mother-calf interactions during the first two years of life of beluga mother-calf pairs in human care were examined to determine if they represented an imprinted bond or an attachment. The first goal of the study was to examine four major behavioral categories in which calves participated across two years.

These categories consisted of independent swim, pair swim, affiliative swim, and aggressive interaction. The second goal of the study was to examine the characteristics of each category beginning with the types of mother-calf swims. Mothers and calves exhibited several types of swims across each year: mother-calf echelon, mother-calf infant, and mother-calf pair. The third goal for this study was to then examine the average durations for each type of behavioral category involving affiliative interactions with and without their mothers, aggressive interactions, and independent activities. The fourth goal for this study was to observe which animal (mother/calf) initiated most of the mother-calf interactions across each year. These mother-calf interactions were then observed to determine if the calves displayed safe haven and secure base across the two years.

Overall Behavioral Categories

Earlier studies of cetacean calf development have indicated that the first few months of life a calf will engage in mother-calf swims the majority of the time with (Hill, 2009; Hill et al., 2007; Krasnova et al., 2006, 2009; Mann & Smuts, 1999). As the calve mature, they tend to display more independent swims than pair swims (Hill, 2009; Hill et al., 2007; Krasnova et al., 2006, 2009; Mann & Smuts, 1999). The beluga calves in the current supported these trends. Mother-calf swim was an important activity during both years but did decline in overall frequency between the two years. As seen in Figure 1, the calves varied in their degree of mother-calf swims, independent activities, and social interactions, but they did not differ from each other significantly. Based on the average amount all four calves spent in the three major categories some differences could visually be seen for each set of mother-calf pair. For three of the four mother-calf pairs their was a decrease of pair swim from year one to year two. This

information supports previous research that suggested in decrease of mother-calf swim and increase in independent swims (Hill, 2009.) However, the fourth mother-calf pair CRI And BEL showed a small increase of pair swim from year one to year two. This difference found in the overall averages for the three major categories could possibly indicate a difference in maternal styles that has been previously researched in bottlenose dolphins (Hill et al., 2007) but has not been tested statistically for beluga mothers.

Specific Categories

Mother-calf swims were expected to change over time based on the age of the animal (Hill, 2009; Krasnova et al., 2006; Mann & Smuts, 1999). As expected the calves preferred an infant swim position or a side by side pair swim. They swam in the echelon position for significantly less time than either infant or pair swim. This trend is typical as the echelon position seems to be used by young calves during the first few months of life as they draft off of their mothers to conserve energy and gain control of their bodies. By the end of the first year, the calves are much stronger and bigger and move to different swim positions. The infant position is particularly intersting as this is the calves' preferred position during times of hunger, fatigue, or stress.

When calves are not swimming with their mothers, they may be found engaging in various social interactions (Krasnova, et al., 2006). Affiliative interactions between calves and their mothers often involve rubbing against one another while affiliative interactions between calves and other animals involve rubbing, chasing, and playing with one another. The calves in the current study displayed both types of interactions. The average duration of mother-calf affiliative interactions did not change between the two years. Likewise,

the average duration of the calf-other affiliative interactions did not change between the two years. However, looking at Table 3, the mean durations suggest that a mother-calf affiliative interaction may last longer than a calf affiliative interaction with another animal although it has not been tested statistically. Aggressive interactions did occur across both years for all calves. The duration of an aggressive interaction did not vary from year one and year two. However, the frequency did suggest that aggressive interactions did take place across all four calves from year one to year two 22 times.

Calves were also expected to increase their solitary behaviors across the two years (Hill, 2009). This trend was also supported by an increase in the average duration of independent activities from year one to year two. Also, all four calves seemed to engage in more independent swims in year two.

Earlier research on the initiator (mother/calf) of mother-calf interactions for the first year indicated that the calves were the primary initiators (Hill, 2009). This finding was supported by the current study. For all four mother-calf pairs the initiator was primarily the calf for both year one and year two. For each mother-calf swim the number of times the calf was the initiator increased twice as many times from year one and year two excluding mother-calf echelon where the calf and the mother initiated about the same quantity of reunions. Figure 1 gives a visual of the frequencies who the initiator (calf/mother) is for the mother-calf swims from year one and year two. The figure shows the significant change from year one to year two for each mother-calf pair and gives the chi-square for each one.

Attachment Behaviors

The findings from a previous study suggested that the mother-calf bond is

considered as one of the most strongest and durable relationships in cetaceans, displayed by the amount of time and proximity the calves remain to their mothers (Krasnova et al., 2006). We used the behaviors of secure base and safe haven to determine if the calf retreated or decreased distance towards its mother from year one to year two. Figure 2 gives a visual of the frequencies for the use of safe haven and secure base for each mother-calf pair from year one to year two.

The Figure gives a descriptive of how the use of safe haven increases from year one to year two for almost all four calves with OLI displaying no use of safe haven but some use in year two. OLIs mother TIN was ill the last could of months before she passed away when OLI was only 19 months. OLI displayed more use of exploratory behavior either independent or with another animal the second year when TIN was diagnosed ill. It is possible that these exploratory behaviors could have led to OLI using more safe haven in his second year but it has not been tested statistically. It also indicates that the female calves QIN and BEL displayed on average the same amount of secure base use from year one and year two. In contrast the male calves decreased their use of secure base from year one to year two. OLI displayed seven secure base, GRA displayed eight secure base, QIN displayed 14 secure base, and BEL displayed 17 secure base. Further research would be needed to investigate the differences between the female and male calves.

These two behaviors (safe haven and secure base) are critical features of attachments. Previous research indicated that proximity increases both physically and psychologically as the infant ages because the attachment system is centered on helping the infant feeling safe and secure (Solomon & George, 1996). The results of the amount of secure base and safe haven use the calves displayed from year one to year two stayed consistently the same.

Possibly, indicating that although the calf engages in more independent swim they still keep close contact to their mother.

The current study found preliminary evidence that the bond between beluga mothers and their calves may qualify as an attachment. The amount of time they spent in the three major categories indicated that although there was an increase in an independent swim the calves still engage in pair swims on average the same amount of time. Also, the calves seemed to have a preference in a mother-calf infant swim or mother-calf pair swim across year one and year two. Indicating that they continue their attachment across year one and year two. Another indication that it could possibly be an attachment is that the frequencies for who initiates (mother/calf) reunions for mother-calf interactions indicated that the calves were primarily the initiators. The previous study indicated that the calves are usually the initiators for year one (Hill, 2009). Our study supported that statement and also indicated that the calves continued to be the initiators for mother-calf interactions across year two as well. This study also helped provide a visual aid that indicated the amount of use of secure base and safe haven happened evenly across year one and year two. Therefore, this demonstrates that the calves always keep a close proximity to their mother even when engaging in exploratory behaviors or social interactions. This study is important because it describes certain characteristics that help define the bond between a beluga mother and her calf as a possible attachment. Thus, if there is an attachment than adequate steps to provide the best housing and care for these animals can be taken to ensure that they live longer and have a normal development.

Several limitations existed that should be addressed by future research. First, we used available data from every other month rather than all months of the two-year period. While this method allowed for the best

videos possible to be coded, it may represent a limited sample. Additionally, the data for OLI ended at 19 months when TIN passed away. Finally, it is possible that examining the first two years may possibly be part of the critical period of an imprinting process. Thus, it is unclear if the caregiving behavior by the mother is performed because of a biological reason or for a psychological one as the calves are still highly dependent upon their mothers for nutrition and safety. Future research should include time after weaning when calves are displaying more solitary behavior and social interactions and may have more opportunities for secure base and safe haven use. Finally, future research should investigate mother-calf affiliative interactions compared to calf-affiliative interactions with another animal. The length of time calves engage in these different activities may be indicative of an attachment rather than an imprinted bond. Much remains to be learned about how the role that mother-calf interactions and calf-interactions helps define the bond between a beluga mother and her calf as an attachment.

References

Ainsworth, M. D. (1964). Patterns of attachment behavior shown by the infant in interaction with his mother. *Merrill-Palmer Quarterly*, 10(1), 51-58.

Ainsworth, M. S. (1989). Attachments Beyond Infancy. *American Psychologist*, 44(4), 709-716.

Bowlby, J. (1988). A Secure Base: *parent-child attachment and healthy human development*. Great Britain: Routledge.

Craig, W., (2000). Ainsworth and infant attachment. *Childhood Social Development: The Essential Readings*. (pp. 165-183). Abingdon: UK. Taylor&Francis.

Eggert, A., Reinking, M., & Müller, J. K. (1998). Parental care improves offspring survival and growth in burying beetles. *Animal Behavior*. 55(1), 97-107.

Gibson, Q. A., & Mann, J. (2008). Early social development in wild bottlenose dolphins: Sex differences, individual variation and maternal influence. *Animal Behaviour*, 76(2), 375-387.

Hill, H. M., Greer, T., Solangi, M., & Kuczaj, S. A. (2007). All Mothers are Not the Same: Maternal Styles in Bottlenose Dolphins. *International Journal of Comparative Psychology*, 20(1), 34-53.

Hill, H. M. (2009). The Behavioral Development of Two Beluga Calves During the First Year of Life. *International Journal Of Comparative Psychology*, 22(4), 234-253.

Immelmann, K. (1975). Ecological Significance Of Imprinting And Early Learning. *AnnuaReview of Ecology and Systematics*, 6(1), 15-37.

Isabella, R. A., Belsky, J., & von Eye, A. (1989). Origins of infant-mother attachment: An examination of interactional synchrony during the infant's first year. *Developmental Psychology*, 25(1), 12-21.

Krasnova, V. V., Bel'kovich, V. M., & Chernetsky, A. D. (2006). Mother-infant Spatial Relations In Wild Beluga (Delphinapterus Leucas) During Postnatal Development Under Natural Conditions. *Biology Bulletin*, 33(1), 53-58.

Krasnova, V. V., Bel'kovich, V. M., & Chernetskii, A. D. (2009). Formation Of Behavior In The White Sea Beluga Calf, Delphinapterus Leucas, During Early Postnatal Ontogenesis. *Russian Journal of Marine Biology*, 35(1), 53-59.

Londerville, S., & Main, M. (1981). Security of attachment, compliance, and maternal training methods in the second year of life. *Developmental Psychology*, 17(3), 289-299.

Mann J. (1997). Individual differences in bottlenose dolphin infants. *Family systems*. 4(1), 34-48.

Mann, J., & Smuts, B. (1999). Behavioral developments in wild bottlenose dolphin newborns (Tursiops sp.). *Behaviour*, 136(5), 529-566.

Miller, P. H. (2002). *Theories of Developmental Psychology*. New York: Worth Publishers.

Poindron, P., Lévy, F., & Keller, M. (2007). Maternal responsiveness and maternal selectivity in domestic sheep and goats: the two facets of maternal attachment. *Developmental psychobiology*,49(1), 54-70.

Rajecki, D. W. (1973). Imprinting in precocial birds: Interpretation, evidence, and evaluation. *Psychological Bulletin*, 79(1), 48-58.

Salzem, E. A. (1998). Imprinting. In G. Greenberg & M. M. Haraway (Eds.), *Comparative Psychology: a handbook* (pp. 509-514). Washington, DC: Library of Congress-in-Publication Data.

Seay, B., Alexander, B. K., & Harlow, H. F. (1964). Maternal behavior of socially deprived Rhesus monkeys. *The Journal Of Abnormal And Social Psychology*, 69(4), 345-354.

Solomon, J., & George, C. (1996). Defining The Caregiving System: Toward A Theory Of Caregiving. *Infant Mental Health Journal*, 17(3), 183-197.

Sroufe, L. A., & Waters, E. (1977). Attachment As An Organizational Construct. *Child Development*, 48(4), 1184-1199.

Professional and Ethical Standards in the Websites of Hypnosis Practitioners

Melina R. Cavazos

Mentor: Patricia Owen, PhD
Department of Psychology;
St. Mary's University

Hypnosis is a treatment technique used by health care professionals which aims, through the power of suggestion, to change or replace unwanted or negative habits and improve certain health conditions. Although medical and psychological organizations have sanctioned the use of hypnosis as a safe and effective treatment modality, the public at large perceives hypnosis as stage hypnosis, that is, hypnosis used by lay people for entertainment purposes. Therefore, it is not only vital for potential clients to be knowledgeable about the effectiveness and limitations of hypnosis used in treatment for health issues but also knowledgeable about health care practitioners who provide hypnosis services and the professional standards and ethical codes to which they adhere. The purpose of this exploratory study was to analyze the websites of hypnosis providers as to compliance with the ethical and professional standards established by the American Society of Clinical Hypnosis (ASCH) and the National Guild of Hypnotists (NGH). Websites were selected randomly within 10 regions in the United States. A total of 70 websites were coded for several variables, including educational background of provider, adherence to scope of practice limitations, and realism of claims about the effectiveness of hypnosis. Results showed that the vast majority of ASCH members adhered to ethical and professional standards. A substantially less number of NGH members did not provide the necessary information needed to comply with NGH standards. In addition, providers who did not indicate membership in ASCH or NGH showed considerable deviation from these standards in their websites.

Professional and Ethical Standards in the Websites of Hypnosis Practitioners

Hypnosis is a widely-used treatment technique during which a health provider facilitates, through suggestion, changes in emotion, perception, behavior, sensation, or thought (Green, Barabasz, Barrett, & Montgomery, 2005). Hypnosis is believed to be an effective technique due to "the therapist's ability to manipulate response expectancies, prime therapeutic responses, strengthen positive response sets and intentions, remove impediments to the automatic execution of desired behaviours, and disrupt or modify negative or undesirable response sets" (Lynn & Hallquist, 2004, p. 64). Hypnosis has been used with some degree of effectiveness for many behavioral problems such as bed-wetting, smoking, weight management, and sleep disorders and many medical problems such as asthma, pain control, high blood pressure, and irritable bowel syndrome (Glaser, 2011).

Practitioners who provide hypnosis services in health care settings have

been divided into two groups: clinical hypnotists and lay hypnotists (Eichel, n.d.). The distinction between the two lies mainly in the educational qualifications/ training requirements of those who practice hypnosis and in the differential emphasis placed on scientific inquiry. The American Society of Clinical Hypnosis (ASCH) and the Society for Clinical and Experimental Hypnosis (SCEH) are credentialing organizations in the United States which are considered to be the most reputable organizations of professionals in clinical hypnosis (Palsson, n.d.). Clinical hypnotists must follow certain guidelines (ASCH, 2010). Clinical hypnotists must possess advanced degrees in health sciences from regionally accredited institutions and must meet training requirements established by Standards of Training in Clinical Hypnosis (Hammond & Elkins, 1994). Clinical hypnotists are licensed to practice in their state and must comply with the ethical codes of their respective clinical affiliations. Guidelines also state that hypnosis should not be the main focus of a practitioner's treatment and should be used as an adjunct to treatment. With this in mind, simply referring to oneself as a "hypnotist" is discouraged, as it does not infer adoption of guidelines (Hammond, 1998). Both the ASCH and SCEH codes articulate a commitment to scientific inquiry. SCEH (n.d.), for example, states that "a distinguishing feature of the group is its premise that sound clinical practice is built upon serious scientific inquiry and that important empirical questions are often raised by those who care for patients." Treatment practices must be evidence-based and include such accepted psychological treatment practices as behavior therapy, cognitive therapy, and interpersonal therapy, among others (American Psychological Association Presidential Task Force on Evidence-Based Practice, 2006). The numerous "alternative"

or "New Age" therapies advertised to the public as effective for all sorts of ills are not accepted treatment practices as these are not based on accepted science and have not been validated by sound research methodology. As such, such alternative therapies as neuro-linguistic programming, emotional freedom technique, thought field therapy, and past life regression would not be appropriate treatment practices (Carroll, 2012; Druckman & Swets, 1988; Singer & Nievod, 2003).

In contrast to clinical hypnotherapists, lay hypnotists are trained in hypnosis by institutes which vary as to educational requirements and other admission criteria. These institutes may also provide credentialing or certification for the practice of hypnosis. Although credentialing institutes vary with reference to education and training requirements, most certify vocational hypnotherapists and do not require health care training or an academic background for certification. As such, those certified label themselves with a perplexing array of credentialing initials such as ACHt, BCH, CHt, IHF, and DCH. The National Guild of Hypnotists (NGH), one of the largest credentialing and respected organizations, provides clear guidelines with reference to scope of practice for lay hypnotists and asserts that "members shall use hypnotism strictly within the limits of their training and competence and in conformity to the laws of their state (National Guild of Hypnotists, 2012). The NGH further recommends avoiding "the language of psychopathology or medicine" and provides preferred language for members to use when referencing client issues. The NGH recommends that practitioners call themselves hypnotists. Guidelines about educational background of members are detailed by the NGH. Members are required to provide their highest degree

in their public announcements and are required to disclose to clients whether their degree is academic or alternative (i, e., an advanced degree from an institution not holding accreditation from United States Department of Education). NGH code of ethics warns members about making exaggerated or unsubstantiated claims about hypnosis—members should "have hard information from outcomes research" to substantiate claims made about hypnosis (National Guild of Hypnotists, 2012).

With the advancement of technology, particularly the Internet, it is easy for providers of hypnosis to advertise their services on websites, which in turn is easy for potential clients to research these providers. However, this ease is offset with a potential danger. With the ability to create web pages freely, it is often difficult to ascertain the legitimacy of hypnosis services. As Raz (2011) states, "type hypnosis into your favorite search engine and you too may confound lay entertainment with clinical intervention, hypnosis with hypnotherapy, and fact with fad" (p. 555). This is a cause for concern and raises awareness about the importance of following ethical standards when advertising hypnosis services on the Internet (and, of course, elsewhere). Do practitioners of hypnosis follow professional and ethical standards when advertising their services through their website? As there is little current published research concerning this question, the purpose of this study is to analyze the content of websites of health providers who offer hypnosis as a treatment technique.

Method

Sample

The websites of practitioners in the United States who advertised hypnosis services were investigated. Websites were selected according to a random stratified sampling methodology whereby the United States was stratified according to geographical region (there are 10 regions), and one state from each region was selected using simple random sampling. The states selected were Texas, California, Illinois, Nebraska, Massachusetts, New York, South Carolina, Montana, Virginia, and Oregon. Members of the American Society of Clinical Hypnosis were selected at random for these states using the ASCH member directory. The first two websites that appeared from this list were then coded. Using the Google search engine, the keyword search term "Hypnosis" were entered by state (i.e. "Hypnosis Virginia") and the first 15 websites of individual practitioners to appear with the key term were then randomized. From this randomized list, the first five websites were coded.

Coding

A coding checklist was created to evaluate professional and ethical standards of the websites of hypnosis practitioners. Website material was analyzed with reference to practitioner credentials (i.e. education, certification, and licensure), appropriate scope of practice, and research corroboration of hypnosis as a valid treatment tool. For the variable of practitioner credentials, certification agencies were listed and level and field of education and nature of the degree granting institution (i.e., whether academic or alternative) were coded. Level and field of education was sub-coded for bachelor's degree in health related field, bachelor's degree in non-health related field, advanced degree (Master's, Doctorate) from an academic institution, and advanced degree (Master's, Doctorate) from an alternative institution. In the analysis of the appropriateness of scope of practice, website information was analyzed for language that indicated that the practitioner was aware of practice limitations by including a disclaimer in the website and/or by listing appropriate client issues for which they provided services. For example, a lay practitioner of hypnosis could state "if you are interested in hypnosis as a treatment for

a medical condition, please consult your doctor first" and could also state that he or she offers treatment for such client issues as fears (though not phobia), anxiety (though not panic disorder), and pain management if prescribed by a medical doctor. The research support of treatment practices was analyzed with reference to realism of claims made about hypnosis and/or the provision of alternative, non-evidence based treatments. For example, a practitioner offering cognitive behavioral therapy and making non-exaggerated claims about hypnosis was coded as research-based whereas a practitioner offering alternate treatments such as hand-writing analysis or thought field therapy was coded as non-research-based (see Appendix for complete list of alternate treatments).

Results

A total of 20 ASCH member, 20 NGH member, and 30 non-member websites were coded and compared on a number of variables. Chi-square tests revealed four significant relationships between membership groups.

With reference to educational background, findings suggest that degree(s) attained differed significantly by membership, $\chi^2(6, N = 70) = 41.11$, $p < .001$. The majority (n = 20, 70%) of ASCH members indicated that they held an advanced degree from an accredited institution while the majority (n = 20, 70.0%) of NGH members and non-member practitioners (n = 30, 63%) either failed to list their educational background or listed academic degrees at bachelor level in a non-health field or from an alternative university. For example, a few practitioners stated that they held a Doctorate of Clinical Hypnotherapy (DCH), a degree that is unregulated. Two identified themselves as doctor yet provided no information about a degree entitling them to use this label.

Concerning scope of practice, chi-square tests revealed a significant relationship

between membership and licensure/certification information, $\chi^2(4, N = 70) = 43.02$, $p < .001$. The majority (n = 20, 75%) of ASCH member websites listed state license in their respective professional fields in addition to hypnosis certification while NGH members (n = 20, 85%) and non-member practitioners (n = 30, 70%) held hypnosis certification. A significant relationship was also found between membership and how hypnosis was practiced, $\chi^2(6, N = 70) = 20.50$, $p < .01$. Less than half (n = 20, 40%) of ASCH members did not provide information about the health conditions for which they used hypnosis. Half (n = 30) of the non-member practitioners provided treatment services for physical or mental health conditions that were inappropriate for their professional field. Guidelines call for certain practitioners to provide a disclaimer when hypnosis would be used for purposes not within the practitioner's professional scope (i.e. a psychologist claiming to perform dentistry hypnosis would advise potential patients to seek guidance from a dentist) or when hypnosis would be used for pain control. The majority failed to do so. This may be due to lack of awareness about the potentially disastrous implications concerning treatment of conditions that are inappropriate. Less than half (n = 20, 40%) of NGH members also provided treatment services for physical or mental health conditions that were inappropriate for their scope of practice, however, they supplied a disclaimer.

With regard to research-based treatments, significant relationships were found between membership and use of alternative therapies, $\chi^2(2, N = 44) = 14.51$, $p < .01$, and between membership and realism of hypnosis effectiveness claims, $\chi^2(2, N = 70) = 7.77$, $p < .05$. The majority of ASCH members (n = 18, 72%) indicated that they did not practice alternative therapies while the majority of NGH members (n = 14, 86%) and non-member hypnosis

practitioners (n = 12, 83%) indicated that they did. Frequent treatments included neuro-linguistic programming (NLP) (N=14), emotional freedom technique (EFT) (N = 10), Reiki therapy (N = 7), and past-life regression (N = 7). The majority of ASCH members (n = 20, 95%), NGH members (n = 20, 65%), and non-member hypnosis practitioners (n = 30, 60%) listed realistic claims concerning the effectiveness of hypnosis.

Discussion

The content of hypnosis practitioner websites was analyzed in order to gain insight into the level of compliance with professional and ethical guidelines as proposed by the ASCH and the NGH. ASCH members, NGH members, and those not indicating membership in these organizations were compared on a number of variables. With reference to educational background, the websites of ASCH members provided information about advanced degrees and name of degree-granting institution(s). NGH and non-member practitioners, on the other hand, provided minimal to no information about level of degree earned or name of degree-granting institution. This lack of information about a hypnosis practitioner's formal education is problematic in that a potential client will be unable to discern the competency level of a hypnosis practitioner which could impact on the effectiveness of treatment. Also, it is important to note institution information in order to assess quality of practitioner education/training and the relevancy of the degree as it applies to the use of hypnosis. On behalf of ASCH, Hammond (1998) notes that certain physical and mental health conditions may require special treatment and it is important that "professionals should have advanced training and supervision in a large body of knowledge above and beyond hypnosis to engage in practice in these areas of specialization" (p. 2).

With reference to scope of practice standards, the majority of non-member practitioners and ASCH members provided treatment services for physical or mental health conditions that were inappropriate within the limits posed by their degree or state licensing. Many of the non-member practitioners and NGH members provided treatment for a wide range of clinical disorders (e.g., phobias, IBS, cancer pain, PTSD) that was not within their scope of practice. With an awareness that hypnosis can cause harmful side effects, such as increased anxiety, headaches, dizziness, nausea, and confusion (Hammond, 1998), the NGH (2012) states:

> Hypnotists work with normal people to help with normal problems in living. We do not independently work with medical or mental disease and we do not "diagnose," "treat" or "prescribe." Hypnotists may work with issues related to a medical or mental health disorder only on referral from a properly licensed health care professional.

The ASCH members (many from the psychology field) referred to pain management as one of their areas of service. Treatment of pain without consultation with a medical professional violates scope of practice standards as the etiological significance of pain may not be accurately assessed and harmful side effects may occur.

The majority of ASCH members made realistic claims about hypnosis and offered additional treatments that were evidence-based whereas the majority of NGH members and non-member practitioners provided alternative therapies considered to be non-research based. It is important for potential hypnosis clients to not fall victim to unsubstantiated claims made by practitioners of any kind. Such claims may result in ineffective treatment or at harmful effects (Hammond, 1998). As Lilienfeld and Lohr (2000) note, "…the increasing

proliferation of unvalidated treatment poses a serious threat to clients and to the scientific status of clinical psychology" (p.5).

There were some limitations in this study. First, the number of NGH member websites was not collected equally from every state.

Second, this study's results are limited in generalizability as only those practitioners motivated to construct websites were sampled. Future research should aim to include more ASCH members with websites and to sample the advertisements (brochures; patient information packets) of those practitioners without websites.

References

American Psychological Association Presidential Task Force on Evidence-Based Practice (2006). Evidence-based practice in psychology. *American Psychologis*t, 61, 271-285.

American Society of Clinical Hypnosis (2010). *Public information.* Retrieved from http://www.asch.net/

Carroll, R.T. (2012). Emotional freedom techniques. Retrieved from http://www.skepdic.com/eft.html

Druckman D., & Swets, J.A., (Eds.). (1988). Enhancing human performance. Washington, DC: National Academy Press.

Eichel, S. D. (n.d.). *Clinical vs. lay hypnosis: A hopeless battle?* Retrieved from http://www.apmha.com/layvspro.htm

Glaser, G. (2011). *Uses of hypnosis in psychotherapy and medicine.* Retrieved from http://www.georgeglaser.com/hyp/

Green, J.P., Barabasz, A.F., Barrett, D., & Montgomery, G.H. (2005). Forging ahead: The 2003 APA Division 30 definition of hypnosis. *International Journal of Clinical and Experimental Hypnosis*, 53, 259-264.

Hammond, D.C. (Ed.) (1998). *Hypnotic induction and suggestion*. Chicago, IL: American Society of Clinical Hypnosis.

Hammond, D.C., & Elkins, G.R. (1995). *Standards of training in clinical hypnosis*. Des Plaines, IL: American Society of Clinical Hypnosis.

Lilienfeld, S.O., & Lohr, J.M. (2000). News and comment: Thought field therapy practitioners and educators sanctioned. *Skeptical Inquirer*, 24, 5.

Lynn, S., & Haliquist, M. N. (2004). Toward a scientifically based understanding of Milton H. Erickson's strategies and tactics: Hypnosis, response sets and common factors in psychotherapy. *Contemporary Hypnosis*, 21, 63-78. Retrieved from Academic Search Complete database.

National Guild of Hypnotists (2012). *The code of ethics of the National Guild of Hypnotists*. Retrieved from http://ngh.net/wp-content/uploads/2010/12/CodeEthicsStandards.pdf

Pallson, O. S. (n.d.). *Clinical hypnosis: Something for you?* Retrieved from http://www.ibshypnosis.com/hypnosisabout.html

Raz, A. (2011). Hypnosis: A twilight zone of the top-down variety. *Trends in Cognitive Sciences*, 15, 555-557. Retrieved from Academic Search Complete database.

Singer, M. T., & Nievod, A. (2003). New age therapies. In S.O. Lilienfeld, S.J. Lynn, & J.M. Lohr (Eds.), *Science and Pseudoscience in Clinical Psychology* (pp176-204). New York, NY: Guilford Press.

Society for Clinical and Experimental Hypnosis (n.d.). *About SCEH*. Retrieved from http://www.sceh.us/about-sceh

Appendix

List of alternative therapies as provided by sample

7 Path Self-Hypnosis®

Age progression

Brainspotting

Chakra clearing and balancing

Dream therapy

Emotional Freedom Technique (EFT)

Five Phase Advanced Transformational Hypnosis (5-PATH®)

Handwriting analysis

Healing touch

Life Between Life

Medical intuitive practices

Neuro-linguistic Programming (NLP)

Neurotherapy

Past-life regression

Process Healing Method

Quantum focusing

Reiki therapy

Time Line Therapy ®

Stroke Volume Decreases in Endurance Trained and Sedentary Young Women From Submaximal to Maximal Exercise

Gina Gallardo

Mentor: Mark Roltsch, PhD
School of Business; St. Mary's University

Several studies over the past few years have reported different outcomes in women of whether the heart's stroke volume (SV) increases, plateaus, or decreases at high aerobic intensities. Sex and level of fitness are shown to influence the response. The purpose of this study was to investigate the SV at increasing intensities in endurance trained and sedentary females. 26 endurance trained and 25 sedentary controls with maximal oxygen consumption (VO (2max)) of 44.08 ± 1.25 and 31.16 ± 1.04 mL · min (- 1) · kg (- 1), respectively, were recruited. SV was measured running on a treadmill at 40%, 80% and 100% of VO (2max) using acetylene re-breathing technique. Both groups showed a significant (p<0.05) decrease in SV from 40% of VO2max to VO (2max), with decreases from 87.21 ± 2.78 to 83.82 ± 2.01 mL· beat(-1) for the endurance trained females and 77 ± 3.31 to 71.71 ± 2.65 mL · beat (- 1) for the Sedentary females. Significant difference were also shown between groups in SV at all submaximal through maximal levels (p<0.05). It is concluded that the SV decreases as the aerobic intensities increase in both endurance trained and sedentary women.

Introduction

There has been an ongoing debacle about whether the Stroke Volume (SV) increases, plateaus, or decreases at high aerobic intensities. These erratic results can be caused be due to different measurement techniques used, the test used to test VO2 levels, fitness level, and sex (1). Although there is past studies that analyze the SV comparing two groups activity level such as elite athletes and moderately trained college students, there lacks analysis between untrained (sedentary) and trained groups (1).

Examination of the cardiovascular system at rest, at submaximal, and at maximal levels of exercise in relation to the oxygen intake (VO2) are important factors when dealing with cardiac output (Q) and stroke volumes (SV). In order to examine the differences I will examine the cardiac output (Q) equation relation to the oxygen intake (VO2). This review will also look into the arterial and venous system in relation to the Q equation. Furthermore the review will analyze the exercise differences in women versus men and how it affects their Q and VO2. This review will also look at the equations associated with calculating. Finally, the review will conclude with a summary of this literature.

The Cardiovascular System

The cardiovascular system is a vital component in everyday function in the human life. It is the way we circulate blood throughout the body. The cardiovascular system is vital in regulating the heart, the most important organ in the body, in order to circulate blood and oxygen throughout the body. The way that blood and oxygen is pumped throughout the body can be calculated through the cardiac output (Q) equation (Figure 1). The average resting heart rate is about 5L a minute.

Figure 1.1

Cardiac Output (Milliliters per minute) → $Q = SV \times HR$ ← Heart Rate (Beats per minute)

Stroke Volume (Milliliters per beat)
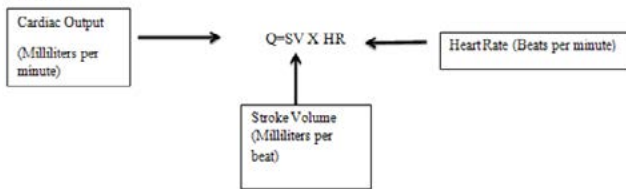
Arterial and Venous System

Within the cardiovascular system is a closed circulatory system where blood circulates in only one direction, it is focused around the central organ, the heart pump and is made up of three types of vessels: arteries, veins, and capillaries. The arterial system consists of the use of arteries and the venous system consists of veins. The arterial system is a high pressure system that carries oxygen saturated blood from the heart to the tissues through arteries and the venous system is a low pressure or capacitance system where the blood gives up oxygen to the tissues.

Changes in Cardiovascular parameters during exercise

Submaximal Exercise

Submaximal exercise is the point of exercise before one hits the maximal exercise. During this point of exercise one is breathing at a higher heart rate and taking in more oxygen, however at this point one is not at the highest point of exercise.

Maximal Exercise

Maximal exercise is the point of exercise where one is at their peak of exercising, meaning that one is

Exercise Difference phenotypes in Women versus Men Summary

Methodology

The following study methodology was taken out of a previous study by Roltsch et al., in their study that determined that there was no association between ACE I/D polymorphism and cardiovascular hemodynamics during exercise in young women (Cite the ACE paper). Here they recruited healthy women ages 18-35 from the University of Maryland community or metropolitan area to voluntarily participate in the study. The women were separated into sedentary or endurance-trained groups based upon their habitual PA levels over the preceding two years. All subjects were advised of the procedures and requirements of the study and then signed a written consent form that verified their understanding and commitment to the study. This study was approved by The Human Subjects Review Committee of the University of Maryland. Also current IRB approval is pending at St. Mary's University.

Following the subjects approval, all women completed a preliminary screening that included an interview via telephone or in person using a screening questionnaire.

This questionnaire was designed to exclude individuals with any prior history of cardiovascular diseases, diabetes, smokers, persons taking medications that would affect vascular function, and persons with orthopedic conditions that would preclude their participation. To verify the telephone screening information, subjects were also required to complete a detailed medical history questionnaire prior to their first visit. Further, the subject's PA level was measured to ensure that criteria for sedentary or endurance-trained were met. "Sedentary" was defined as not regularly taking part in any aerobic types of exercise (<20 min/session, <2 times/wk) for ≥ 2 yrs. "Endurance- trained" (ET) was defined as performing ≥ 45 min of endurance activity ≥ 5 days/wk at moderate to high intensity and having followed such a program for ≥ 2 yrs. These two definitions were exactly the same as those used in previous studies in postmenopausal women (15, 16). This was done to ensure that valid comparisons could be made between the results of these studies of women of different age.

At each subject's first laboratory visit, their height, weight, and subcutaneous skinfold thicknesses were recorded. Body composition was determined using the skinfold technique. (19) Subjects then completed a maximal treadmill exercise test to determine their Vo2max. (15)

Subjects returned to the laboratory on a separate day after 24 hours with no aerobic exercise and during the follicular phase of their menstrual cycle (2 - 7 days post menstrual cycle) to determine their CV hemodynamic responses to exercise using acetylene rebreathing cardiac output system. To determine the subject's cardiac output (Q) during submaximal and maximal exercise, a modified version of the acetylene rebreathing system of Triebwasser et al. (42) with a customized software package was used to analyze the rebreathing data. (28)

The submaximal (40, and 80% of Vo2max) and maximal exercise cardiac output measurements and procedures were administered as previously described. (27) Trials at the different intensities were separated by a 5-10 min rest interval to allow for recovery and for clearance of acetylene from the body. Vo2 was monitored throughout each exercise trial. Blood pressure (BP) was measured in the minute immediately following rebreathing. Stroke volume (SV), total peripheral resistance (TPR), and arteriovenous oxygen difference ((a-v)O2 diff) were calculated from Vo2, Q, HR and BP using standard equations.

For statistical analysis IBM SPSS Statistics Version 19.0 (SPSS Inc., Texas, USA) was used. Subject characteristics and maximal exercise data were analyzed using a 2 (sedentary or endurance-trained) x 3 factorial ANOVA (SPSS version 19) to examine the effects of PA groups (sedentary or endurance trained), and their interaction on systolic and diastolic BP, TPR, VO2, (a-v)O2 diff SV, HR, and Q. If the Stroke Volume by PA group interaction effects were found to be significant, means comparison procedures (LSD) would have to be conducted. Technically acceptable data from the maximal cardiac output test were available from 65 of the total of 77 women who participated in the study.

The submaximal exercise data were analyzed using a mixed leaner model, repeated measures factorial ANOVA (SPSS version 19). Two levels of PA (sedentary or endurance-trained), and 3 submaximal to maximal exercise levels (40%, 80%, and 100% Vo2max) formed the factorial. The dependent variables were systolic and diastolic BP, TPR, Vo2, (a-v)O2 diff, SV, HR, and Q at 40%, 80% and 100% Vo2max resulting in 3 repeated measures for each subject.. Within the general linear model descriptive statistics were used to presented results as mean ± standard error (SE) unless otherwise. Within-subjects contrasts were

used to analyze the significance in PA groups. Means ± SE are reported. A t-test in all other absolute values between PA groups was used. All cases considered statistically significant was established at probabilities <0.05.

Data

Table 2. Subject characteristics as a function of ACE genotype in the different PA groups of young women.

Table 2. Subject characteristics as a function of ACE genotype in the different PA groups of young women.

Subject Group	Subject Characteristics As A Function In Different PA Groups of Young Women	
	Sedentary (n=25)	Endurance-trained (n=26)
Age, Yrs	24.56 ± 0.83	27.4 ± 1.6
Body Weight, Kg	66.09 ± 3.23	58 ± 1.12
Height, Cm	164.4±1.44	163.48 ± 1.28
Body Fat, %	26.18 ± 1.38	19.25 ± 0.92
Maximal HR, B/Min	187.28 ± 1.92	188.8 ± 3.0
Maximal aVo2 Difference, mL/dL	13.72 ± 0.89	1.17 ± 0.02
VO$_2$max, L/Min	2.01 ± .71	2.58 ± 0.04
VO$_2$max, Ml/Kg/Min	31.16 ± 1.04	44.08 ± 1.25
Maximal Q, l/min	13.41 ± .45	16.5 ± 1.14
Maximal TPR, dyn-sec-cm^{-5}	596.67 ± 20.79	520.47 ± 12.47

Values are least squares means ± SE. Means within a variable with different letters are significantly different at P<0.05.

Table 1. Submaximal to maximal variable exercise intensities in Sedentary and endurance trained women

	Subject Group Across At Submaximal And Maximal Exercise					
	Sedentary (n=25)			Endurance-trained (n=25)		
	40%	80%	100%	40%	80%	100%
Systolic BP, mmHg	119.2 ± 2.18	145.44 ± 3.05	155.68 ± 3.28	122.54 ± 2.59	149.31 ± 2.76	200.23 ± 39.2
Diastolic BP, mmHg	70.4 ± 1.41	70.2 ± 1.13	69.2 ± 1.17	71.89 ± 1.59	71.92 ± 1.19	68.39 ± 1.14
VO2max, l/min	0.87 ± 0.03	1.65 ± 0.058	2.01 ± .71	1.08± .019	2.11 ± .047	2.58 ± 0.04
VO2max, ml/kg/min	13.62 ± 0.47	25.79 ± 0.92	31.16 ± 1.04	18.62 ± 0.38	36.07± 0.82	44.08 ± 1.25
Cardiac Output L/min	8.66 ± .29	12.04 ± .31	13.4 ± 0.45	9.97 ± .42	14.96 ± .78	16.5 ± 1.14
Stroke Volume, ml	77 ± 3.3	71.31 ± 2.33	71.7 ± 2.65	87.22 ± 2.76	85.59 ± 2.09	83.82 ± 2.01
Heart Rate, b/min	113.68 ± 1.87	170.08 ± 2.5	187.28 ± 1.92	112.27 ± 2.02	167.23 ± 1.66	184.77 ± 1.3
a-vO$_2$ diff, ml/dl	10.18 ± 0.34	12.52 ± 0.83	13.72 ± 0.89	11.24 ± 0.24	14.76 ± 0.31	15.98 ± 0.7
Total Peripheral Resistance dyn⊙sec⊙cm^{-5}	817.83 ± 27.5	618.88 ± 31.93	596.67 ± 20.79	746.59 ± 20.18	554.77 ± 12.64	520.47 ± 12.47

Values are means ± SE averaging across the submaximal and maximal exercise intensities (40%, 80%, 100%) between sedentary and endurance-trained women . Means within a variable with different letters are significantly different at P<0.0
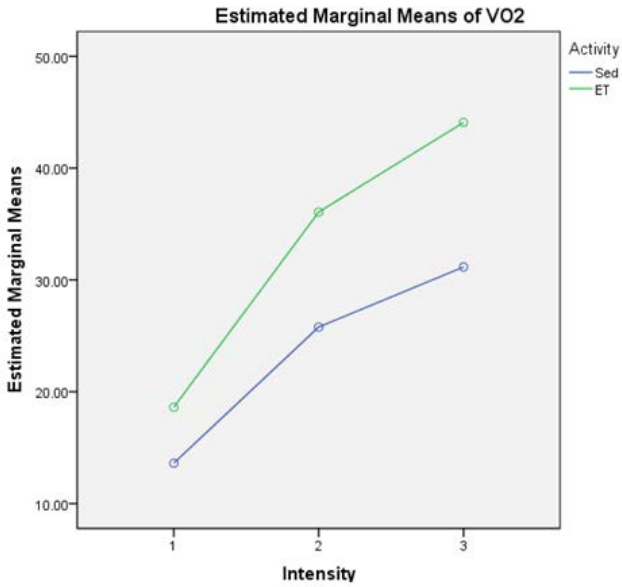
Figure 1 Means at submaximal through maximal VO2 l/min (40%, 80% and 100%) between Sedentary and Endurance Trained Group
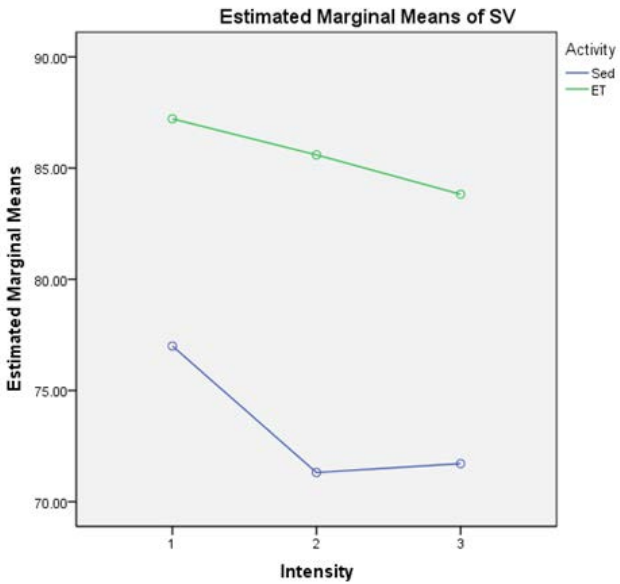
Figure 2. Means at submaximal through maximal SV (40%, 80% and 100%) between Sedentary and Endurance Trained Groups
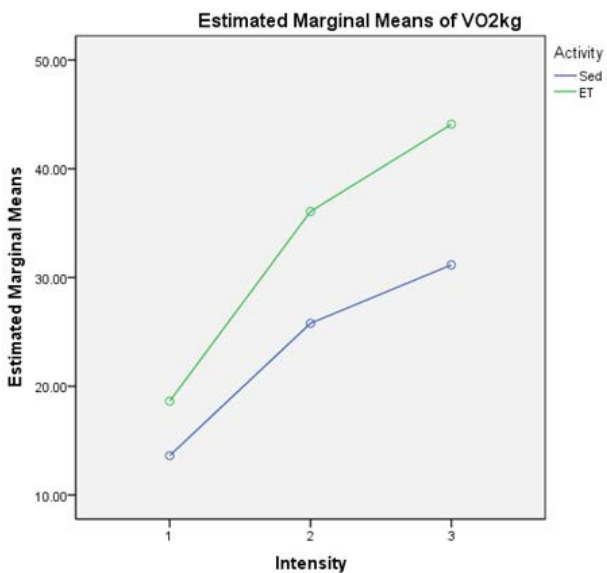
Figure 3. Means at submaximal through maximal VO2 mL/min/kg (40%, 80% and 100%) between Sedentary and Endurance Trained Groups

Profile Plots

Figures 4-9 show Estimated Marginal means of Dependent Variables throughout different intensities within the PA group (activity level) showing the slope between the submaximal and maximal differences. Therefore it focuses more on the intensity differences within each variable rather than the differences within the PA group.
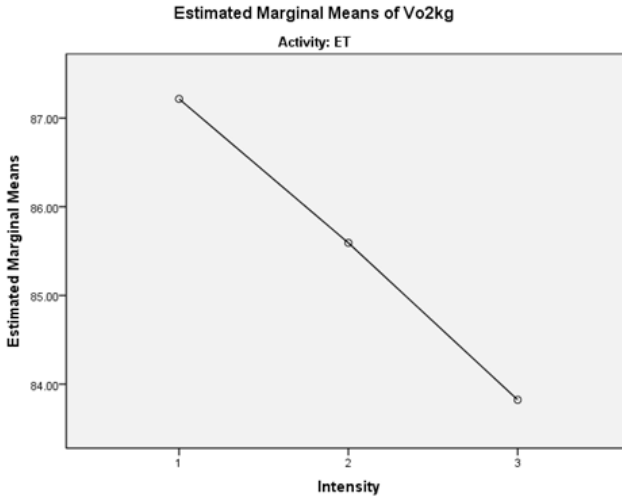
Figure 4. Means of Vo2MAX mL/min/kg in the ET group
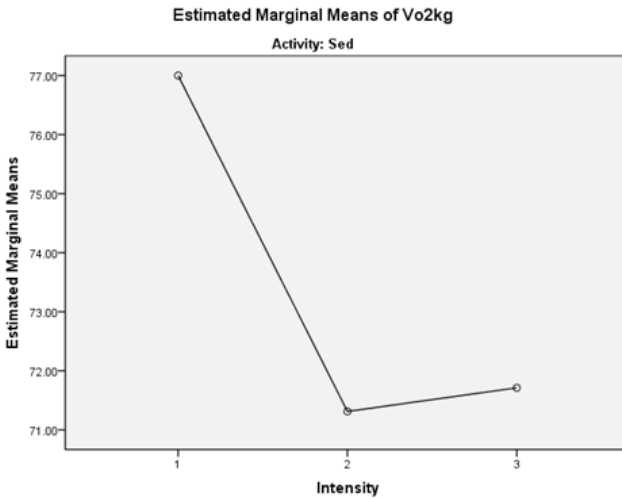
Figure 5. Means of Vo2MAX mL/min/kg in the sedentary group
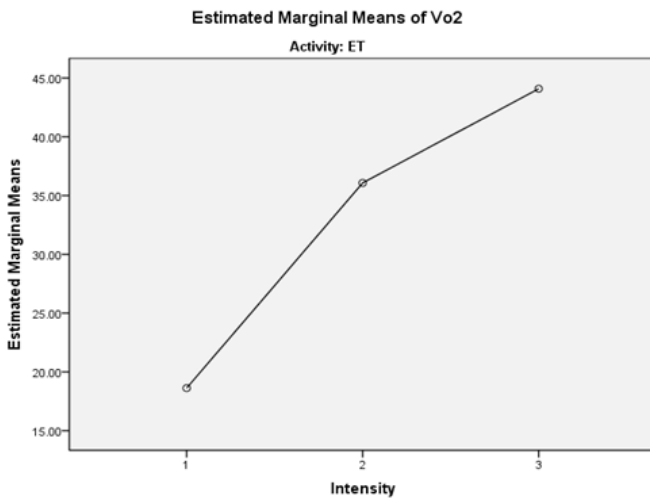
Figure 6. Means of Vo2MAX l/min in the ET group

Estimated Marginal Means of Vo2

Activity: Sed
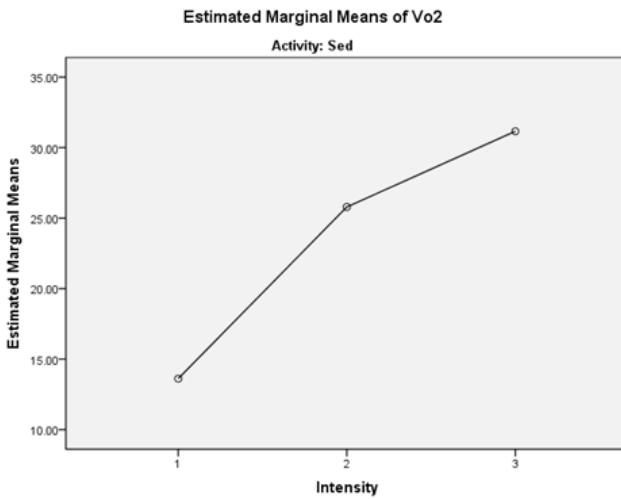
Figure 7. Means of Vo2MAX l/min in the sedentary group

Estimated Marginal Means of SV

Activity: ET
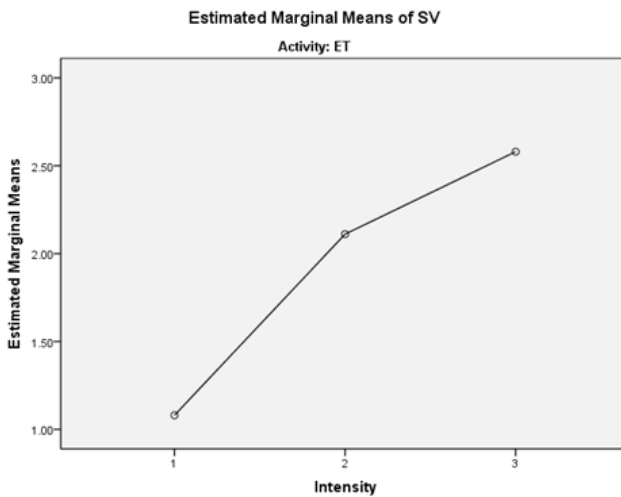
Figure 8. Means of SV2MAX in the ET group
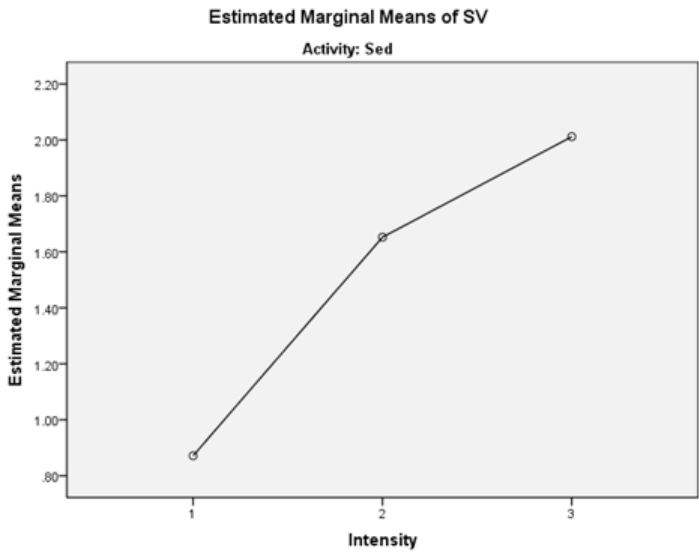
Figure 9. Means of SV2MAX in the sedentary group

References

Wang, E., Solli, G., Nyberg, S., Hoff, J., & Helgerud, J. (2012). Stroke volume does not plateau in female endurance athletes. *International Journal Of Sports Medicine*, 33(9), 734-739. doi:10.1055/s-0031-1301315

Petot, H., Meilland, R., Le Moyec, L., Mille-Hamard, L., & Billat, V. (2012). A new incremental test for VO_2max accurate measurement by increasing VO_2max plateau duration, allowing the investigation of its limiting factors. *European Journal Of Applied Physiology*, 112(6), 2267-2276. doi:10.1007/s00421-011-2196-5 (cycling)

The Business Profession as a Vocation in a Global Community

Celina Garcia

Mentor: Zaida L. Martinez, PhD
School of Business; St. Mary's University

Mentor: Robert O'Connor, PhD
School of Theology; St. Mary's University

The recent global financial crisis and concerns regarding the ethical breaches of international business companies have accentuated the need to examine the role of business professionals in a global economy. The separation of the technical side of business from the development of personal virtues is seen as a contributing factor to the emphasis on profits at the expense of the communities affected by the decisions of business leaders. This study provides an historical overview of business as a vocation or calling based on Catholic Social Teaching principles. A proposal for examining the exposure of business students to Catholic Social Teaching at Catholic universities in San Antonio, Texas, and students' views on business as a vocation is also presented.

Introduction

Historically, the idea of a vocation or a calling in Catholic social teaching has evolved from a view of vocation as a response to God's calling through removing oneself from worldly activities, such as business, to a view of vocation as engaging in worldly activities, including business, in ways that preserve the dignity of the human person and contribute to the common good (Chamberlain, 2004). The Social Encyclicals, *Rerum Novarum* by Leo XIII in 1891, *Quadragesimo Anno* by Pius VI in 1931, *Mater et Magistra* by John XXIII in 1961, *Populorum Progressio* by Paul VI in 1967, *Laborem Exercens* by John Paul II in 1981, and *Caritas in Veritate* by Benedict XVI in 2009 provide a development of a vision of Catholic social thought with respect to economics, business enterprise, and human dignity, shaping the current views of the business profession as a vocation or a calling.

This article provides a review of the development of business as a vocation in Catholic social teaching reflected in selected encyclicals spanning 108 years. The overview of the encyclicals on business as a calling will serve as the foundation for developing a future study on business students at Catholic universities in San Antonio. The purpose of the study will be to explore the views that business students have of their chosen professions and their understanding of business as a vocation as viewed in Catholic social teaching

The Development of the Business Profession as a Vocation

Since the Middle Ages, the Catholic

Church has largely promoted only religious professions as vocations (Chamberlain, 2004). The initial rationale for the view of vocations being solely religious professions was the Catholic understanding of vocation as a response to a calling from God. A response to God was understood as involving the abandonment of worldly activities to live an ascetic life, replicating scenes in scripture where individuals abandoned worldly activities to follow Christ or live waiting for His return (Weber, 1930). The pursuit of a profession in business, largely involved with worldly activities, was not considered a response to a calling from God and therefore in no way a vocation. With the increase of economic activity in Europe towards the end of the Middle Ages, came usury in loans, which the Church had prohibited until increased economic activity rendered usury as necessary to maintain solvency in the banking industry (Applied History Research Group , 1997). Although the Church consented to usury for loans given at risk, a distrust of the direction of business is likely to have caused distrust in the moral valuation of business as a profession from that point on.

In the 16th and 17th centuries, Protestantism began to separate itself from the Catholic Church and in the process created progressive ideas about a relationship between business and the religious institution. The notion of a calling as pertaining to a person's fulfillment of duties in work such as business is a creation of the Reformation (Weber, 1930). During the first decade of his reform activities in the 16th century, Martin Luther brought to the forefront the idea that every person was called to "the fulfillment of duty" including "worldly affairs", considering it the "the highest form of moral activity" (Weber, 1930, p. 40). Because faith needed no works, an ascetic life, considered by the Catholic

Church in the Middle Ages as a vocation in response to a calling from God, was now understood as not responding to the calling of fulfilling worldly responsibilities (therefore not a vocation) and even being self-centered (Luther, 1520). Protestantism saw success in business as a "sign of Godly favor" because it reflected a successful vocation- a successful response to the calling from God of fulfilling worldly obligations according to individual positions in life established by God (Watt, 2008, p. 569).

John Calvin further supported the business profession as a moral activity by providing the view that every man's position in life was assigned by the Lord and that those who do not comply with the duties of their calling would be rejected by God (Calvin, 1845). Arguably, this concept inspired a connection between fulfilling the business profession as a vocation and salvation itself, sparking a culture of industriousness regarded historically as the Protestant work ethic. Although the Protestant development of the business profession as a vocation is not responsible for the creation of capitalism, traits, such as industriousness and discipline, applauded in the business vocation were easily adapted into the culture of capitalism. Adam Smith, considered the father of capitalism, indicated a high regard for the common good in 1790. He stated that wise and virtuous men would always be willing to sacrifice their private interests to public interests of their communities (Smith, 1790). Caring for the common good does not compromise the individual. Smith goes on to state that the man who cares for all of humanity will respect and value the individual (Smith, 1790).

Since the development of the concept of business as vocation among Protestant reformers, the Catholic Church has contributed to the view of the business as a vocation from the Catholic tradition. Observed through the course of various

encyclicals to be discussed, the Catholic Church's meaning of vocation channeled itself to the focus of understanding vocation as the fulfillment of the human person.

Pope Leo XIII's *Rerum Novarum* (1891)
The encyclical Rerum Novarum was published in 1891 in response to the abuses occurring to the working class during the Industrial Revolution which had sparked sentiments for revolution and communism as a solution. It established the fundamentals of modern Catholic social teaching of vocations outside of religious fields. In this encyclical the business profession is not mentioned specifically as a profession, vocation, or calling but a future view of business as a vocation can be intuited by the great attention given to the business process throughout the encyclical. Several transcending viewpoints are introduced. The most fundamental is the dignity of the human person. The ideal manner of doing business is addressed frequently with human dignity as the primary focus in the description of optimal relationships between workers and their work. In the optimal relationship proposed, the human is above any work and not to be understood as a product of a business process. Employers and employees must live in harmony, understand the needs of each and interact with the intention of nurturing the soul because they need each other (Leo XIII, *Rerum Novarum*).

Free enterprise is defended essentially because of the many opportunities it creates for human development including the right to hold property and the fruits of labor that can be used to plan for the stability of the worker's family (Leo XIII, *Rerum Novarum*).

The mission of furthering the common good entails the responsibility of using worldly possessions for the good of all (Leo XIII, *Rerum Novarum*). Gifts, "external, material, or of the mind" are to be used for personal development and the development of others (Leo XIII, *Rerum Novarum* 22).

The progressive notion that work must be appropriate to the age and sex of the worker stands out (Leo XIII, *Rerum Novarum*). Pope Leo XIII states that children should not be allowed to work until their "bodies and minds are sufficiently developed" so as not take away their "education" (Leo XIII, *Rerum Novarum* 42). The association of workers is supported as a mechanism to monitor the conditions of the workers and ensure humane treatment. Included in the description of the proper work conditions is the need for workers to be allowed time for religious duties.

Another progressive concept presented is solidarity of ownership between employers and employees noting that workers "work harder and love" their work when they have some ownership of the company (Leo XIII, *Rerum Novarum* 47).

Rerum Novarum as well as later encyclicals influenced debates about economic policies such as communism and the conditions of the working classes from 1891 to 1962 (Gribble, 2005). However, economists have applied *Rerum Novarum* differently taking into account factors not present in Catholic social teaching (Gribble, 2005).

Pius VI's *Quadragesimo Anno* (1931)
On the 40th anniversary of *Rerum Novarum* in 1931, Pope Pius VI published the encyclical *Quadragesimo Anno*. This encyclical restates the principles of *Rerum Novarum* but expands on those that became more pressing at the time, with the end of the Industrial Revolution and the beginning of the Great Depression (Pius VI, *Quadragesimo Anno*). The concept of subsidiary is presented for the first time in this encyclical (California Catholic Conference , 2011). Subsidiarity calls for a limited role of government in favor of individual action at the local level as much as possible. The government is called to only intervene in matters that individuals

cannot resolve. The Great Depression would soon become one of those instances of government intervention. Pius VI strongly reprimands zealous economic growth that did not take into account the common good in the previous decades for which he credits grave income gaps and the establishment in society of only two classes, the rich and the poor. Because the human person has dignity, economic activity must serve humanity and not vice versa. The determination of wages taking into account the common good is crucial to avoid unemployment as even too high of a wage may not allow the employment of those willing and able to work (Pius VI, *Quadragesimo Anno*). Wages also play a part in establishing well-proportioned prices of products in the global economy. The right to property is recalled with an emphasis on the calling to use all resources for the common good.

John XXIII's *Mater et Magistra* (1961)
This encyclical recalls principles of previous encyclicals. However, with the Great Depression and World War II over, wages are given priority. John XXIII states that wages must be determined by the worker's contribution to the company and the company's equity, not solely the marketplace (John XXIII, *Mater et Magistra*). Solidarity is brought to the discussion with an emphasis on undertaking all activities including business with a sense of brotherhood. International justice and harmony can only be accomplished by humanity recognizing the dignity in each individual. Work is finally explicitly called a vocation, a response to the call to raise ourselves and others to a higher level of civilization (John XXIII, *Mater et Magistra*).

Paul VI's *Populorum Progressio* (1967)
In *Populorum Progressio*, the concept of business as vocation is reiterated as well as other established principles of social teaching in regards to business. Business people are described as being creators and called to continue God's creation on Earth (Paul VI, *Populorum Progressio*). Paul VI warns of the potential for enslavement of the person through their profession. A focus on the human aspect of work and the interaction with other humans is central to avoiding selfishness within the business profession. We must see ourselves in other humans.

John Paul II's *Laborem Exercens* (1981)
In John Paul II's 1981 encyclical *Laborum Exercens*, vocation requires the fulfillment of the human person and the entire encyclical is dedicated to in depth descriptions of the spirituality of work and its role in society (Chamberlain, 2004). The focus on the nature of humans in work became more pressing with the rise of technology at the time. We are all called to act with vocation in our work whether it involves the business profession or not (John Paul II, *Laborum Exercens*). Characteristics, such as industriousness, are virtuous when linked with the social order of work (the dominion of the human of work). Foreseeing the rise in an international labor force, John Paul II reminds the world that we are all humans and must see the dignity of each person regardless of nationality. Therefore, emigrants working in another country must not be put at a disadvantage by others in the host country. Business leaders must direct strategy with the intention of creating work in which workers can develop their mind, body, and soul, becoming more human (John Paul II, *Laborum Exercens*). Progress is evident when a person is valued for what he is rather than what he has. Valuing the person for what they are rather than what they have or can produce is essential to the sacredness of humans whose physical strength will weaken with age (John Paul II, *Laborum Exercens*).

John Paul II's *Centesimus Annus* (1991)
A hundred years after the publication of *Rerum Novarum* John Paul II published Centesimus Annus. With the fall of the

Berlin Wall and the dissolution of the Soviet Union, John Paul II notes that while totalitarian governments had fallen in Eastern Europe as well as Latin America, the transitioning nations were still highly vulnerable. International agencies and corporations can play a major role in reiterating the importance of the dignity of the person within those transitioning countries in which they operate. Globalization provides the opportunity to act with the universal vocation to direct the global economy towards the common good (John Paul II, *Centesimus Annus*). Business must go beyond raising the standard of living by serving the human person and contributing to their human formation (John Paul II, *Centesimus Annus*).

Benedict XVI's *Caritas in Veritate* (2009)
Benedict XVI published this encyclical shortly after the global financial crisis. In this encyclical, he calls for the education of vocation as contributing to the complete formation of the human person including the welfare of the body and soul (Benedict XVI, *Caritas in Veritate*). In order for this concept to reach the future generations, education must place great emphasis on studying human nature (Benedict XVI, *Caritas in Veritate*). The human person is formed through interpersonal relations. The more authentic humans live these relations, the more their personal identity will mature (Benedict XVI, *Caritas in Veritate*). Business and all activities in the world are called to view their professions as a means to human ends, thus having integral humanism as part of their mission.

From the encyclicals reviewed it is established that within Catholic social teaching, vocation has developed to mean a response to the universal calling to fulfill the obligations to God and the community in a way that preserves the dignity of the human person while contributing to the common good. Each person has a particular vocation

according to their talent, circumstance and community (Chamberlain, 2004, p. 31). Because humans are by nature social, their formation is strongly tied to their interpersonal relations and how they view themselves in the global community. The encyclicals reviewed suggest that educating for a vocation must involve the understanding of talents and skills as tools to be utilized in the vocation to contribute to the common good within our professions. Viewing our activities as a vocation, that has effects on the global community, prompts reflection on how our interpersonal relations contribute to an integral human formation.

Methodology
I plan to conduct a study of the view of business as a vocation among business students at the three Catholic universities in San Antonio, Texas. The sample size of at least 100 would include only business students in their junior and senior year. The survey will explore the extent to which business students view the business profession as a vocation. In addition, the survey will identify the length and type of exposure of business students to the encyclicals and the two most fundamental concepts in Catholic Social Teaching: the dignity of the human person and the common good. I expect to find a higher level of exposure to the concepts of the common good and the dignity of the human person among St. Mary's University business students due to the increased number of ethics and theology courses present in the core curriculum in comparison to University of Incarnate Word and Our Lady of the Lake University. However, I do not expect a large portion of the sample to view business as a vocation.

Conclusion
The global nature of the economy has accentuated the impact that businesses have on communities throughout the world.

Thus, how business professionals view their work can make a major difference on how their actions affect individuals and communities. My review of the social encyclicals published since 1891 highlights how the idea of business as a vocation evolved and the significance of key principles of Catholic social teaching: the relational nature of the human being, the inherent dignity in every individual, and the importance of genuinely acting in a manner that benefits the common good. Leo XIII in his 1891 encyclical, *Rerum Novarum*, articulates these principles, noting how a view of business as a vocation contributes to the common good and restrains greed (Leo XIII, *Rerum Novarum*). More recently, Benedict XVI in *Caritas in Veritate* emphasizes the importance of integral humanism as part of the mission of all business professions.

My proposed study of business students' views of the business profession as a vocation will provide insights on their level of awareness of the principles of human dignity and the common good in the social encyclicals, and whether there is a correlation between viewing business as a vocation and students' exposure to these principles.

References

Applied History Research Group . (1997). *Banking in the Middle Ages* . Retrieved June 22, 2013, from The End of Europe's Middle Ages: http://www.ucalgary.ca/applied_history/tutor/endmiddle/bluedot/banking.htm

Benedict XVI. Encyclical Letter. Caritas in veritate. 29. June. 2009

California Catholic Conference . (2011, November 21). *Quadragesimo Anno* . Retrieved June 19, 2013, from California Catholic Conference : http://www.cacatholic.org/index.php/resources/catholic-social-teaching/social-encyclicals/41-quadragesimo-anno-the-fortieth-year

Calvin, J. (1845). How to Use the Present Life, and the Comforts of It. In J. Calvin, *Institutes of the Christian Religion* . sacred-texts.com.

Chamberlain, G. L. (2004). The Evolution of Business as a Christian Calling. *Review of Business*, 25(1), 27-36.

Gribble, R. (2005). Wtihin the Market Strife: American Economic Thought from Rerum Novarum to Vatican II (review). *The Catholic Historical Review* , 867-868.

John XXIII. Encyclical Letter. Mater et magistra. 15. May. 1961

John Paul II. Encyclical Letter. Centesimus annus. 1. May. 1991

John Paul II. Encyclical Letter. Laborem exercens. 14. Sept. 1981

Leo XIII. Encyclical Letter. Rerum novarum. 15. May. 1891

Luther, M. (1520, September 6). *Modern History Sourcebook: Martin Luther: On the Freedom of a Christian* . Retrieved June 23, 2013, from Fordham University : http://www.fordham.edu/halsall/mod/luther-freedomchristian.asp

Paul VI. Encyclical Letter. Populorum progressio. 26. March. 1967

Pius VI. Encyclical Letter. Quadragesimo anno. 15. May. 1931

Smith, A. (1790). *The Theory of Moral Sentiments.*

Watt, D. H. (2008). Protestantism. In W. A. Darity, *International Encyclopedia of the Social Sciences* (pp. 569-571). Detroit: Macmillan Reference USA.

Weber, M. (1930). *The Protestant Work Ethic and the Spirit of Capitalism.*

Comparing Sleep Characteristics in a Hispanic vs. Non-Hispanic Population

Marco Gonzales

Mentor: Eric Powell, PhD
Department of Psychology;
St. Mary's University

Sleep is a core biological need for people and most other species. For humans, there is typically a defined amount of time that we sleep within the 24 hour day period. Given sleep's importance, there is no purpose of sleep; there are several ideas as to its purpose. What is known of sleep is the fact that it is important in the survival and wellbeing of animals and humans alike and cannot be ignored. Sleep itself was not researched much until 1953 when Dr. Nathaniel Kleitman and Eugene Aserinsky discovered REM sleep, which showed that the brain and body were not inactive during sleep as people believed.

Studies have now shown that chronic sleep deprivation can result in significant physical and functional consequences as well as affect lifestyle choices such as diet and exercise. The National Sleep Foundation (NSF) showed that insufficient sleepers were unable to work efficiently, exercise, eat healthy, and even enjoy leisure activities. If one suffers from inefficient sleep, you have a greater chance of eating unhealthier foods and having less physical activity. Sleep is extremely important to the wellbeing of people. Chronic sleep deprivation will lead to other physiological issues and vice versa. Lack of sleep can cause daytime sleepiness, and fatigue, in turn causing one to preform less throughout the day. The NSF conducted a poll looking at sleep habits and ethnicity and found that Blacks/African-Americans report the least amount of sleep on workdays/weekdays (6 hours and 14 minutes). Interestingly, they also report

that they need only 7 hours and 5 minutes of sleep each night to perform at their best during the day, which is significantly less sleep than Asians and Hispanics report needing (7 hours and 29 minutes each) (NSF, 2010). Despite this report, there is a paucity of sleep data in Hispanics, studies are showing Hispanics are at higher risks for issues such as obesity, high blood pressure and hypertension. This raises the question if they are at greater risk for sleep related illnesses such as sleep apnea and insomnia.

Literature Review:
When looking at certain aspects of Latino lifestyle around the U.S., one study showed that specifically, showed that a higher acculturation was associated with lower fruit and vegetable intakes and a higher consumption of sugar and sugar-sweetened beverages and added fats (Escamilla, 2011). Latino people acculturated to United States culture had the tendency to eat

less fruit and more sweets. Furthermore, higher acculturation was associated with food-consumption behaviors that led to higher solid fat, added sugar, and sodium intakes such as the frequency of eating out, consumption of meals at fast-food outlets, and salty snack consumption (Escamilla, 2011). Again stating that, the U.S. culture increases unhealthier eating in Hispanics. One study in Florida showed that Park et al compared adult obesity trends in Latino immigrants and their US-born counterparts on the basis of 2 repeated cross-sectional samples drawn from the 1994–96 and 2004–06 National Health Interview Survey. A comparison of obesity trends broken down by age groups showed that obesity rates between 1995 and 2005 increased significantly more in native-born individuals than in immigrants (comparing individuals who had lived in the United States for 10–14 y compared with, 5 y) and diverged rather than converged in immigrants with respect to their age-matched US-born counterparts (Escamilla, 2011).

According to the U.S. 2005 census, U.S. Hispanics number almost 42 million and have grown from 4.5% to 13.9% of the U.S. population over the last 30 years (Loredo, Soler, Bardell, et al, 2010). Over the years, studies have documented the increase in rates of obesity, diabetes, cardiovascular disease, and psychiatric disorders, with increasing acculturation to a U.S. lifestyle in Hispanic immigrants and their descendants living in the United States (Loredo et al, 2010). The population of Hispanics is only going to increase and as it does, so do more reports of health issues. According to the NSF, Hispanics are the most likely to say they are kept awake by financial, employment, personal relationship and/or health-related concerns. Overall, at least one-third of Hispanics (38%) and Blacks/African-Americans (33%) report that any

of these concerns disturb their sleep at least a few nights a week, compared to about one-fourth of Whites (28%) and/or Asians (25%). Hispanics (16%) are more likely than Blacks/African-Americans (12%), Asians (9%) and Whites (7%) to say that health-related concerns have disturbed their sleep at least a few nights a week (NSF, 2010). This shows that Hispanics not only have health conditions that have the potential of harming their sleep, they also lose sleep over worrying about these health conditions. In 1990, a survey of adult Hispanic Americans showed that snoring prevalence was 27.8% in men and 15.3% in women. In this population, snoring was associated with excessive daytime somnolence and myocardial infarction, suggesting that obstruc¬tive sleep apnea was probably common in Hispanics although no objective data was provided (Loredo et al, 2010). Hispanics with snoring have shown to have some form of sleep issue or heart issue because of potential sleep apnea. Snoring was more frequently reported by Hispanic men (OR = 2.30, 95% CI 1.43-3.69) and Hispanic women (OR = 2.25, 95% CI 1.48-3.42) than their White (reference group), Black, American Indian, and Asian Pacific Islander counterparts (Loredo et al, 2010). Hispanics now have more reports of snoring issues again showing the potential rise of certain health risks. Hispanic men have longer nightly sleep duration than Black and Asian American men. Although data on Hispanic men is limited, one small study (Rao et al., 1999) reported that they had higher REM density than did Black and White individuals. A recent study of National Health and Nutrition Examination Surveys data also reported that Hispanic adults, specifically Mexican Americans had longer self-reported sleep duration than the general U.S. sample, an association hypothesized to reflect cultural influences on sleep behaviors (Seicean, Neuhauser, Strohl, & Redline, 2011) (Song, Ancoli-

Israel, Lewis, Redline, Harrison, Stone, 2011). Related, Latinos born in the U.S. are at more risk of obesity than immigrants.

Although some data exists in Hispanics related to sleep, there is still lack of data on Hispanics regarding sleeping habits and the relationship between poor sleep, lifestyle choices, and health conditions. Given this unresponsive in the literature, this study aims to gather clinical data to better understand sleep habits, incidence of sleep disorders and health issues in a Hispanic population and compare this to Non-Hispanic Whites.

Methods:
This retrospective clinical database study has been approved by the St. Mary's University IRB. Included in the study are adult males and females, between the ages of 18 to 80 who have participated in a sleep study evaluation at a local accredited sleep disorders center. Chart review was performed on patients who went to the sleep center for clinical evaluation between May 2012 and May 2013. Consecutive patients who met the study criteria were reviewed and entered into the database. Variables include age, body mass index (BMI), and ethnicity, and polysomnographic data. Other variables involved will include previous health conditions and sleep habits, elect results from objective sleep testing. After all this information is gathered, it will then be input into SPSS in order to view potential trends amongst Hispanic and Non-Hispanic populations.

Table 1: Demographics

Demographics			
	Hispanic	Non-Hispanic	P-Values
Age	53.7 yrs	46.1 yrs	0.02
18-34	6.50%	13.40%	
35-54	39.50%	55.80%	
55+	53.90%	30.80%	
BMI	36.90%	30.30%	0.00
25-29.9	18.00%	78.90%	
≥ 30	78.90%	40.40%	
Hypertension	64.50%	48.10%	
Diabetes	40.80%	15.40%	
Depression	25.00%	32.70%	
Anxiety	25.00%	28.80%	
Heart Disease	9.20%	5.80%	
Pain	11.80%	23.10%	

A total of 140 patients were entered into the data base. The data were divided into groups based on ethnicity. There were a total of 76 Hispanics, 52 Non-Hispanic/White, and African American. Due to the limited sample of African Americans, their data was not used for analysis. All comparisons were between Hispanic and Non-Hispanic/Whites. Refer to Table 1 for sample demographic characteristics compared. Review of the demographics show that the population of Hispanics was older than that of the Non-Hispanics (53.7yrs vs. 46.1yrs, P= 0.019). Overall, the sample population was more proportionate to males (61% M to 39% F). The BMI of both populations were elevated in the categories of overweight (25.0-

29.9) and obese (≥30). Hispanics were significantly higher in the obese category (78.9%) compared to Non-Hispanics (40.4%). Hispanics had a higher average of Hypertension

Table 2: Sleep Habits of Hispanic vs. Non-Hispanics

	Hispanic	Non-Hispanic	P-Values
TSTWKDAYS	6.7	7.01	0.203
TSTWKEND	7.4	8	0.049
SLPLATENCY	31.5	34.6	0.623
WASO	29.2	31.2	0.815
ESS	10.9	10.4	0.615
TIBWKDAY	7.5	7.9	0.104
TIBWKEND	8.2	8.7	0.071

On average, both populations sleep about 7 hours during the week and 8 hours on the weekend, yet Hispanics get less sleep all around. More so they receive equal to or less than 7 hours of sleep, 32.4% sleep on weekends than Non-Hispanics, 18.4%. The sleep latency of the sample population was higher in Non-Hispanics (34.6 min.) compared to Hispanics (31.5 min.). The Wake after Sleep Onset (WASO) was greater in Non-Hispanics (31.2 min) in comparison to Hispanics (29.2 min). There was not a significance in the ESS of the sample populations because there was not much difference in their scores (10.9 vs. 10.4, P=0.615). Overall, both populations spent ≥ 7 hours of time in bed during the week and on the weekends, yet Hispanics spent less time in bed than Non- Hispanics.

Based on results of the objective PSG testing, Hispanics had a significant elevated AHI (average frequency of apnea and hypopnea per hour of sleep) and RDI (average frequency of all respiratory events per hour of sleep) compared to Non-Hispanics. Hispanics also demonstrated a higher arousal index and SaO2 then Non-Hispanics; however the difference was not a significant difference. Looking at the treat outcomes, Hispanics require a significant treatment pressure compared to Non- Hispanics.

Figure 1: Polysomnograph Results
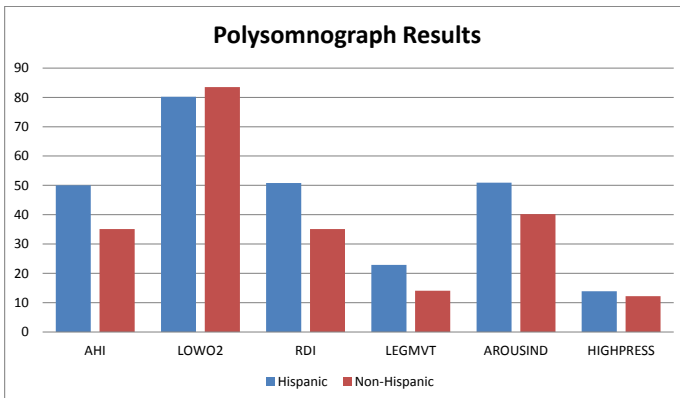
Discussion:

Hispanics continue to be the largest growing ethnic population group in the U.S. with data supporting high increase of obesity. However, there is still a lack of sufficient data that relates both sleep habits and the relationship between poor sleep and health. This pilot database should attempt to gain more understanding of sleep in this population. The data shows that the Hispanic population gets less sleep, are mainly in the obese BMI range, had extreme health conditions and had high AHI's and RDI's, and were diagnosed with severe OSA compared to Non-Hispanics. This correlates with the literature that Hispanics have less sleep and are also at risk for obesity and other health diseases. The large number in the Hispanics population directly correlates with the notion that Hispanics are growing population. Data suggest that obesity in Hispanics is increasing. Our sample reported a staggering 41% of Hispanics with a BMI ≥ 30. The significance compared to the published suggestions maybe the result of a limited or skewed sample; however this might be representable of sleep disorders given the high AHI in Hispanics within the sample. The rise of obesity is not new to any ethnicity, but the data from the PSG does add to the paucity of sleep data in Hispanics. It shows the severity in the sleep conditions of Hispanics and that, for some reason yet unknown, their conditions are extreme and require more attention and time.

The research must be continued in order to see where the trends lead. The first step would be to add to the database to see if the data found will continue as such. The next step would be to look specifically at the lifestyle and sleep and the correlation between the two. One would then want to examine the presence of sleep disorders, prescribed diagnosis and other health conditions. The Hispanic population is growing and the potential for health and sleep issues may arise with it, as such further study must be done in order to break the prevalence of these factors in the population.

References

Escamilla, R. (2011). Acculturation, nutrition, and health disparities in Latinos. *The American Journal of Nutrition*, 93, 1163S-1167S.

Gradner, M., Patel, N., Gehrman, P., Xie, D., Sha, D., Weaver, T., et al. (2010). Who gets the best sleep? Ethnic and socioeconomic factors related to sleep complaints. *Sleep Medicine*, 11, 470-478.

Hesselbacher, S., Subramanian, S., Allen, J., Surani, S., & Surani, S. (2012). Body Mass Index, Gender, and Ethnic Variations Alter the Clinical Implications of the Epworth Sleepiness Scale in Patients with Suspected Obstructive Sleep Apnea. *The Open Respiratory Medical Journal*, 6, 20-27.

Loredo, J., Soler, X., Bardell, W., Ancoli-Israel, S., Dimsdale, J., & Palinkas, L. (2010). Sleep Health in U.S. Hispanic Population. *Sleep*, 33(7), 962-967.

Shafazand, S., Wallace, D., Vargas, S., Toro, Y. D., Dib, S., Abreu, A., et al. (2012). Sleep Disordered Breathing, Insomnia Symptoms, and Sleep Quality in a Clinical Cohort of US Hispanics in South Florida. *Journal of Clinical Sleep Medicine*, 8(5), 507-514.

2010 Sleep and Ethnicity | National Sleep Foundation - Information on Sleep Health and Safety. (n.d.). *National Sleep Foundation - Information on Sleep Health and Safety | Information on Sleep Health and Safety*. Retrieved June 26, 2013, from http://www.sleepfoundation.org/article/sleep-america-polls/2010-sleep-and-ethnicity

Song, Y., Ancoli-Israel, S., Lewis, C., Redline, S., Harrison, S., & Stone, K. (2011). The Association of Race/Ethnicity with Objectively Measured Sleep Characteristics in Older Men. *Behav Sleep Med.*, 10, 54-69.

Interest Rate Fluctuation and Its Effect on Economic Growth Among Metropolitan Areas

Oscar Gonzalez

Mentor: Steve Niven, PhD
Department of Economics; St. Mary's University

Previous studies have documented discrepancies in response to interest rate fluctuation among regions and metropolitan areas within the United States (Francis and Owyang, 2011; Carlino and DeFina, 1999). While these studies conclude that some of the reasons for these varying levels of responsiveness are differences in industrial activity and government size within an area (Francis and Owyang 2011), this paper takes a closer look at the effect that industry share has on metropolitan response to interest rate volatility. Because of the short recession and strong recovery "high technology" metropolitan areas experienced during the 2007 recession (Wial, 2013), a special emphasis is placed on the effects that innovation and technology have on metropolitan interest rate responsiveness. Using a time-series regression, we look at the effect that interest rate volatility has on economic growth among metropolitan areas with different industrial makeups and innovation as control variables.

Introduction

As the economic downturn of 2008 was in full effect, the Federal Reserve engaged in several monetary actions to push interest rates lower, a decision that, according to economic theory, leads to increased spending, investment, and overall economic activity. The interest rate is an essential factor in economic activity, as it influences important economic indicators that determine action among households, businesses, and financial institutions. Such an important economic tool, and maybe most importantly, economic *influencer*, should be correlated to economic growth.

However, the adjustment in monetary policy by the Federal Reserve did not have a nationwide, homogenous economic effect. On the contrary, regions across the United States responded differently and with

varying degrees of responsiveness to the change in interest rates (Wial, 2013); some metropolitan areas, such as San Antonio and Pittsburgh, were able to recover to pre-recession employment levels by 2012, while other metropolitan areas, such as New Orleans and Toledo, remained more than 10% below pre-recession levels (Wial, 2013). Most importantly, "high technology centers went into recession late, had short recessions of varying degrees of severity, [and] recovered strongly" (Wial, 2013).

Knowing that a relationship between the interest rate and economic activity exists and that adjustments in the interest rate have varying degrees of effect on different parts of the country, it becomes beneficial to know what effect an adjustment to the interest rate – through monetary policy – has on American metropolitan economic

activity, and dive into the issue of why these geographical effects may differ. Additionally, it becomes intriguing to see what effect innovation and technology have on metropolitan interest rate responsiveness.

Literature Review

By implementing either restrictive or expansive monetary policy, which in turn affects the interest rate, the Federal Reserve is able to influence the demand for goods and services. An expansionary monetary policy bolsters borrowing and spending which translates into increased demand, as new consumers flood the market and old consumers find themselves with more money to spend. This causes an expansion of real outputs, as producers try to meet the new increased demand by increasing the supply (McConnell, Brue, and Flynn, 2011). On the other hand, restrictive monetary policy increases the interest rate, which in turn reduces the amount of borrowing and spending within an economy (McConnell, Brue, and Flynn, 2011). This spike in the interest rate slows down the economy and is generally used to fight inflation.

The roles of monetary policy and interest rates as determinants of economic growth have been greatly researched. Long-term growth has been correlated to sound governmental actions, with emphasis on the efficiency of a country's monetary policy's ability to control inflation (Barro 1996; Petrakos, Arvaniditis, and Pavleas, 2007). Because high levels of inflation destroy certainty and usher in uncertainty in markets, inflation can lead to the misallocation of resources, the further instability of inflation itself can act as a hindrance to economic growth by having a negative impact on productivity and investment (Pertakos, Arvanditis, and Pauleas, 2007). For countries experiencing inflation rates over 20%, an "increase by 10 percentage points in annual inflation rate is associated with a decline by 0.3

percentage points in the annual GDP growth rate" (Barro, 1996); although the relation between growth and inflation rates under 20% are not statistically significant, there is not enough information to precisely isolate the effect of low inflation on growth and does not mean that this effect is small (Barro 1995). Monetary policies that are geared towards the achievement of low, stable inflation and a stable macroeconomic environment are the most favorable to economic growth (Barro 1996; Pertakos, Arvanditis, and Pauleas, 2007).

The relationship between a stable macroeconomic environment and monetary policy is essential to economic growth. Erratic behaviors in monetary policy, and consequently on the interest rate, have a substantial effect on economic growth (Bordo and Schwartz, 1987). Examining quarterly monetary data in the period between 1918-1965, Clark Warburton (1966) was able to determine that turning points in business cycles were preceded by changes in money supply. Additionally, Warburton was able to find that, "erratic money supply [was] the chief origination factor in business recessions and not merely an intensifying force in the case of severe depressions" (1966). Supportive of these findings, other researchers were able to establish a relationship between money supply and the time-lag effect it had on the business cycle (Bordo and Schwartz, 1987; Friedman, 1965). Looking at the time series from 1867 to 1960, Friedman found a time-lag relationship between the peaks and troughs – representative of maximums and minimums, respectively – of money supply and the business cycle (Bordo and Schwartz, 1987); Friedman was able to argue that, "appreciable changes in the rate of growth of the stock of money are a necessary and sufficient condition for appreciable changes in the rate of growth." (Bordo and Schwartz, 1987). The reason for the time-

lag relationship is due to the "outside lag" and "inside lag" associated with the politics of policy implementation – or an inside lag - and the time elapsed for an economy to experience changes in money supply – and outside lag (Bordo and Schwartz, 1987; Debortoli and Nunes, 2009).

In concurrence with these findings, Shagil Ahmed was able to find two key features about the relationship between money growth and output growth (1993). Examination of data reveals two features: "1) when output grows at an above average pace, so does the money supply; 2) changes in money growth occur prior to changes in output growth"(Ahmed, 1993). Although two opposing theories – the monetary business cycle and the real business cycle – disagree in the direction of causation between money and output, a complete impotence of monetary policy's correlation with output growth cannot be accepted (Ahmed, 1993).

The link between monetary policy and output, and the varying output according to changes in money supply, becomes more important as the relationship between output volatility and economic growth is analyzed. Yet, the relationship between output volatility and economic growth is disputed.

On one side, Bernanke argues that "Output volatility raises economic uncertainty and thus hampers investment" (1983), which results in a decrease in economic growth. In a sample of ninety-two countries, Ramey and Ramey (1995) were able to find that higher levels of output volatility were inversely related to economic growth rates, and that volatility of innovations, which affect changes of output, increased the amount of uncertainty in an economy. Accounting for spillover effects, Badinger showed that periods of high volatility simultaneously occur during periods of low output growth (2010). On the other hand,

empirical evidence presented by Lee (2010) and Fountas and Karanasos (2006) argues that economic growth rates are directly correlated to the level of output volatility; "countries with higher output volatility tend to experience higher economic growth rates" (Antonakakis and Badinger, 2012).

Previous literature has dived into the issue concerning the varying levels of responsiveness towards changes in monetary policy (Carlino and DeFina, 1996; Francis and Owyang, 2011). Carlino and DeFina (1996) attributed the differences in metropolitan responsiveness to interest rate adjustments to three different phenomena: 1) the difference of industries that thrive in individual regions, 2) differences in the ability of regional and local banks to issue loans, and 3) propensity of small and large borrowers in regions. If a region is highly dependent on industries that are very responsive to the interest rate, that region will be more susceptible to changes in monetary policy than a region whose predominant industries are not as interest rate sensitive. The size of banks within a region affect the size of the effect that a change in monetary policy might have within the region; for example, a region dominated by small banks might see a decrease in the amount of loans – a negative influence on growth – given out during times of restrictive monetary policy, because of the less funding options that these small banks have compared to larger banks. Lastly, the size of the borrower usually determines the amount of options available for borrowing that the borrower has, as large borrowers "have greater access to alternative, nonbank sources of funds", while small borrowers "typically have banks as their sole sources of credit" (Carlino and DeFina, 1996).

Francis and Owyang (2011) observed interest rate responsiveness at a more micro level by focusing on individual metropolitan areas. Looking at the 100

largest metropolitan areas in the United States, they find significant heterogeneity in metropolitan responsiveness to changes in the monetary policy, regardless of what region they are in or how close these metropolitan areas are to each other (2011). They come to the conclusion that industry share and government employment within a metropolitan area play a crucial role in determining metropolitan interest rate responsiveness.

Innovation may influence the responsiveness to interest rate fluctuation, as it is a driver of economic growth (Rothwell et. al., 2013). Specifically, patenting, which has been growing in recent years and stands at historically high levels, is associated with higher worker productivity growth and lower unemployment, factors which are positively correlated with growth (Rothwell et al. , 2013). However, 63% of all patents in the United States are invented in only 20 metro areas (Rothwell et al, 2013), meaning that innovation differs among metropolitan area and that so should the economic benefits that derive from innovation.

Because of the relationships that exist between interest rates, the money supply, and output growth and volatility, and the importance that these relationships have on the economic growth and welfare of a state, this paper focuses on bringing light to the effects that a national interest rate has on American metropolises' economic growth and causes for possible differences in reactions to the interest rate, with a special emphasis on the effects of innovation and percentage of employment in 'high level' sectors, such as healthcare and technology.

Data and Methodology

While previous studies (Francis and Owyang, 2011; Carlino and DeFina, 1999) have looked at the multi-state regional or select city responses towards changes in monetary policy, no study has measured the effects of interest rates on economic growth in select metropolitan areas. Because observations span a time period from 1990 through 2011, a time series regression, similar to the ones used by other econometric models to measure the effects of changes in monetary policy on states and regions (Crone, 2007), will be used. All data will be collected from the U.S. Bureau of Economic Analysis database, the World Bank database, U.S. Census Bureau database, Bureau of Labor Statistics, United States Patent and Trademark Office, and the Brookings Institute.

Each metropolitan area will be looked at individually, in order to understand how fluctuation in interest rates affect each area individually, and then compared to the results of the other metropolitan areas. The twelve metropolitan areas chosen – Austin, Boston, Dallas, Houston, Indianapolis, Miami, Oklahoma City, San Antonio, San Diego, and San Francisco – were selected because of their varied industrial makeup across the regional economies, as seen on the tables below.

Proportion of Employment by Sector (2001)				
	% Mfg.	% Services		% Govt.
Metro Area		High Tech	Other	
San Antonio	0.132542072	0.050303036	0.670535769	0.17753793
San Jose	0.248591241	0.139683815	0.522962409	0.080378373
Austin	0.165473207	0.083823296	0.569619413	0.166529617
Houston	0.197745795	0.078161758	0.599411586	0.114651221
Dallas	0.168787084	0.068746053	0.592188987	0.097882686
San Diego	0.133619344	0.092790349	0.576667454	0.186649791
San Francisco	0.122737787	0.115710148	0.603974964	0.111123125
Seattle	0.167414636	0.076636803	0.610977413	0.138139477
Boston	0.145055364	0.103026072	0.646050977	0.104334967
Oklahoma City	0.150198958	0.051118818	0.596948651	0.172466055
Indianapolis	0.169678909	0.054079458	0.640350081	0.112492955
Miami	0.104479671	0.068813541	0.497689622	0.11054496

Proportion of Employment by Sector (2011)				
	% Mfg.	% Services		% Govt.
Metro Area		High Tech	Other	
San Antonio	0.114565142	0.055682848	0.748624405	0.16373162
San Jose	0.179939605	0.140567701	0.591845023	0.07907781
Austin	0.118072494	0.096959061	0.619679443	0.155408371
Houston	0.17729197	0.080839697	0.626963087	0.106800564
Dallas	0.123406119	0.077168853	0.627039046	0.100480545
San Diego	0.102035248	0.104478834	0.602634139	0.181936348
San Francisco	0.093697847	0.132766261	0.62545823	0.22673242
Seattle	0.134008417	0.08655567	0.630510652	0.143743961
Boston	0.106300678	0.110207855	0.681984578	0.100073586
Oklahoma City	0.154250973	0.057535467	0.58994122	0.171034757
Indianapolis	0.126559787	0.062852375	0.671695867	0.11691718
Miami	0.070178997	0.075798266	0.763953734	0.099867815

Metro Area	Patents
San Jose	117167
Boston	66614
San Francisco	73040
San Diego	36771
Seattle	34916
Dallas	34174
Houston	33156
Austin	30677
Miami	15192
Indianapolis	9764
San Antonio	4119
Oklahoma City	2821

Since GDP levels for metropolitan areas are only available for 2001 and later years, we will measure economic growth using the total personal income and employment growth statistics for metropolitan areas. Our main independent variables of interest will be fluctuation of the interest rate, which will be measured as the percentage change in the interest rate from the previous year. Additionally, the results will be analyzed with the percentage share of employment by the manufacturing, governmental, and service industries. The variables in all the regressions will be logged, and as such, will measure the elasticity between the dependent variable and the independent variables. Because innovation is of importance to this paper, we quantify innovation using the level of patents recognized by the United States Patent and Trademark Office in a year within a metropolitan area. The time series will run from 1990-2011.

Initially, the regression model included eight control variables – interest rate, population, unemployment rate, employment growth (in earnings models only), patents, % total jobs in manufacturing, % total jobs in services, and % total jobs in government – to take the form:

$$\text{Log(PI)} = \alpha + \beta_1(\text{logIR}) + \beta_2(\text{logPOP}) + \beta_3(\text{logUR}) + \beta_4(\text{logPAT}) + \beta_5(\text{logMFG}) + \beta_6(\text{logGOVT}) + \beta_7(\text{logSRV}) + \varepsilon$$

where 'PI' represents personal income, 'IR' represents interest rate, 'UR' represents unemployment rate, and 'mfg', 'govt', and 'srv', represent percentage of total employment in the manufacturing, government, and service sectors. Regressions were run on each metropolitan area, with the unemployment rate and employment rate being substituted with each other. However, this regression showed signs of high multicollinearity among the three variables that represented proportion of employment by sectors. These three variables were taken out of the regression, and the regression took the form of :

$$\text{Log(TE)} = \alpha + \beta_1(\text{logIR}) + \beta_2(\text{logPOP}) + \beta_3(\text{logUR}) + \beta_4(\text{logPAT}) + \varepsilon$$

where 'TE' represents change in total employment and 'IR' represents interest rate.

$$\text{Log(PI)} = \alpha + \beta_1(\text{logIR}) + \beta_2(\text{logPOP}) + \beta_3(\text{logUR}) + \beta_4(\text{logPAT}) + \varepsilon$$

where 'PI' represents personal income and 'IR' represents interest rate.

and

$$\text{Log(MFG)} = \alpha + \beta_1(\log IR) + \beta_2(\log POP) + \beta_3(\log UR) + \beta_4(\log PAT) + \varepsilon$$

where 'MFG'. represents % of total employment in manufacturing and IR represents 'interest rate'.

All statistics, for both the dependent and independent variable, will be from the same year.

Results

Change in Employment Growth

Metro Areas	Interest Rate	Population	Unemployment	Patents	Adjusted R2
San Antonio	-0.000222	0.0862	-0.007584	0.001028	0.992174
	(-.266770)	-28.44325	(-5.019626)	-1.010335	
San Jose	0.001896	0.072835	-0.006173	0.000827	0.843309
	-1.1930007	-2.350394	(-3.115442)	-0.314247	
Austin	0.001158	0.072593	-0.005077	0.003558	0.99884
	-2.505416	-30.55691	(-6.533139)	-4.438985	
Houston	-4.71E-05	0.074819	-0.006286	0.00042	0.997131
	(-.103656)	-36.0961	(-6.850510)	-0.356046	
Dallas	0.00081	0.072848	-0.004473	0.000103	0.997
	-1.66021	(63.65134	(-6.001833)	-0.853781	
San Diego	-0.00083	0.15842	-0.008094	-0.007345	0.976282
	(-.995261)	-9.527917	(-7.452258)	(-2.90279)	
San Francisco	-0.000106	0.07978	-0.005334	0.001199	0.950347
	(-.146638)	-2.936602	(-4.745840)	-0.506395	
Seattle	7.45E-05	0.085227	-0.006986	0.7272	0.98868
	-0.134032	-12.18134	(-7.153305)	-0.354696	
Boston	0.00068	0.167147	-0.002022	-0.004341	0.964775
	-0.951236	-11.76871	(-3.086559)	(-3.421379	
Oklahoma City	-7.58E-07	0.096813	-0.005673	0.003155	0.9855
	(-0.001103)	-25.99414	(-4.106441)	-2.24119	
Indianapolis	-0.000307	0.091638	-0.006609	-0.000987	0.983009
	(-.640649)	-37.17221	(-8.902195)	(-1.02994)	
Miami	-0.000683	0.096631	-0.003942	-0.000889	0.9666592
	(-.680805)	-14.22057	(-2.802994)	(-.473883)	

Results for the first regression for all twelve of the metropolitan areas can be found on the table above, which shows the significance and effect of a change in the interest rate within the metropolitan areas. While the change in the interest rate is only statistically significant for one of the twelve metropolitan areas, this gives us an insight into the effects that industry

share of employment and innovation have on fluctuating interest rate responsiveness. The total employments in all metropolitan areas were statistically significantly affected by changes in the population level and the unemployment rate. As might be expected, change in total employment was positively correlated with population levels and inversely correlated with the unemployment rate. Patents were positively correlated with total employment growth in all metropolitan areas, but only statistically significant in half of the metropolitan areas in the study.

Of more interest to this paper is the second regression, which measures growth in total personal income and lets us infer about the relationship between interest rate fluctuation, innovation, and growth.

Change in Total Personal Income

Metro Area	Interest Rate	Population	Unemployment	Patents	Adjusted R2
San Antonio	-0.340288	1.2182	-0.507034	0.266262	0.876521
	(-4.240365)	(19.82441)	(-2.757846)	(0.266262)	
San Jose	-0.012448	1.014137	-0.055648	0.435098	0.957603
	(-.209101)	(35.99383)	(-.763241)	(13.65462)	
Austin	-0.011553	1.03566	-0.003061	0.407487	0.9888554
	(-.284038)	(51.2354)	(-.046111)	(14.87095)	
Houston	-0.293435	0.992677	-0.636708	0.69855	0.907564
	(-3.659274)	(8.4448)	(-3.66383)	(3.243132)	
Dallas	-0.445225	1.345806	-0.617132	0.038366	0.863637
	(-5.188204)	44.6506	(-3.608486)	(1.174211)	
San Diego	-0.070287	0.947576	-0.045279	0.603117	0.908699
	(-.989985)	18.08532	(-.485109)	(7.179468)	
San Francisco	-0.011264	0.97558	-0.047132	0.530705	0.948231
	(-.193668)	(32.62701)	(-.58088)	(12.75787)	
Seattle	-0.111422	1.149064	-0.321496	0.352412	0.918812
	(-1.71184)	(35.65484)	(-2.715553)	(7.504512)	
Boston	-0.2915	0.985851	-0.294064	0.593824	0.737444
	(-2.725593)	(6.510746)	(-1.817892)	(2.328822)	
Oklahoma City	-0.437666	1.281606	-0.463272	0.129111	0.699438
	(-4.28873)	(9.528276)	(-1.671706)	(0.392518)	
Indianapolis	-0.176003	1.03365	0.140299	0.490183	0.759353
	(-1.518275)	(10.2897)	(-0.807182)	(2.373435)	
Miami	-0.251861	0.916098	-0.201347	0.293652	0.835874
	(-3.503271)	(13.54694)	(-1.922099)	(2.173055)	

Interest rate fluctuation, while only statistically significant for half of the metropolitan areas, is inversely related to growth in total personal income. With the exception of Austin and Indianapolis, many of the metropolitan areas with a comparatively smaller amount of patents produced appear to be more affected by a change in the interest rate. It is interesting to note that while Dallas and Houston have produced more patents than Austin from 1990-2011, a change in the interest rate affects them while it does not affect Austin. This could be

due to the fact that their manufacturing industries employ a larger proportion of workers, a phenomena which makes these two metropolitan areas more susceptible to fluctuations in the interest rate. This gives an insight into the greater susceptibility of metropolitan economies with a relatively larger manufacturing base to changes in the interest rate.

Changes in unemployment differ in their statistical significance, with, once again, metropolitan areas that rank high in patents developed being less affected by changes in the unemployment rate. This could be an indication that these metropolitan economies are driven more by the churn of innovation, a strong driver of growth. Indeed, all of the metropolitan areas, except for Dallas and Oklahoma City, were statistically and positively affected by higher levels of patents. Furthermore, population levels were positively correlated to total personal income in all of the metropolitan areas.

The results of the third set of models – which looks at how the manufacturing industry share of employment is affected – show that manufacturing is mainly affected by population levels and the unemployment rate. While it is natural to expect the unemployment rate to have a negative correlation with the percent of total jobs that are in the manufacturing industry, the negative correlation between population and manufacturing may be due to the measurement of this as the proportion of manufacturing employment to total employment. Such that, as the population grows, the proportion of employment in manufacturing is smaller as the demand for greater services increases.

Change in proportion of employment in mfg.

Metro Area	Interest Rate	Population	Unemployment	Patents	Adjusted R2
San Antonio	0.014189 (1.176465)	-0.058842 (-1.339661)	-0.104354 (-4.764895)	-0.026531 (-1.798591)	0.843612
San Jose	0.55869 (1.142984)	-1.175174 (-1.233321)	-0.094109 (-1.544742)	-0.087854 (-1.085704)	0.87813
Austin	0.26156 (1.069007)	-0.751688 (-5.976007)	-0.16784 (-4.066928)	0.19566 (4.610037)	0.939141
Houston	0.012536 (.964015)	-0.242466 (-4.085980)	-0.035648 (-1.356967)	-0.06052 (-1.792918	0.91221
Dallas	-0.000125 (-.008211)	-0.895876 (-25.07624)	-0.152159 (-6.540368)	-0.001113 (-.294437)	0.988027
San Diego	-0.023108 (-1.609313)	-1.312002 (-4.582624)	-0.1599937 (-8.551983)	-0.014622 (-.335612)	0.962206
San Francisco	0.004018 (.151909)	-0.625202 (-.629111)	-0.166729 (-4.055016)	-0.075837 (-.0875783)	0.901641
Seattle	0.048203 (2.083041)	-1.568466 (-5.384175)	-0.085443 (-2.101175)	0.064443 (1.36918)	0.944201
Boston	-0.011026 (-.382945)	-4.90090234 (-8.562429)	-0.149735 (-3.833379)	0.027494 (.380577)	0.946292
Oklahoma City	0.044748 (1.411040)	-0.331513 (-1.929873)	-0.036369 (-.570816)	-0.185624 (-2.603591)	0.60495
Indianapolis	-0.008953 (-.556318)	-0.904665 (-10.91733)	-0.163446 (-6.549206)	-0.074489 (-2.312417	0.976075
Miami	-0.012932 (-.741311)	-1.707864 (-14.5802)	-0.269153 (-11.16141)	-0.031943 (-.993282)	0.975955

Implications/ Conclusions

We find that metropolitan areas react differently in the face of interest rate fluctuations. Innovation within the metropolitan areas we selected influenced the interest rate responsiveness, and areas with a greater amount of innovation – measured as patents in this paper – were less susceptible to interest rate fluctuations. Additionally, innovation is found to be a strong driver of economic growth. Lastly, we find that the percent of total employment employed by the manufacturing industry is negatively correlated to population.

With these findings in mind, it would be most beneficial for the city of San Antonio to continue to develop an atmosphere that promotes innovation and technology in which to thrive. In the ranking of patents produced within the twelve metropolitan areas in the study, San Antonio was a dismal second to last. Austin, Houston, and Dallas, cities that are geographically close and are in the same state, produced almost four times as many patents from 1990-2011. Such increases in innovation and technology can help San Antonio become less susceptible to fluctuations in the interest rate, and less affected by unstable macroeconomic conditions.

Further Research

Although we used patents as a way of measuring innovation, we understand that not all patents have the same effect on productivity, and that innovation can encompasses much more than just patents. A more accurate measurement of innovation within a metropolitan area can give a clearer insight into the effects that innovation has on metro economic growth. Research into how and what kinds of socioeconomic conditions influence innovation within a metropolitan city will be worth looking into.

 While this paper looks at how metropolitan areas respond to interest rate fluctuations using innovation and industrial make-up as control variables, it would be interesting to see how these two control variables influence metropolitan response to other macroeconomic shocks. Lastly, the economic benefits of innovation and technology on metropolitan economic growth would an area of much interest.

References

Ahmed, S. (1993). Does money affect output?. *Business Review*, (Jul), 13-28.

Antonakakis, N., & Badinger, H. (2010). *International spillovers of output growth and output growth volatility: evidence from the g7* . Informally published manuscript, Department of Economics, Vienna University, Vienna, Austria.

Antonakakis, N., & Badinger, H. (2012). Output Volatility, Economic Growth, and Cross-Country Spillovers: New Evidence for the G7 Countries.

Barro, R. J. (1996). *Determinants of economic growth: a cross-country empirical study* (No. w5698). National Bureau of Economic Research.

Barro, R. J. (2003). Determinants of economic growth in a panel of countries. *Annals of economics and finance*, 4, 231-274

Bernanke, B. S. (1983). Irreversibility, uncertainty, and cyclical investment. *The Quarterly Journal of Economics*, 98(1), 85-106.

Bordo, M. D., & Schwartz, A. J. (1987). The Importance of Stable Money: Theory and Evidence. *In Money in Historical Perspective* (pp. 255-270). University of Chicago Press.

Carlino, G. A., & DeFina, R. H. (1996). Does monetary policy have differential regional effects?. *Business Review* (Federal Reserve Bank Of Philadelphia), 17.

Carlino, Gerald A., and Robert DeFina. "Does Monetary Policy Have Differential Regional Effects?" Federal Reserve Bank of Philadelphia *Business Review* (March/April 1996).

Carlino, Gerald A., and Robert DeFina. "The Differential Regional Effects of Monetary Policy: Evidence from the U.S. States," *Journal of Regional Science* (forthcoming 1999)

Crone, T. M. (1999). A pattern of regional differences in the effects of monetary policy. *Business Review,* (Q3), 9-19.

Debortoli, D., & Nunes, R. (2011). *Monetary regime switches and unstable objectives* (No. 1036).

Fountas, S., & Karanasos, M. (2006). The relationship between economic growth and real uncertainty in the G3. *Economic Modelling*, 23(4), 638-647

Han, T. (2012). *Regional effects of monetary policy*. (Doctoral dissertation, Louisiana State University).

Lee, J. (2010). The link between output growth and volatility: Evidence from a GARCH model with panel data. *Economics Letters*, 106(2), 143-145.

Neville, F., Owyang Michael, T., & Tatevik, S. (2012). The Local Effects of Monetary Policy. *The BE Journal of Macroeconomics*, 12(2), 1-38.

Nunes, R., & Debortoli, D. (2010). The Macroeconomic Effects of Unstable Monetary Policy Objectives. In *2010 Meeting Papers* (No. 1271). Society for Economic Dynamics.

Petrakos, G., Arvanitidis, P., & Pavleas, S. (2007, March). Determinants of economic growth: the experts' view. In *2nd Workshop of DYNREG in Athens* (pp. 9-10).

Posch, O., & Walde, K. (2009). *On the non-causal link between volatility and growth*. Informally published manuscript, School of Economics and Management, Aarhus University, Denmark.

Ramey, G., & Ramey, V. A. (1994). C*ross-country evidence on the link between volatility and growth* (No. w4959). National bureau of economic research.

Uhlig, H. (2005). What are the effects of monetary policy on output? Results from an agnostic identification procedure. *Journal of Monetary Economics*, 52(2), 381-419.

United States. Federal Reserve Board. How does monetary policy affect the U.S. economy? Retrieved 27 May 2013 from the Federal Reserve Web site: http://library.wlu.edu/research/ref/cite_apa_govt.asp

Vega, S. H., & Elhorst, J. P. (2013). On spatial econometric models, spillover effects, and W.

Wial, H. Metropolitan Economies in the Great Recession and After.

The social interactions and solitary activities of a developmentally delayed beluga calf (*Delphinapterus leucas*) as compared to a typically developing beluga calf

Kelsey Houtkooper

Mentor: Heather Hill, PhD
Department of Psychology; St. Mary's University

Abstract

Understanding the developmental milestones of mammals helps to recognize when atypical development occurs. The purpose of this study was to compare the development of two belugas during the first three years of life on their affiliative, aggressive, and sexual interactions as well as their solitary behavior. A total of 288 archived videos or approximately 72 hours of video footage was coded by several individuals. The results indicated that the 2 belugas followed 2 developmental trajectories with one reaching expected milestones at a later time than the other. One calf swam with her mother, initiated and reciprocated interactions with other belugas as early as the first year of life. The other calf did not display these behaviors until the third year of life and did so with reduced rates. The calf who did not engage in interactions tended to float independently more often and in longer durations than the calf that did engage in interactions. The implications of the research emphasize the importance of studying milestones longitudinally.

Development of mammals is multi-faceted. It encompasses physical development, cognitive development, social development, and emotional development. Milestones help to understand the main indicators that development is occurring. Physical development describes the manner in which animals develop physically. For example, characteristics generally such as in humans and primates (altricial/semi-precocial species) they learn to control their head first, then body, then are able to be mobile. Marine mammals, a – precocial species, they have some physical developmental changes such as more efficient breathing efforts, and body control while swimming or floating, etc). Cognitive development includes the ability to form mental representations or , understand intention, (predict future events, etc). Social development involves the interacting with others appropriately, understanding social norms and naturally following them. Lastly, emotional development is responding appropriately to environmental stimuli with responses such as to laugh, cry, or get angry.

The correlation can lead to the conclusion that the abnormal developments of the two would be similar as well. Human atypical development may serve as a model for the abnormal developments of a beluga.

In humans, a number of developmental disorders exist in which certain milestones are delayed, modified, or never reached. A prevalent developmental disorder that is evident in humans is Autism Spectrum disorder (ASD) a social disorder that affects a human's life from development to interactions with others. The symptoms of ASD are broadly categorized in three aspects: impaired social interaction, verbal and non-verbal communication issues, and limited and reduced behavior (Guy, all authors. 2001). Children diagnosed with symptoms of ASD have difficulty engaging in appropriate social interactions, using language fluently, and displaying a full behavioral repertoire, while often displaying repetitive or stereotyped behaviors.

When a child has symptoms of ASD, these milestones may be altered or omitted, motor skills and/or verbal delays may occur (Matson, all authors, 2010). In humans, ASD is more common in males with a ratio of four males to one female receiving the diagnosis. Identified as having a neurological foundation, ASD ranges in severity from mild to extreme impairments. Humans with Asperger syndrome are the most functional individuals in the spectrum. The symptoms are problems with social skills, repetitive behaviors and unable to reciprocate appropriating to social situations. In contrast, Rett's syndrome is an extreme form of autism. People with Rett's syndrome will experience difficulties in every aspect of their lives, such as little to absent speaking skills, motor skills, and social skills, and must be watched over twenty four hours a day.

The cause of Autism is unclear currently.

Studies have indicated a variety of possible factors, including genes, environmental factors, and abnormalities in the brain (e.g., cerebellum, amygdala, hippocampus, and mammillary bodies). For most humans, autism is developed during the early fetal development. However, some cases have indicated a possible onset during early childhood. The early development of autism symptoms for most children indicates that genes play a significant role in the development of autism. Unfortunately, symptoms of ASD cannot be cured. Rather the symptoms must be treated using behavioral therapies (Guy et al., 2001). Learning the triggers of individuals' stereotypical behaviors helps to minimize the symptoms.

Autistic children are studied while they are infants; a time where one cannot actually diagnose them with autism. By age two, children can be diagnosed with autism although symptoms are evident much earlier. The authors put forth the issues with the study in the beginning such as a sign of autism deals with language impairment and infants have not developed that ability whether they have autism or not. Early signs of developmental delays include lack of eye contact by infants when playing with their parents (REF), other social impairments such as lacking the reciprocal interest with the parent. Children who are diagnosed with autism earlier have better outcomes as earlier interventions for delayed social skills and interactions may be implemented (Glasson, E. J., Bower, C., Petterson, B., de Klerk, N., Chaney, G., & Hallmayer, J. F. 2004).

The social impairment children with ASD have affects their developing attachments to their parents. Typically, children without ASD form attachments with their parents during their first year of life. They seek comfort from their parents' touch or heartbeats, elicit and maintain eye

contact with them, and respond to their parents' interaction attempts. Children diagnosed with autism early in life, often display limited forms of attachment as they rarely displayed typical parent-child interactions, including shared eye contact and physical contact. Autistic children may reject physical contact (e.g., hugs) due to abnormal responses to sensory stimulations. Children with ASD are also more difficult for their caregivers if they are not developing their motor skills properly, including eating and speaking (REF).

Some factors leading to atypical development include a lack of maternal care (Dienske & Griffin). Without the presence of a clear-cut attachment, children with ASD often display other forms of comfort-producing behaviors in the form of repetitive actions, including hand movements, rocking, or repeating soothing words. Unfortunately these stereotypical actions paired with the abnormal tendencies of no eye contact and lack of social skills are frightening to children without autism who then treat the children with ASD differently and negatively. Furthermore, while children with ASD are often highly intelligent, they learn very differently than their peers without ASD. Autism can disrupt regular social interactions and activities, it has been perceived to decrease after stages of normal development, such as the stages you go through from infancy to adulthood; learning to talk, play, interact (Landa & Garrett-Mayer, 2006).

Abnormal development is present in all mammals development. Chimpanzees have around 95 to 98 percent of the same DNA that humans do, their development of their physical, cognitive and social developments are similar as a result of the commonalities. They experience emotions and express them in ways such as kissing, touching hands and mothers and their offspring are stay in a pair interaction always. If a mother chimpanzee were to die her offspring would not be able to survive unless adopted by family or non-related chimpanzees. The offspring are relatable to humans in their dependence on maternal care (Jane Goodall Institute). Researchers examined the social interactions of orphaned chimpanzees, noting that with the absence of maternal care there is a debility for the offspring to effectively have social interactions and an abnormal development will be anticipated. Overtime, when interactions occur with an abnormally developed chimpanzee, their responses to the interfaces are anxiety related and produce stress causing them to have physical reactions such as aggressively scratching oneself.

Little information exists about atypical development in non-human animals in their natural habitat. Likely, as most offspring displaying abnormal behavior are abandoned by their mothers and do not survive. However, offspring displaying abnormal development in human care can survive with human intervention. Most of the available knowledge of abnormal development comes from animals in the care of humans. Thus, a beluga calf with abnormal development would likely to develop typically with the allo-maternal care of humans, the developmental milestones differ due to the missing naturalistic care. The lifespan of animals in human care is greater than the wild.

A typically developing beluga calf will stay with their mother for over three years, in this period of time they learn social behaviors and have developmental patterns that help the calves to become independent. From birth calves follow their mothers, learning their environment and expected behaviors. As the calf develops their activities go from mother-calf pairswims to more independent activities or other social activities. The calf begins to learn different types of swims and motor activity (Krasnova et al., 2006). A beluga mother-calf swim has a purpose of protecting the

calf, being an effective way for nursing and to help regulate the calves respiration (Hill, 2009). The mother-calf attachment keeps the calf safe with the mother and allows the mother to guide the calf through development. As the calf develops, the mother begins to allow the calf to explore, this is when exploratory behaviors are more evident; solo swims and affiliative interactions become more prevalent. As the calves explore their surroundings they become more comfortable. For an atypically developing calf in the wild without the attachment to their mother, the different developments and survival techniques have to be learned through other means such as allonursing; where another beluga will care for non-offspring to protect and assist the calf in their development.

With the result that belugas and humans are both mammals, belugas; like chimpanzees, have been observed to be very similar in their developments throughout stages in life. Mainly, beluga and human social development as well as their connections to their caregiver. The correlation can lead to the conclusion that the abnormal developments of the two would be similar as well. Human atypical development serves as a model for the abnormal developments of a beluga whale. The purpose of the current study was to compare a beluga with typical development and an intact mother-calf bond to a beluga with atypical development and no mother-calf bond to better understand what facets of development were affected. Using archived video footage of the two beluga and calves born in the care of humans one year apart, the behavioral repertoire, social interactions and solitary behaviors were examined for the first three years of life. Based upon the follow hypothesis address physical development. The following hypotheses were evaluated:

1. The durations and frequencies of social interactions will be less for the abnormal developing beluga and the durations and frequencies of solitary activities will be greater.
2. The developmental milestones and roles in interactions of a beluga will occur later for an abnormal developing beluga than a typical developing beluga.
3. It is evident through social interactions that a beluga whale has had an abnormal development in comparison to a typical mother-calf bonded beluga.

Method

Subjects

Two calves, at SeaWorld San Antonio in Texas, were the subjects for the current study. The younger calf, ATL was born on June 23, 2010. The older calf, BEL was born on June 12, 2009. ATL's mother, LUN, was a captive-born beluga giving birth to her first surviving calf. BEL's mother, CRI was wild-born giving birth to her second calf. LUN was 10 years old at the time of ATL's birth and CRI was approximately 27 years old at the time of BEL birth. LUN and ATL did not bond upon ATL's birth, which led to ATL being reared by humans although she remained with her mother and the beluga population.

Materials/ Measures

While coding, an excel spreadsheet is used to organize four different social bouts: affiliative interactions, which are positively-oriented interactions that includes close proximity to other animals, reciprocal interactions, contact, or other pleasurable experiences, aggressive interactions in which animals initiate or respond to others in a threatening manner , sexual interactions, which are exchanges between animals involving the genitalia or for the purpose of courtship, and solo activities, which are all activities that animals perform independent of all other animals. Each variable was coded for frequency and durations, converting them to rates and proportions correspondingly.

Additional variables of interest included age of the calf, amount of video recording time, and amount of visible time.

Procedure

A total of 288 archived videos or approximately 72 hours of previously recorded of the first three years of each calf was coded. The videos were recorded by various research assistants over a period of three years for each calf and consisted of narrated 10-15 minute recordings of focal pair follows. Videos were collected for each animal two to four times a week, every week of a year. Four videos were randomly selected each month for each calf across 36 months. Each video was then coded by one of four coders. To account for variations in video availability and session lengths, data were transformed into rates and percentages when appropriate. Data were analyzed by individual events and as collapsed summary data. All hypotheses were tested with a series of factorial ANOVAs to determine if differences existed between the two calves across each year of life or by chi squares tests of independence when data were categorical. All data were first processed in Excel and then analyzed using SPSS© 19.

Results

Figure 1 summarizes the activity budget of each calf across each year of life. As the figure indicates, ATL, the beluga that did not bond with her mother, behaved substantially different from BEL, the beluga that did bond with her mother. A series of 2 (animal) x 3 (year) factorial ANOVAs were performed to test if the animal and age interacted for the total percentage of each type of behavior.
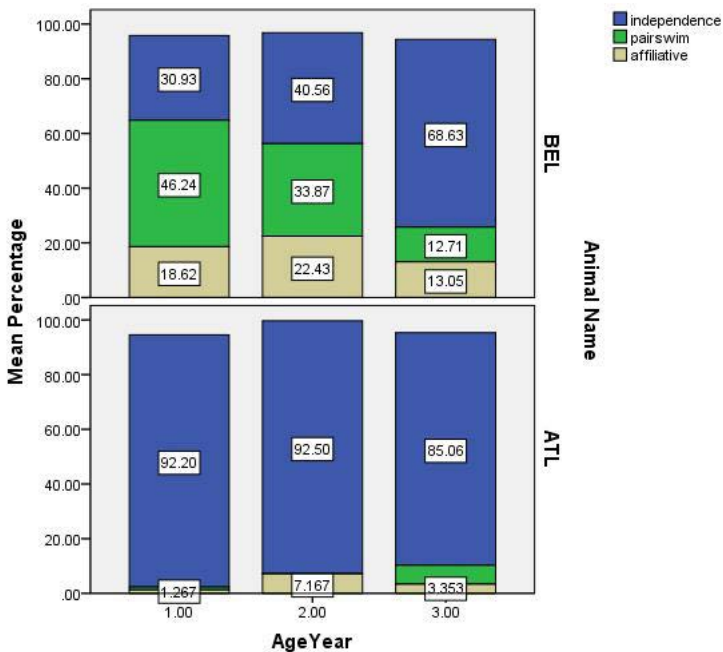
Figure 1. Activity Budget demonstrates how much time the two calves spent in the three major categories of interactions.

Frequency of the type of interactions for the two calves over three years

Table 1

BEL				ATL			
Year	Independent	Affiliative	Pair	Year	Independent	Affiliative	Pair
1	38	36	38	1	37	7	4
2	41	14	39	2	46	9	2
3	30	12	25	3	35	9	6
Total Percent	46.8%	71.3%	89.5%		53.2%	28.7%	10.5%

A two-way ANOVA was used to assess the influence of animal and age on the average percent of pair swims with mothers. The results indicated a significant effect between animal and the average percentage of pair swims, $F(5,101) = 6.88$, $p < .001$, $2=.20$). As Figure 1 and Table 1 indicate, BEL engaged in significantly more pair swims than ATL. Although no main effect was observed for year, BEL was observed to decrease her time in pair swim in half by the third year of life. Finally, BEL displayed a total of 96 swims with her mother across the three years while ATL displayed a total of 11 pair swims with various animals, including her mother.

Table 2
Mean percentage and standard deviations of independent bouts for each year and calf

BEL			ATL		
Age Year	Mean	Std. Deviation	Age Year	Mean	Std. Deviation
1	46.236	35.902	1	1.456	1.379
2	40.780	31.419	2	0.000	0.000
3	20.080	19.351	3	4.550	4.381
Total	37.4353	32.180	Total	3.011	3.669
Total					
Age Year		Mean		Std. Deviation	
1		41.758		36.633	
2		39.647		31.705	
3		17.074		32.244	

Mean percentage and standard deviations of independent bouts for each year and calf

Pair Swim Frequencies for calves over three year period
A two-way ANOVA was used to test the significance for how long pairswims last over three years of two calves. The results of the two-way ANOVA indicated a significant effect of animal on the duration of pairswims, $F_{(4, 279)}= 3.770$, $p< .005$, $\eta^2=.02$). As indicated in Figure 1 and in Table 3. ATL clearly spent the majority of her time in independent swims and floats across all three years.

Table 3
Means and standard deviations for the independence for each year and calf

<u>*Means and standard deviations for the independence for each year and calf*</u>

BEL			ATL		
Age Year	Mean	Std. Deviation	Age Year	Mean	Std. Deviation
1	30.932	3.548	1	97.083	3.499
2	55.414	3.499	2	97.556	3.173
3	72.546	3.886	3	95.067	3.598

Affiliative Interactions

To determine whether there was a difference between the frequency of affiliative interactions of each calf, a series of chi-square tests of independence was conducted. In 31 months BEL had a total of 116 affiliative interactions and ATL displayed only 39 affiliative interactions. Figure 1 demonstrates that BEL spent an average of 17% of her time in affiliative interactions while ATL spent only 6.7% of her time in affiliative interactions with many of those appearing later in the second and third years. This trend was confirmed by the results of a chi-square test of independence in which a significant relationship between the age in years and the presence or absence of an affiliative interaction (χ^2(N=157)=37.491, $p < 0.001$). The results suggested that affiliative interactions were somewhat equally spread across the three years of life for BEL, ATL displayed significantly more affiliative interactions than expected by chance by the end of the second year. Also of interest, BEL began participating in interactions during her fifth month while ATL delayed hers until month 11. Figure 2 shows the breakdown of the total interactions per month for each calf.

Table 4
Means and standard deviations for the affiliative interactions for each year and calf

BEL			ATL		
Age Year	Mean	Std. Deviation	Age Year	Mean	Std. Deviation
1	63.18	110.055	1	54.70	59.386
2	53.80	33.848	2	32.92	38.677
3	31.50	37.546	3	27.58	36.162
Total	57.58	94.278	Total	37.44	45.049

A one way ANOVA was used to compare the length of an affiliative interaction and the age in year. The results indicated that there was no significant difference between the duration of an affiliative interaction or main affects for the age in year for either calf. These results suggest that while BEL engaged in more affiliative interactions than ATL, they did not vary in their average duration. Both calves engaged in fairly short durations.
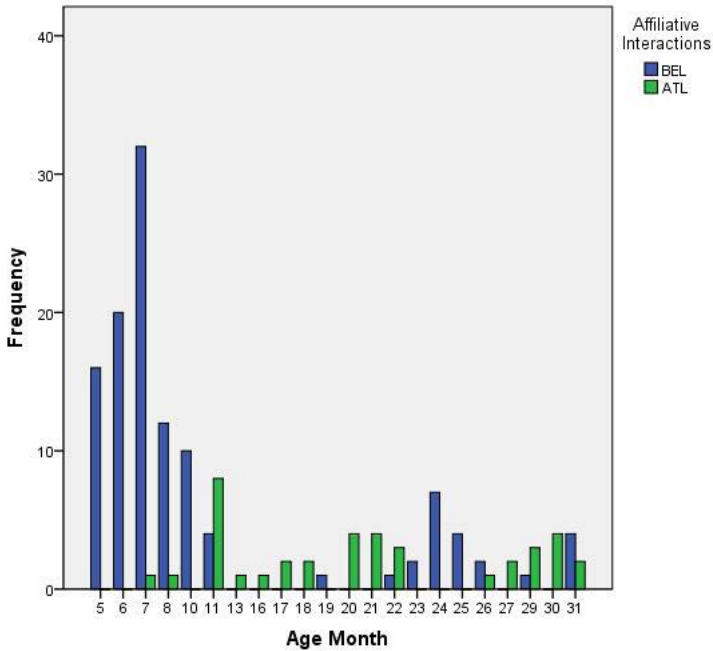
Figure 2. Frequencies for affiliative interactions for each month of the first three years of life for each calf. (Available data ended at month 31 for ATL)

When the social interactions were further analyzed for the initiator, additional differences emerged. BEL initiated 38 of her total 48 calf-non-mother interactions and then ATL initiated 10 of her total 27 calf-non-mother interactions. Two chi-square tests of independence were computed to examine whether a difference was present between the initiators and receivers of the social interactions of the calves over three years. The results for BEL showed a significant relationship between the initiators and receivers for all years, year one (χ^2(N=48)=34.00, p<.001), year two (χ^2(N=48)=7.00, p<.03), and year three (χ^2(N=48)=7.00, p<.03). Chi-Square test of independence for ATL showed a significant relationship between the initiators and receivers per year, year one (χ^2(N=27)=8.00, p<.005). BEL's preferred initiated interactions were with WHI at 63.2%, OLI at 15.8%, as well as ATL at 13.2%. ATL's preferred initiated interactions were with BEL at 100%.

Chi-Square test of independence for ATL showed a significant relationship between the initiators and receivers for year two (χ^2(N=27)=6.00, p<.014 and year three (χ^2(N=27)=13.00, p<.002). Year one did not have enough affiliative interactions to evaluate the relationship (N = ??). These results suggest that initiations of interactions were observed over the first three years of life for the two animals, BEL having more interactions and initiations than ATL throughout every year. BEL in total had 48 interactions, initiating 38 of the interactions. ATL in total had 27 interactions, initiating 10 of the interactions.

Independent Activities

A two-way ANOVA was used to assess the influences of animal and age on the percent of independent activities displayed by the calves. The results indicated a significant effect of animal on the percent of independent bouts, $F(5, 214)= 33.498$, $p <.001$, $\eta=.589$). Thus, ATL engaged in significantly more independent activities than BEL. Figure 3 shows the breakdown of independent activities for each animal. As you can see, ATL floated and swam significantly longer than BEL while their average solitary play lasted about the same durations. A two-way ANOVA confirmed the difference seen in Figure 4. The results of the two-way ANOVA indicated a significant effect between the two animals on the duration of pair swims, $F (2, 439)= 148.721$, $p< .001$, $\eta2=.31$). A Student-Newman-Keuls (SNK) indicated that there was no difference in the duration for the three years.

Table 5

Means and standard deviations for the independence for each year and calf

BEL			ATL		
Independence Type	Mean	Std. Deviation	Independence Type	Mean	Std. Deviation
Soloswim	125.17	184.794	Soloswim	332.30	319.970
Solofloat	22.17	22.938	Solofloat	420.51	333.377
Soloplay	39.15	142.134	Soloplay	150.26	240.098
Total	112.93	179.417	Total	349.94	326.212
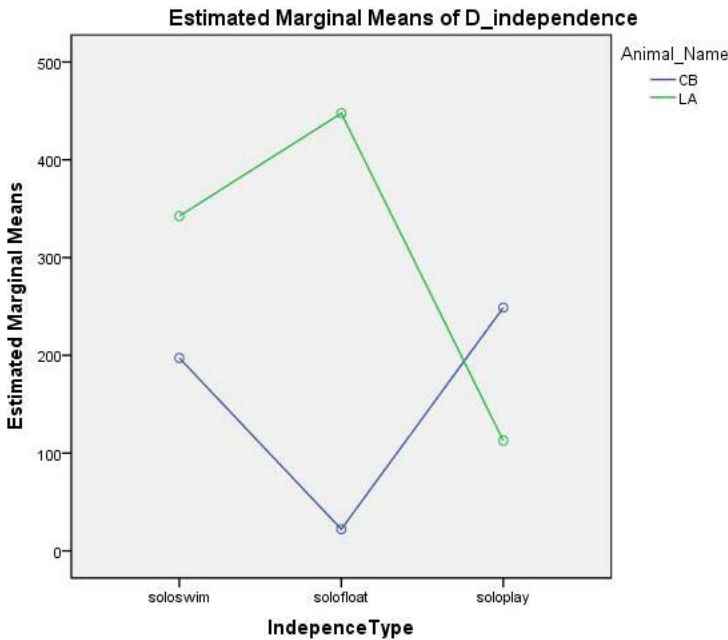
Figure3. Mean duration of independent bout type for each calf

Discussion

The purpose of this study was to compare the development of two belugas, ATL and BEL, during the first three years of life on their affiliative, and aggressive interactions as well as their solitary behaviors. A normal development for a beluga consists of attachment to their mother which is seen through pair swim, also the social interactions are a big indicator of a belugas development (Hill 2009), Within these interactions are play, contact with one another as well as the points in which the calves became the initiators of the interactions (Hill, 2009; Krasnova et al., 2006,2009). In the current study, one of the calves did not bond with her mother and the question became how did this affect her behaviors as compared to a typically developing beluga. The research questions to be answered are as follows: Are the durations and frequencies of social interactions less for the abnormal developing beluga and the durations and frequencies of solitary activities greater? Are the developmental milestones and roles in interactions of a beluga occurring at a later time for an abnormal developing beluga than a typical developing beluga? Is it evident through social interactions that a beluga whale has had an abnormal development in comparison to a typical mother-calf bonded beluga?

Lack of maternal care has been said to activate an abnormal development for mammals, however, belugas have been seen to have an automatic attachment to their mothers present at birth, ATL did not attach to her mother in any of the first three years of life. The implications of this study emphasize the importance of researching the milestones of a mammals development and understanding the abnormal progresses that mammals are intertwined within.

The study found that ATL began initiating interactions at the beginning of her second year of life and BEL around the middle of her first year. An abnormal development consists of the contrary, little to no attachment to mother or other belugas, an abundance of solo activities ranging from every year of life. ATL statistically had an average of 95% of her time dedicated to solitary activities such as solo swims, solo float and solo play. The durations and initiating rates of ATL are small in proportion to her other activities and in comparison to BEL exceed BEL.

Using the data from the two-way ANOVAs, a significant difference between ATL and BEL was found when observing the social interactions with BEL having a more interactions than ATL. ATL deviated from the typical development in all of the target social interactions and solitary activities by having a greater amount of solitary activities present and a small amount of interactions. Within the studied mammals, there is a potential for an abnormal development.

ATL has a significantly different development than BEL, they were raised in the same environment with both mothers coming from the wild. BEL attached to her mother at birth while ATL didn't. ATL has tendencies to prefer solitary activities; floating along the net, solo swimming in repetitive patterns, as she gets older her social interactions grow at a slow rate. These tendencies are the opposite for BEL who reached all of the typical milestones for a developing beluga calf; had mainly pairswims with her mother at the beginning of life and then progressively became independent. Fostering and allonursing an offspring without the connection to their mother commonly occurs, however, ATL did not attach to any of the other mothers or calves and did not have an alloparent. In the wild a beluga without their mother would not have the means necessary to survive such as nursing and protection. ATL being in human care has helped her to reach her milestones and develop in a similar form to BEL (at a slower pace), in

a way that has encouraged the development of ATL and treated her to be functioning in an acceptable way for a beluga calf.

Future research to be studied on mammals and abnormal development would benefit from researching the repetitive activities such as repetitive swim patterns and repetitive play. Limitations on the study were the missing number of videos recorded and the missing coding for target variables.

Sources

Botero, M., MacDonald, S. E., & Miller, R. S. (2013). Anxiety-related behavior of orphan chimpanzees (Pan troglodytes schweinfurthii) at Gombe National Park, Tanzania. Primates, 54(1), 21-26.

Chimpanzee Facts. The Jane Goodall Insitute. http://www.janegoodall.org/chimpanzee-facts.

Cunningham, A. (2012). Measuring Change in Social Interaction Skills of Young Children with

Autism. Journal Of Autism & Developmental Disorders, 42(4), 593-605. doi:10.1007/s10803-011-1280-3

Dienske, H., & Griffin, R. (1978). ABNORMAL BEHAVIOUR PATTERNS DEVELOPING IN

CHIMPANZEE INFANTS DURING NURSERY CARE-A NOTE. Journal of Child Psychology and Psychiatry, 19(4), 387-391.

Glasson, E. J., Bower, C., Petterson, B., de Klerk, N., Chaney, G., & Hallmayer, J. F. (2004).

Perinatal factors and the development of autism: a population study. Archives of General Psychiatry, 61(6), 618.

Guy, J., Hendrich, B., Holmes, M., Martin, J. E., & Bird, A. (2001). A mouse Mecp2-null mutation causes neurological symptoms that mimic Rett syndrome. Nature genetics, 27(3), 322-326.

Hill, H. (2009). The behavioral development of two beluga calves during the first year of life.

International Journal of Comparative Psychology, 22, 234-253.

Karenina, K., Giljov, A., Baranov, V., Osipova, L., Krasnova, V., & Malashichev, Y. (2010).

Visual Laterality of Calf-Mother Interactions in Wild Whales. Plos ONE, 5(11), 1-6. doi:10.1371/journal.pone0013787

Krasnova, V. V., Bel'kovich, V. V., & Chernetsky, A. A. (2006). Mother-infant spatial relations in wild beluga (Delphinapterus leucas) during postnatal development under natural conditions. Biology Bulletin, 33(1), 53-58. doi:10.1134/S1062359006010079

Landa, R., & Garrett-Mayer, E. (2006). Development in infants with autism spectrum disorders:

a prospective study. Journal of Child Psychology and Psychiatry, 47(6), 629-638.

Matson, J. L., Mahan, S., Kozlowski, A. M., & Shoemaker, M. (2010). Developmental

milestones in toddlers with autistic disorder, pervasive developmental disorder—not otherwise specified and atypical development. Developmental Neurorehabilitation, 13(4),

239-247. doi:10.3109/17518423.2010.481299

Mitchell, P. (1997). Introduction to theory of mind: Children, autism and apes.

Provost, B., Lopez, B. R., & Heimerl, S. (2007). A comparison of motor delays in young children: Autism spectrum disorder, developmental delay, and developmental concerns. Journal of autism and developmental disorders, 37(2), 321-328.

Religion and Politics: Their Affects on the Perceptions of Muslims

Jessica Moore

Mentor: Stefanie Gonzalez, PhD
Department of Political Science;
St. Mary's University

Abstract

Religion and politics plays a major role in one's belief system. Religion not only has the ability to have a positive influence on a person's personal life, but can also impact one's values and beliefs. However, religion can have the opposite effect when people clash with one another because of their conflicting beliefs. Politics, on the other hand, reveals how differences of values and beliefs provide a foundation for one's views of the government. The purpose of this study is to connect both religion and politics and while history allows one an opportunity to learn from the past, it can affect how people think in the present. Since the tragedy of 9/11, many Muslims have suffered a severe discrimination because of their culture and religious views. Since the United States is made up of citizens who are predominantly Christian, the intention of this study is to observe perceptions of Muslims. This study asks how religious and political views influence perceptions of other religions, more specifically Muslims. The findings in the analysis reveal that Christian views of Muslims have become increasingly negative over time. Additionally, the study suggests Republicans have negative views of Muslims compared to Democrats.

INTRODUCTION:

Religion plays a major part of all societies because it is a system of beliefs. While people can change and share and alter ideas it is a much harder thing to change a belief. People die, create wars, and even kill for their beliefs. This strong attachment to one's belief can affect how one views the world and its inhabitants. Politics and its political parties are designed to relate to a people to represent and reflect peoples' opinions and values. However, often political party loyalty ends up with a population of people reflecting the political parties' stances instead of the other way around. Thus, people are influenced by their religion and the political parties. Each religion has different perspectives on other

religions from whether or not the religion is an opposing view to what kind of people are of the specific religion. This perspective stems from personal belief in their religion and political party and can affect how one can view other beliefs, who they associate with, and how they act in society down to their opinions in the voting polls.

Of the many types of religions, the major organizations are the ones that have the most influence because of the vast numbers of individuals that fall under them. It falls mostly down to the scriptures and religious writings that shape people's perspective of other religions because mostly, religion is meant to create peace and good living for those who follow the practices. It is the fine details of "scriptures" and the religious

leaders that shape the follower's views on other religions. This can be based purely because of literal interpretations of writings or because of religious leaders' guidance towards such a view. The writings are left to interpretation but the religious leaders vary and can have varying affects on the followers.

Then, because of the fact that people take their religion and beliefs to seriously to the point of killing, dying and war, it is easy for the beliefs to spill its effects into politics. Who one votes for, who one feels represented with, whom one identifies with, whom one does not like, what one does not like are all things that come with their religious affiliations. Throughout history, the views of people outside a religion can change because of what was done in that religion's name, the number of the people of a country that identify with that religion, and the country's official identification with [or the lack of identification] a religion

This study will analyze the relation between American perceptions of Muslims and Christian and political party influences. Previous literature has shown that individually Christianity and political party affiliation can have an effect on a person's perception of Muslims. Christians often have a more negative perspective of Muslims especially the more Western Christians. Between Republicans and Democrats, Republicans tend to have more negative comments of Muslims as a political party and its people tend to have more negative views of Muslims as a whole. Since America is an overall Christian state and most people identify as either Democrat or Republican, this study aims to see exactly how much the American perceptions overall are affected by the religion, Christianity and their political parties. This is done by multiple regressions that compare how American people identify (through the General Social Survey) religiously and politically and their feelings towards Muslims.

LITERATURE REVIEW

Previous literature has discussed religion in all sorts of fields as it plays such a major role in culture and politics. Most of these cover specific religions and that religion's view on another religion.

The Different Religions

The Muslim perspective on other religions in terms of the Qu'ran is relatively clear in terms of its scripture. Muslims view their religion to be the one "true" religion but in terms of Jewish and Christian beliefs, the Muslim official view is not an aggressive one (Waardenburg 1999). Most views of other religions come from their religious leaders because of politics.

The Qur'an explains [if sometimes in a roundabout manner] that the people should regard the Jews politely as Jews do believe in the same God. However, the Muslim people should not befriend them as the Jews have not accepted God's continued works and stay in the past. The Muslims believe that the Jews have not grown from a primitive state and therefore are primitive themselves. Muhammad, a Muslim prophet, held the Jews to be a people of disobedience towards God and the tone the Muslims take in this accusation is a strict one. The Jews are believed to have committed sins against God and therefore the Jews often cannot be trusted as the Jews have deviated from the truth of the scripture of God (Waardenburg 1999).

The Qur'an further explains the Muslim view towards Christians as one to be familiar with in a civil manner. The Muslims regard Jesus to also be a prophet of the Muslim God and believe Jesus' teachings to be followed. However, the Christians too have deviated from their alliance with God in not accepting Muhammad's teachings. But Muhammad does not have such a harsh view of Christians as he does the Jews because the Christians are believed to have evolved higher. Where the Jews

wait for a God to become a physical entity before their saving, Christians are valued because of the emphasis on individual responsibility for their sins. Muslims should regard Christians as people with good belief characteristics. However, the Christian act of "forgetting their spiritual rules and living in animosity with another (Waardenburg 1999)," is reproached and the Christians will be [and have been] punished for it.

In contrast, the historical Christian perspective of Muslims is that Muslim [and Islam in general] is that the Muslim faith is a rival one (Lamoreaux 1996). The perception was highly influenced by the two faiths clashing in the search for land and food. The clashing for dominance lead to the Christian view of Islam being a view that made Muslims seem violent and feel that the Muslims felt malevolent towards Christians. However, with the course of history changing to both faiths having large numbers and the Muslim community recognizing the Christians, the Christians began to view the Muslims in a milder light. The Christians still viewed Muslims to be a rival faith, but one to be tolerated and respected (Lamoreaux 1996).

However, in areas where political conflict is low, Christianity has a relatively mild attitude towards other religions (Ray 1996). For example, Buddhism is a belief (or a way of life) that Christians find opening and good. In fact, some denominations of Christianity promote having "Buddhism retreats" because of the meditative practices and altruistic promotions that come from them. Christian perspective are relatively positive especially in regards to Asian Buddhism where the importance of activity, value of life, and engagement in finding solutions to problems are emphasized. As Buddhism developed into a multifaceted tradition in the Bengal-Bihar region and spread across Asia, it took pride on its ability to reach people of all temperaments and varying capability, providing them with opportunities to connect with "the

Dharma" and continue on the "path to liberation (Ray 1996)." This openness and tolerance for others is seen as a good thing to Christians as the Christians relate this temperament to Jesus, their leader.

Furthermore, the Christian concern for social action is also one to which Buddhists can respond with readiness and eagerness. Although social action, at least as defined in Christianity, has not traditionally been an emphasis for Buddhism (Carus 1897), all known Buddhist traditions place a value on compassion, are fully engaged with their cultural contexts, and attempt to implement their values as widespread as possible (Ray 1996).

This Christian view is therefore portrayed in American Christians too. However, since there are not as many Muslims in America, the Muslim perception of Christianity is not seen in America as often. This Christian view of Muslims therefore dominates a great amount of

Political Parties and America
While the United States of America declared independence in 1776, political parties did not emerge in the US until the election of 1796. It was during this election that the political candidates began to run for office as members of organizations with strong political parties. However, this was not meant to be a permanent phenomenon (US Political Parties, 2012). James Madison believed that the purpose of the organizations should be temporary and only for extremely controversial elections. Originally the two political parties were the Federalists and the Democratic-Republicans. Here, the Federalists favored more government influence and the Democratic-Republicans favored laissez-faire [less government intervention] (American Government, 2013).

The Democratic-Republicans then split to form the Jacksonian-Democrats and the opposition, the Whigs. The Whigs

eventually fell out of favor in 1850 but the new Republican party formed and was highly influenced by the Whigs (American government, 2013).

When one looks back, the shift in political party values is seen in a rather radical form. Early Democrats were seen as highly conservative with deep emphasis on morality. Today's more modern Democrat's are seen as very liberal with a high emphasis of human rights. The early Republicans were seen as highly liberal with their ideas to oppose slavery to be considerably progressive and modern (US Political Parties, 2012).

Politics and Perception

The United States of America in the past had politics and religion closely tied because it was usually a matter of one religion versus another. The issues of the past meant drawing the distinction between Catholic and Protestant and liturgical from pietistic (Putnam, 2012). Yet, despite the shift to religious versus secular religion affiliation and beliefs still clash in politics today. While a sense of embattlement with secular Americans may cause different religious politicians, leaders and followers to pull together, the tensions among religious traditions are still prominent.

An example of religious views affecting American voters' perceptions is seen in the Presidential elections of 1960, 1967, and more recently in 2012. Americans in 2012 informed pollsters that they would not vote for a Mormon (which Mitt Romney, a presidential candidate identifies as). The same percentage was said about a Catholic presidential candidate in 1960. And the percentage is close in regards to Mormons' running in 1967. Evangelicals in particular had detesting opinions about Mitt Romney's candidacy. 54 percent of evangelicals claimed that they would be "bothered" by a Mormon president as opposed to 18 percent of non evangelicals (Putnam, 2012).

The opposite is seen too in which political party affiliation has implementations on religious perceptions and not just religion on political issues. In the 2008 elections, one-third Americans who identified themselves as conservative Republican believed that Obama was (or secretly was) Muslim and this is why or partly why they had negative views of him or their negative views helped shaped their belief of his being Muslim in which case, Muslim is a negative connotation (Hartman, 2012).

Historical Effects

Previous literature reveals that religious beliefs are not only political but also tied to wars (Kandiyoti 1997). Perspectives of a people change with outcomes and effects of war. In America, one can see the shift of who is a "bad guy" because of what one believes in and that belief's association with a place.

An example of the effects of war on perspectives would be the Gulf War where animosity and tension was high between Arab countries and the West. The involvement of the United States in what was seen as fundamentally an inter-Arab problem and the possibility of the stationing of foreign-essentially, non-Muslim-troops in Saudi Arabia became one of the major issues of the crisis for both governments (Azzam 1991). With the West and East clashing in such a violent way, the people of the countries had a tendency to stereotype the opposing country based on strong identifiers other than the nation. This included religion. The Americans viewed the East as highly Muslim and the East viewed the West as highly Christian. So, the results were that the opposing side was highly violent, uncooperative, and for the Muslims that the Christians were ignorant and for Americans it was that the Muslims were quick to agitate and therefore inconsolable. The identifier of "Christian" led to the "anti-American" sentiments from other countries such as Iraq, Jordan, and Pakistan (Azzam 1991).

Another example of the effects of perspectives brought about by war is the affects of 9/11 and the Iraq war. Hate crimes against Arab and Muslim Americans increased dramatically in the months and years following September 11, 2001 (Disha, Cavendish and King 2011). Moreover, the controversies over the building of an Islamic mosque near "ground zero" and the threats of burning copies of the Qu'ran on the anniversary of 9/11 suggest that stereotypes portraying Arabs and Muslims as perpetrators of terrorism have not dissipated nearly a decade after 9/11 (Disha, Cavendish and King 2011). Part of the problem is the American desire to have a "bad guy." The need for blame is easy to defend when one has a "belief" to defend. The belief that someone else's belief is a threat to the one one possesses or to what one holds dear makes it easier for someone to react in violence. Here, the effects of 9/11 spill into people killing and creating wars over a belief.

THEORETICAL CONTRIBUTION

Muslim

To understand the Muslim people also known as members of the Islamic religion one can begin at the etymology of the word "Muslim" and "Islam." The words stem from the Arabic verbal noun "slm" which means "to surrender, accept, or submit" in which case, the Muslim people are people who submit themselves to "God." The Muslim people believe in one god [referred to as "God" mostly but this god has other names], angels (created by God), and prophets. The Muslim people follow the teachings of their believed prophets Abraham and Muhammad .

Christianity

Christianity is one of the most diverse branches of major religions because of the vast number of sub-branches of Christianity. From Anabaptists to Catholics to the members of the United Church of Christ, the Christian branches can have subtle or drastic differences from another but each shares the common fundamentals. These fundamentals are that Christians follow the teachings of Jesus of Nazareth. These followers refer to Jesus as the "Christ" (Messiah) and believe him to be their Savior from sins. These people (Christians) and Muslims share the notion that Jesus was a prophet of the same God. However, unlike Christians, Muslims do not believe Jesus to be the Savior, nor for him to be God. The Muslim people still wait for their Christ to come whereas the Christians believe he already has come and are waiting for him "come again."

Since most Republicans identify as Christian, the Christian views of Muslims will reflect a more negative view of Muslims. The more Conservative Republican Christians will reflect more negative perceptions overall.

Gaps in the Literature

There is a vast amount of literature on these religions and the religions' affects on different areas of society and how it affects perceptions of them, however, the intercrossing of the four religions to one another is rare four major religions and their perceptions is not written or scarce. When one looks at the 1960s-2000. Instead, the majority of works are from the 1800s and the recur in vastness after September 11th, 2001. However, these works do not focus mainly on perception so much as hate crimes, violence and the effects of the 9/11 bombing in relation to the increase of hate crimes.

In fact, the literature does not really focus much on perceptions and misconceptions very often at all. Generally, the issue of misconceptions is a side-note or shortly mentioned in a few paragraphs. Overall, the literature focuses on relationships between violence and history and not really on

perceptions. Then, the few that do cover perceptions are often dated and cover only two or at max three of these major four religions. And often, the covering of all religious perceptions is not addressed. Literature of one religion's perception of another, the literature focuses on religions with the most tumultuous history or is about when the two religions clashed during a particular time. This common recurring factor is seen in that a lot of works is written about Islam compared or versus Christianity. Then it is seen frequently in Hinduism in comparison or contrast to Islam. These pieces have a commonality of reviewing bloody, violent aspects of history between the two religions.

Furthermore, a great percentage of the previous work done is now taken to be based on "popular belief" of history, or based on works that are very dated. There is a lot of literature regarding Christians versus Muslims and even literature of Republicans and Democrats and their views of Muslims and influence of the American people. However, the focus and emphasis of the combination of Christianity, political party, and liberal or conservatism is virtually nonexistent. There is also a lack of literature focused on the issue of Liberal or Conservatives so identifying a shift in views via literature is difficult.

HYPOTHESES:

The perceptions of one religion to another will be more negative the more violent the history and the more recent the violence occurred with the religion's name associated with it. The less the religions interact and the less they contradict another in beliefs, the more likely that the religions will view the other positively or at the least civilly. The American perception of Muslims will be mostly negative as the United States is a mostly Christian state. Also, the more Conservative Republicans will have the most negative views and contribute most to the negative perceptions.

H1: *Christian Perceptions of Muslims have become increasingly negative over time.*

H2: *Americans who identify themselves as Republican are more likely to have negative perceptions of Muslims compared to Democrats over time.*

METHODOLOGY:

The data collected for this study was gathered from the General Social Survey (GSS) between the years 1972-2010. The data set used was the General Social Survey 2010 which is a cumalitive data set of all 28 GSS surveys from 1972-2010. The General Social Survey data was collected via telephone interview, face-to-face interview, and computer assisted personal interview (CAPI) and there was about a 70 percent response rate.

Dependent Variables:

In order to see if there was an effect on our statistical models, the dependent variables utilized consist of the following: a dummy variable for religious preferences focusing on Christianity, party identification, and political ideology.   A dummy variable was created in an effort to aggregate all respondents who classified themselves as Christians.   This variable was coded dichotomously so that Christians were coded as 1 and all other religious preferences were coded as 0.   The second dependent variable, party identification was also coded dichotomously. If the respondent identified with the Republican Party they were coded as 1, whereas those who identified with the Democratic Party were coded as 0.   All the dependent variables had missing elements where the respondent refused or did not know.   In each case for every dependent variable, if the information was missing all together it was coded 97, if the respondent refused to answer it was coded 98, and if the

respondent did not know then it was coded 99.

Independent Variables:

The independent variables utilized in this study are a Muslim thermometer, whether they believe Muslims have made a positive contribution to the country, how religious the respondent considers themselves to be, and how often the respondent attends religious services. The Muslim feeling thermometer is a scale ranging from 1 to 100 where 1 is cold feeling towards Muslims and 100 is warm feeling towards Muslims. The variable asking the respondent whether Muslims have made positive contributions to the country is coded 1 to 4. One represented most important contribution and 4 represented little positive contribution. The variable asking the respondent how religious they consider themselves to be is coded from 1 as very religious to 4 not religious. Lastly, a variable asking how often the respondent attends religious services was included. The religious attendance variable was coded from 0 to 8 where 0 is never attends and 8 more than once a week. All the independent variables had missing elements where the

respondent refused or did not know. The same was done to code each case so that it was consistent for each variable. In each case if the information was missing all together it was coded 97, if the respondent refused to answer it was coded 98, and if the respondent did not know then it was coded 99.

Control Variables:

Several control variables were included in each model to hold constant to see if they had any influence on the independent variables. The control variables consist of gender, race, household income, age, marital status, and education. The gender variable is coded dichotomously where 1 is male and 0 is female. Race is coded as follows: 1 White; 2 Black; and 3 Other. Household income is coded from 1 to 12 where 1 is less than $1,000 a year and 12 is $250,000 or more a year. Marital status is coded as follows: 1 Married, 2 Widowed, 3 Divorced, 4 Separated, and 5 Never Married. Education is coded as follows: 1 Less than high school diploma, 2 high school diploma, 3 Junior College, 4 Bachelor, and 5 Graduate.

TABLES:

Table 1: Standard Multiple Regression of Christian perceptions of Muslims	
	Are you a Christian?
Muslim Feeling Thermometer	-0.005
	(-1.131)
Have Muslims Made Positive Contributions	0.002
	(0.889)
Church Attendance	0.156**
	(53.311)
Does R Consider Self to Be Religious	-0.005**
	(-6.382)
Age	-0.17**
	(-10.353)
Gender	0.620**
	(11.107)
Race	0.064
	(1.189)
Marital Status	1.177**
	(15.344)
Education	0.132**
	25.610
Income	0.009**
	(9.825)
Constant	1.952
	3.677
N	54776
R²	.058

Robust standard errors in parentheses
* P < .10 ; ** P < .05; *** P < .01

There was the issue of data collection. Finding a data set that covered more specific questions on a regular basis regarding Muslims was a challenge. The GSS was good for overall feeling thermometers but there were other data sets with better specified thermometers. However, unlike the GSS which asked these questions annually [or some other regular basis] and to the same people, the other data sets would often only ask once and then never return to that question.

Religion Questions
There were not many people who identified as "Muslim." This prevented the study from examining the Muslim view of Christians.

Christian Affiliation
This data set included the option for people to identify as different denominations of Christianity [e.g., Protestant, Catholic, orthodox-Christian]. However, the varying number of responses to each would have made some of the less popular denominations insignificant on their own. To prevent this, the focus of this research was on Christianity as a whole.

Time

There was a time constraint that limited the work to work only with already collected data.

Political Affiliation

Since the data set was used from previously gathered data, political affiliation is generalized. There could be varying levels of Republicans and Democrats that are not considered.

Religious Affiliation Strength

Some people could recognize themselves as varying levels of a Christian from "strong" to "weak" that was not considered. This was not considered due to low numbers of answers and due to this project's focus on "Christianity" as a whole.

Future Research

To address the limitations, a similar project could be made with a survey catered to address specific questions. This survey however, would be focused on current perceptions.

During the literature review, the topic of other perceptions from other religions was an area that seemed to have a gap. Possible studies could research the Christian view of Hindus and Buddhists also and then the other way around. This would include the Muslim view of Buddhists; Buddhist view of Hindus; and continued so that each religion's perceptions of other religions are covered.

Part of what was discovered in our research through the use of Demographics was that married, conservative people were more likely to have negative perceptions of Muslims and more likely to associate themselves as a Republican Christian. This could be an area of focus in its own to see the varying perceptions between liberals and conservatives in terms of religious perceptions.

Implications

This research reveals an area that needs to be addressed in the United States. That forms of discrimination against people of a different religion than the majority are still very present and significant. Revealing how religions view each other could shine insight as to why certain issues arise between people regarding politics.

References

Ahmed, Akbar S. 1991."Postmodernist Perceptions of Islam: Observing the Observer." *Asian Survey*. 31, no. 3. 213-231.

Amin, Sajeda, and Alaka Malwade Basu. 2004."Popular Perceptions of Emerging Influences on Mortality and Longevity in Bangladesh and." *Population Studies* 58, no. 3: 357-363.

Azzam, Maha. 1991. "The Gulf Crisis: Perceptions in the Muslim World." *International Affairs* (*Royal Institute of International Affairs 1944-*) (Wiley on behalf of the Royal Institute of International Affairs) 67, no. 3: 473-485.

Bruce, Steve. 1997. "The Pervasive World-View: Religion in Pre-Modern Britain." *The British Journal of Sociology* 48, no. 4: 667-680.

Carus, Paul. 1897. "The Philosophy of Buddhism." *The Monist* (Hegeler Institute) 7, no. 2: 255-286.

Compare Infobase. 2012.U.S. *Political Parties*. 2012.

Davis, George. 1946"Some Hidden Effects of Christianity upon Hinduism and Hindus." *Journal of Religion* (The University of Chicago Press) 26, no. 2: 111-124.

Disha, Ilir, James C. Cavendish, and Ryan D. King. 2011. "Historical Events and Spaces of Hate: Hate Crimes against Arabs and Muslims in Post-9/11." *Social Problems* (University of California Press) 58, no. 1: 21-46.

Kaja Borchgrevink, Kristian Berg Harpviken, Kanishka Nawabi, Idrees Zaman, Mirwais

Wardak, Arne Strand, Astri Suhrke. 2007."Disconnected and Discounted? Religious Actors and Civil Society in Post-2001 Afghanistan." *International Peace Research Institute*.

Kandiyoti, Deniz. 1997."Rethinking Modernity and National Identity in Turkey." *University of Washington Press*.

Lamoreaux, John C. 1996."Medieval Christian Perspectives of Islam." Edited by John Victor Tolan.

Nelkin, Dorothy. 2004. "God Talk: Confusion between Science and Religion: Posthumous Essay." *Science, Technology, & Human Values* 29, no. 2: 139-152.

Pharo, Lars Kirkhusmo. 2007."The Concept of "Religion" in Mesoamerican Languages." *Numen* 54, no. 1: 28-70.

Ray, Reginald A. 1996. "Solitary Retreat in American Buddhism and Buddhist-Christian Dialogue." *Buddhist-Christian Studies* (University of Hawai'i Press) 16 (1996): 129-142. ushistory.org. *Political Parties*. 2013. http://www.ushistory.org/gov/5a.asp (accessed 2013).

Waardenburg, Jacques. *Muslim Perceptions of Other Religions*. Oxford Press, 1999.

Smith, Tom W., Peter V. Marsden, and Michael Hout. General Social Survey, 1972-2010

[Cumulative File]. ICPSR31521-v1. Storrs, CT: Roper Center for Public Opinion Research, University of Connecticut/Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributors], 2011-08-05. doi:10.3886/ICPSR31521.v1

Appendix

Codebook

Educ22 Highest year of education completed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 No formal schooling- grade 11	12947	23.5	23.6	23.6
	2 High school diploma (12th grade)	16953	30.8	30.9	54.4
	3 1st yr of college	4579	8.3	8.3	62.8
	4 2 yrs	5909	10.7	10.8	73.5
	5 3 yrs	2414	4.4	4.4	77.9
	6 4 yrs	6681	12.1	12.2	90.1
	7 5 yrs	1604	2.9	2.9	93.0
	8 6 yrs	1885	3.4	3.4	96.4
	9 7 yrs	719	1.3	1.3	97.7
	10 8 yrs	1086	2.0	2.0	99.7
	98 Don't know	68	.1	.1	99.8
	99 No answer	94	.2	.2	100.0
	Total	54939	99.7	100.0	
Missing	System	148	.3		
Total		55087	100.0		

Sex22 Respondent's Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 Female	30827	56.0	56.0	56.0
	1 Male	24260	44.0	44.0	100.0
	Total	55087	100.0	100.0	

Race22 Race of the respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 White	44873	81.5	81.5	81.5
	2 Black	7625	13.8	13.8	95.3
	3 Other	2589	4.7	4.7	100.0
	Total	55087	100.0	100.0	

Income22 Tal Family Income

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 LT $1000	658	1.2	1.2	1.2
	2 $1000 to 2999	1203	2.2	2.2	3.4
	3 $3000 to 3999	1195	2.2	2.2	5.6
	4 $4000 to 4999	1114	2.0	2.0	7.6
	5 $5000 to 5999	1220	2.2	2.2	9.8
	6 $6000 to 6999	1157	2.1	2.1	11.9
	7 $7000 to 7999	1206	2.2	2.2	14.1
	8 $8000 to 9999	2014	3.7	3.7	17.8
	9 $10000 to 14999	5904	10.7	10.8	28.6
	10 $15000 to 19999	4616	8.4	8.4	37.0
	11 $20000 to 24999	4567	8.3	8.3	45.3
	12 $25000 or more	23146	42.0	42.2	87.5
	97 Missing	1613	2.9	2.9	90.5
	98 DK	2216	4.0	4.0	94.5
	100 refused	3017	5.5	5.5	100.0
	Total	54846	99.6	100.0	
Missing	System	241	.4		
Total		55087	100.0		

PartyID22 Political Party Affiliation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 strong democrat	8761	15.9	15.9	15.9
	2 not strong democrat	11697	21.2	21.2	37.1
	3 independent, near democrat	6508	11.8	11.8	49.0
	4 Independent	8126	14.8	14.8	63.7
	5 independent, near republican	4764	8.6	8.6	72.4
	6 not strong republican	8755	15.9	15.9	88.2
	7 strong republican	5356	9.7	9.7	98.0
	8 other party	807	1.5	1.5	99.4
	98 other party	10	.0	.0	99.4
	99 NA	303	.6	.6	100.0
	Total	55087	100.0	100.0	

polyviews22 think of self as liberal or conservative

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 extremely liberal	1249	2.3	2.3	2.3
	2 liberal	5338	9.7	9.7	12.0
	3 slightly liberal	5973	10.8	10.8	22.8
	4 moderate	17781	32.3	32.3	55.1
	5 slightly conservative	7423	13.5	13.5	68.6
	6 conservative	6800	12.3	12.3	80.9
	7 extremely conservative	1438	2.6	2.6	83.5
	97 Missing	6777	12.3	12.3	95.8
	98 dk	2014	3.7	3.7	99.5
	99 NA	294	.5	.5	100.0
	Total	55087	100.0	100.0	

reliten22 strength of affiliation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 very religious	19181	34.8	36.0	36.0
	2 not very strong	20272	36.8	38.1	74.1
	3 somewhat strong	5134	9.3	9.6	83.7
	4 no religion	5558	10.1	10.4	94.1
	97	3119	5.7	5.9	100.0
	Total	53264	96.7	100.0	
Missing	System	1823	3.3		
Total		55087	100.0		

relperson Does r consider self to be a religious person

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 very religious	1557	2.8	2.8	2.8
	2 moderately religious	3576	6.5	6.5	9.3
	3 slight religious	1940	3.5	3.5	12.8
	4 not religious	1354	2.5	2.5	15.3
	97 missing	46583	84.6	84.6	99.9
	98 don't know	31	.1	.1	99.9
	99 NA	46	.1	.1	100.0
	Total	55087	100.0	100.0	

contmslm22 Have muslims made positive contributions to country

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 most important contribution	32	.1	.1	.1
	2 important contribution	202	.4	.4	.4
	3 some contribution	462	.8	.8	1.3
	4 little positive contribution	406	.7	.7	2.0
	97 missing	53689	97.5	97.5	99.5
	98	286	.5	.5	100.0
	Total	55077	100.0	100.0	
Missing	System	10	.0		
Total		55087	100.0		

born22 Was r born in this country?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 no	3828	6.9	7.0	7.0
	1 yes	42005	76.3	76.5	83.4
	97 missing	9108	16.5	16.6	100.0
	Total	54941	99.7	100.0	
Missing	System	146	.3		
Total		55087	100.0		

age57 age of respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18	194	.4	.4	.4
	19	757	1.4	1.4	1.7
	20	799	1.5	1.5	3.2
	21	899	1.6	1.6	4.8
	22	939	1.7	1.7	6.5
	23	1100	2.0	2.0	8.5
	24	1082	2.0	2.0	10.5
	25	1200	2.2	2.2	12.7
	26	1187	2.2	2.2	14.8
	27	1221	2.2	2.2	17.0
	28	1273	2.3	2.3	19.3
	29	1149	2.1	2.1	21.4
	30	1242	2.3	2.3	23.7
	31	1165	2.1	2.1	25.8
	32	1244	2.3	2.3	28.0
	33	1193	2.2	2.2	30.2
	34	1228	2.2	2.2	32.4
	35	1212	2.2	2.2	34.6
	36	1197	2.2	2.2	36.8
	37	1165	2.1	2.1	38.9
	38	1184	2.1	2.1	41.1
	39	1045	1.9	1.9	43.0
	40	1124	2.0	2.0	45.0
	41	1052	1.9	1.9	46.9
	42	1033	1.9	1.9	48.8
	43	1073	1.9	1.9	50.8
	44	1014	1.8	1.8	52.6

45	959	1.7	1.7	54.3
46	968	1.8	1.8	56.1
47	940	1.7	1.7	57.8
48	951	1.7	1.7	59.5
49	968	1.8	1.8	61.3
50	886	1.6	1.6	62.9
51	892	1.6	1.6	64.5
52	860	1.6	1.6	66.1
53	842	1.5	1.5	67.6
54	829	1.5	1.5	69.1
55	734	1.3	1.3	70.4
56	831	1.5	1.5	71.9
57	731	1.3	1.3	73.3
58	785	1.4	1.4	74.7
59	733	1.3	1.3	76.0
60	768	1.4	1.4	77.4
61	672	1.2	1.2	78.6
62	710	1.3	1.3	79.9
63	686	1.2	1.2	81.2
64	600	1.1	1.1	82.3
65	658	1.2	1.2	83.5
66	612	1.1	1.1	84.6
67	660	1.2	1.2	85.8
68	610	1.1	1.1	86.9
69	563	1.0	1.0	87.9
70	593	1.1	1.1	89.0
71	507	.9	.9	89.9
72	533	1.0	1.0	90.9
73	468	.8	.8	91.7
74	498	.9	.9	92.6

75	425	.8	.8	93.4
76	422	.8	.8	94.2
77	394	.7	.7	94.9
78	353	.6	.6	95.5
79	309	.6	.6	96.1
80	274	.5	.5	96.6
81	273	.5	.5	97.1
82	238	.4	.4	97.5
83	214	.4	.4	97.9
84	179	.3	.3	98.2
85	163	.3	.3	98.5
86	141	.3	.3	98.8
87	116	.2	.2	99.0
88	92	.2	.2	99.1
89	279	.5	.5	99.6
98	1	.0	.0	99.6
99	196	.4	.4	100.0
Total	55087	100.0	100.0	

muslim23 Muslim Feeling thermometer				
		Frequency	Percent	Valid Percent	Cumulative Percent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	.0	.0	.0
	3	1	.0	.0	.0
	5	3	.0	.0	.0
	7	1	.0	.0	.0
	10	15	.0	.0	.0
	11	1	.0	.0	.0
	15	34	.1	.1	.1
	20	13	.0	.0	.1
	25	4	.0	.0	.1
	30	47	.1	.1	.2
	35	1	.0	.0	.2
	40	69	.1	.1	.4
	45	2	.0	.0	.4
	49	1	.0	.0	.4
	50	330	.6	.6	1.0
	55	4	.0	.0	1.0
	60	60	.1	.1	1.1
	65	5	.0	.0	1.1
	70	62	.1	.1	1.2
	75	17	.0	.0	1.2
	80	7	.0	.0	1.2
	85	32	.1	.1	1.3
	90	3	.0	.0	1.3
	95	1	.0	.0	1.3
	97	54214	98.4	98.5	99.8
	98	63	.1	.1	99.9
	99	18	.0	.0	100.0
	100	25	.0	.0	100.0
	Total	55037	99.9	100.0	
Missing	System	50	.1		
Total		55087	100.0		

Relig22 RS Religious Preference

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 None	5726	10.4	10.4	10.4
	1 Protestant	32556	59.1	59.1	69.5
	2 Catholic	13482	24.5	24.5	94.0
	3 Jewish	1127	2.0	2.0	96.0
	4 Buddhism	124	.2	.2	96.2
	5 Hinduism	54	.1	.1	96.3
	6 other Eastern	26	.0	.0	96.4
	7 Moslim/ Islam	95	.2	.2	96.6
	8 orthodox-Christian	90	.2	.2	96.7
	9 Christian	468	.8	.8	97.6
	10 native american	18	.0	.0	97.6
	11 inter-nondenominational	122	.2	.2	97.8
	12 other (specify)	973	1.8	1.8	99.6
	98 dk	15	.0	.0	99.6
	99 n/a	211	.4	.4	100.0
	Total	55087	100.0	100.0	

Attend22 How often r attends religious services

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 never	8924	16.2	16.2	16.2
	1 AT LEAST ONCE A YEAR	4240	7.7	7.7	23.9
	2 once a year	7212	13.1	13.1	37.0
	3 several times a year	7011	12.7	12.7	49.7
	4 once a month	3934	7.1	7.1	56.9
	5 2-3 times a month	4892	8.9	8.9	65.7
	6 nearly every week	3100	5.6	5.6	71.4
	7 every week	11003	20.0	20.0	91.3
	8 more than once a week	4230	7.7	7.7	99.0
	97	541	1.0	1.0	100.0
	Total	55087	100.0	100.0	

Marital22 Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Married	29861	54.2	54.2	54.2
	2 widowed	5377	9.8	9.8	64.0
	3 divorced	6753	12.3	12.3	76.2
	4 separated	1916	3.5	3.5	79.7
	5 never married	11160	20.3	20.3	100.0
	99 N/A	20	.0	.0	100.0
	Total	55087	100.0	100.0	

Marital22 Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Married	29861	54.2	54.2	54.2
	2 widowed	5377	9.8	9.8	64.0
	3 divorced	6753	12.3	12.3	76.2
	4 separated	1916	3.5	3.5	79.7
	5 never married	11160	20.3	20.3	100.0
	99 N/A	20	.0	.0	100.0
	Total	55087	100.0	100.0	

ReligChristian R a Christian

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Christian	46596	84.6	84.6	84.6
	2 Jewish	1127	2.0	2.0	86.6
	3 Buddhism	124	.2	.2	86.9
	4 Hinduism	54	.1	.1	87.0
	5 Other Eastern	26	.0	.0	87.0
	6 Moslim	95	.2	.2	87.2
	7 Native American	18	.0	.0	87.2
	8 Interdenominational	122	.2	.2	87.4
	9 None	5726	10.4	10.4	97.8
	10 Other	973	1.8	1.8	99.6
	98 DK	15	.0	.0	99.6
	99 NA	211	.4	.4	100.0
	Total	55087	100.0	100.0	

PartyID30 Party ID Dummy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 Democrat	20458	37.1	37.1	37.1
	1 Republican	14111	25.6	25.6	62.8
	96 Other Party	20215	36.7	36.7	99.4
	99 NA	303	.6	.6	100.0
	Total	55087	100.0	100.0	

IdeologyDummy Ideology Dummy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 Liberal	12560	22.8	22.8	22.8
	1 Conservative	15661	28.4	28.4	51.2
	96 Independent	17781	32.3	32.3	83.5
	97 Missing	6777	12.3	12.3	95.8
	98 DK	2014	3.7	3.7	99.5
	99 NA	294	.5	.5	100.0
	Total	55087	100.0	100.0	

LiberalDummy Liberal Dummy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 Conservative	15661	28.4	28.4	28.4
	1 Liberal	12560	22.8	22.8	51.2
	96	17781	32.3	32.3	83.5
	97 Missing	6777	12.3	12.3	95.8
	98 DK	2014	3.7	3.7	99.5
	99 NA	294	.5	.5	100.0
	Total	55087	100.0	100.0	

Binary Oppositions and Mimetic Relationships: Woolf's Denunciation of WW II

Jennifer Nunez

Mentor: Mary Lynne Hill, PhD
Department of English; St. Mary's University

Abstract

Virginia Woolf's war-related manuscript "Thoughts on Peace in an Air Raid", written in 1940, at the peak of combat between England and Germany, was a call to peace. By employing binary oppositions, such as men/women, listener/speaker, public/private, nature/nurture, and society/individual, Woolf reveals to her English and American audience how these oppositions create and sustain the social codes that permit and perpetuate war. The following analysis of this text takes a Structuralist perspective to show how Woolf scrutinizes and criticizes these social codes and her understanding of them.

An analysis of Woolf's use of binary opposites reveals a mimetic relationship, between fascism in England and fascism on an international scale, through which she deconstructs the mores of the nation which sustain a hierarchy in which men are superior and by which countries also struggle for superiority. Such a notion inherent in the mentality of us versus them, who gets to be on top and who is below, is arbitrary for Woolf. She subtly deconstructs this through the use of the literary device of binary oppositions not only to show the mimetic relationship between types of fascism but also to posit a new dialectic, a mimetic dialectic to move beyond the social codes of hierarchy to something new. This literary effort revealed to her American audience that personal mindsets and beliefs of Englishmen, Italians, Germans, and Americans, must be examined and amended to change the nations and their paradigm, or social code, of war so that they can create peace.

Adeline Virginia Stephen (January 25, 1882-March 28, 1941), known as Virginia Woolf, was a Modernist British author who pioneered the stream of consciousness technique to promote feminist perspectives. Her better known fiction works in this vein include *The Waves* (1931), and *Mrs. Dalloway* (1925). She also was a prolific essayist, producing such works as *A Room of One's Own*, (1992) a feminist call for women's space, and the *Three Guineas* (1938), a feminist call for peace. Her feminist individual counters the model of the Victorian woman as her work shifted toward causes which were unlooked on, unheard, hidden. "This was a move away from the self-conscious superiority of modern writers towards the lives of the obscure, particularly the lives of women, in whom she sought a counter-history to that of power, of kings with golden teapots on their heads" (L. Gordon 5). In a move to

produce not only such a counter-history but a possible counter reality, Woolf employs binary oppositions in her manuscript "Thoughts on Peace in an Air Raid" to illuminate the mimetic relationship within the destructive desire for power manifested concurrently within the patriarchy of the public and the patriarchy of the private in England.

"Thoughts on Peace," one of her less well known works, was written in August of 1940, the month preceding the German Blitz of London, at the beginnings of World War II. In this piece, not only was she denunciating the violence that was wreaking havoc in England but the role patriarchy played in this violence. The Blitz began on September 7, 1940 and lasted until May 1941. However, London had already suffered through a few air raids. It was a strategic move by the German Luftwaffe, or German air force, who conducted sporadic air raids on East London during that time. The Luftwaffe was a conglomerate of almost 350 bombers who battered East London killing 450 and severely injuring 1,300 citizens on September 7 alone, during a day time air raid. As a result of the Blitz, "around one third of the City was laid to waste" (Lewis). These air raids directly impacted Virginia since she was then living in London. They inspired her to write of the need to fashion a new society based on equal rights for men and women as a means to stop not only World War II, but also to prevent war in future generations.

The original manuscript of "Thoughts on Peace in an Air Raid" is housed in the Harry Ransom Research Center at the University of Texas in Austin. I came across it as part of an earlier project for one of my English courses. It was written "for an American symposium on current matters concerning women" ("Thoughts on Peace" 4-5). What Woolf yearned to do was to forewarn them of the nature of war, of the way in which

the international crisis was very much a mirror of the way women were treated by men in their respective nations. In an understated way she decries the ways in which the problems of the home, in which women receive a baser status than their male counterparts, are parallel to the ways that Germany contended that England held the alleged baser status to the Germans, and that Englishmen contended that the Germans held that nature. This philosophy in which one binary opposition is treated and believed to be superior allows for violence to be generated, both in the home and in the nation-state.

Woolf's Family Life

Virginia Woolf was born in London to Julia and Leslie Stephen. She was their third child, after siblings Vanessa and Thoby, who were two and two and three years old when Virginia was born. Both her parents had children from previous marriages. Julia had three children from her espousal to Herbert Duckworth, who passed away: George who was the eldest, then Stella, and her youngest was Gerald. Their ages when Woolf was born were approximately fourteen, thirteen, and twelve-years old respectively. Leslie had one daughter, Laura, from a previous marriage to Harriet Thackeray, who also passed away. Laura was twelve, the same age as Gerald, when Virginia was born. And a year after her birth, Julia and Leslie gave birth to her younger brother, Adrian (Nicolson 3).

Within her own family Woolf experienced the repression that patriarchy exerted on women. Julia Stephen died when she was only forty-nine years old, and Virginia was thirteen. According to Lyndall Gordon's biography of Woolf, the grief of the bereaved Stephen children turned into anger when they "decided that she had been worn out by their father's relentless emotional demands" (21). As a father and husband he had many shortcomings. He would often groan and deprecate himself to receive compliments

from his wife, whom Leslie adored, but what was for him "a heartening drama was, in effect, an imposition on the integrity of his wife and, later, his adolescent children" (26).

Despite this, Leslie Stephen, a man of letters and Woolf's primary teacher compensated in pedagogy for what he lacked in his role as supportive father and husband. "Leslie gave her the run of his extensive library, talked to her about what she read, and encouraged her to write, and on those occasions she felt soothed, stimulated, full of love for this unworldly, distinguished, adorable man. He paid for her to take Greek lessons from Janet Case and Latin from Dr. George Warr ("my beloved Warr")" (Nicolson 10). Yet Stephen was also afflicted with "moodiness… reinforced by the saintly indulgence of a Victorian wife" (L. Gordon 24). This emotional abuse caused his children to hold umbrage against him, which became immediately apparent when Julia perished.

Along with her father's oppressive behavior toward his whole family, Woolf was also subjected to sexual abuse by her older half-brothers Gerald and George Duckworth. After the death of Julia and Stella the family fell apart. Vanessa and Virginia were accosted by their father's histrionics; the sexual assault of their half-brothers, and the emotional neediness of Jack, Stella's bereaved husband. Therefore, Woolf had many personal reasons to protest against the injustices of public patriarchy by criticizing the stifling domestic private sphere. As declared by Nigel Nicolson:

> Virginia recalled how once at St. Ives [the Stephens vacation spot until Virginia was thirteen] Gerald lifted her onto a table, and out of curiosity, put his hand under her skirt and examined her private parts…She never forgot it. She did not accuse Gerald of any other indiscretions. George became the monster. After Julia's death, he would enter Virginia's bedroom, fling himself

onto her bed, and take her in his arms. She wrote later of his "violent gusts of passion," and of his behavior as "little better than a brute's." The suggestion was that he had committed, or at least attempted, incest with the girls (12).

In her own life Woolf was subjected to Leslie's erratic emotional demands. The sexual abuse by her brothers also left her questioning the role women played within the home and the disproportionate rights man and woman exercised. This injustice fueled her feminist stance, and fed much of the material in her essay *Three Guineas*, her "1938 polemic on war, women, and the future of educations, [which] investigates this notion of war as calling" (Schisler 2). As a witness and a victim of the effects of patriarchy within her home she also designated "Thoughts on Peace" to be a text that censures the subjugation of women; her use of binary oppositions in her discourse subverts the preference of one binary over the other.

Binary Oppositions as Foundational to Structuralism

Binary oppositions are "the principle of contrast between two mutually exclusive terms: on/off, up/down, left/right etc.; an important concept of structuralism, which sees such distinctions as fundamental to all language and thought" (Baldick 36). The binary oppositions of man/woman and, public/private are interdependent in Woolf's text. She identifies this interdependency when she states, "Women of ability"—it was Lady Astor speaking in *The Times* this morning—""are held down because of a subconscious Hitlerism in the hearts of men" ("Thoughts on Peace" 2). The dichotomy that Woolf and Astor refer to is the abundant rights that were available to the men of England but scarce to all women. "Your class has been educated at public schools and universities for five or six hundred years, ours for sixty. Take the fact of property. Your class possesses in its own

right and not through marriage practically all the capital, all the land, all the valuables, and all the patronage in England. Our class possesses in its own right and not through marriage practically none of the capital, none of the land, none of the valuables, and none of the patronage in England" (*Three Guineas* 18).

Binary opposites are fundamental to the literary theory of Structuralism, which is a "modern intellectual movement that analyzes cultural phenomena according to principles derived from linguistics, emphasizing the systematic interrelationships among the elements of any human activity, and thus the abstract codes and conventions governing the social production of meanings" (Baldick 319). This system, the customs of a culture, and its rules in general are based on signs and symbols. To simply our understanding of them we can employ the theories of the linguist Ferdinand de Saussure. To him signs can be broken down into the signifier and the signified. "When the first language came into existence, when the first word (sign) came into existence, any sound or sequence of sounds (signifier) could have been chosen to express any concept (signified). The proof of arbitrariness is that when different languages came into existence they developed different signs … If the linguistic sign were not arbitrary, there would be only one language in the world" (T. Gordon 25).

In other words, Structuralism provides a lens on how an understanding of the meaning-making process develops. In her manuscript, Woolf analyzes the social codes and conventions that underlie fascism, tyranny, sexism, and war. By employing a series of binary oppositions she deconstructs the doctrines that allow men more freedom and that justify war. This series of binaries include that of: male/female, speaker/listener, destruction/creation, nature/nurture, and individual/society. "According to structural linguistics, meaning is possible only because there is a

difference among signs" (Palmer 136). Ergo meaning is generated through use of binary opposites.

In the text of "Thoughts on Peace" Woolf develops the foundational binary opposition of male/female in relation to the oppositions of speaker/listener, destruction/creation, nature/nurture, and individual/society which define the norms of the time (Structuralism) to reveal how arbitrary their meanings are. She deconstructs them, most especially when she recounts the incident in which the German pilot is treated with kindness by English citizens. "One of the pilots landed safe in a field near here the other day. He said to his captors, speaking fairly good English, "How glad I am that the fight is over!" Then an Englishman gave him a cigarette, and an Englishwoman made him a cup of tea" ("Thoughts on Peace" 3).

Germany and England too are binary opposites; they stand for different government ideals and goals (totalitarianism vs. democracy); they are nations with different languages and cultures. It is the ideology that one is better than the other, that one is less, which allows them to slaughter each other. Yet when that Englishwoman and man offer the German soldier hospitality, the line between nationalities becomes blurred. In this moment, they are not enemies; instead, they prove they are not naturally averse to each other. The signifier is the German man's country of origin, while the signified is the tyranny and totalitarian ideals associated with Germany. In the anecdote manifest in "Thoughts" though, the signifier of "German" dissolves in the midst of this friendly exchange among these three people. By sharing this story with us, Woolf stresses the malleable meaning people attribute to the signifier. In that encounter the signifier was a man in need who those two English people decided to help.

Rooted in the tradition of Saussure, Jacques Derrida wrote on the binary opposition

of speech and writing. "It is Derrida's discovery of a prejudice among linguists, anthropologists and philosophers against writing as opposed to speech" (Palmer 125). Derrida coined this bias as logocentrism. Derrida argued that both are made up of signs and symbols. Speech is made up different sounds acting as signs, which compose words that are represented in writing through letters. Writing is also made up of signs, the letters of the alphabet. But those words and sentences all represent ideas/concepts, whether written or spoken. "Logocentrism in prioritizing the spoken word over the written word, is also privileging an original meaning over its supposed repetition, just as it privileges a present meaning over an abstract one, an origin over a copy" (Palmer 129).

The irony lies in that if both are composed of signs and symbols therefore none of them have an absolute meaning. Also, this can be further understood by remembering that the sounds we use are randomly partnered with the letters or symbols they stand for. This relates to Woolf's manuscript in that "according to Derrida, these [binary opposites] turn out to be not only key categories of structuralism, but of "logocentric" discourse itself. Furthermore, logocentric reasoning tends to privilege one of the two poles of these "necessary" binary opposites. Derrida tries to show that, in all cases, the prioritizing of one pole over the other displays mere cultural manipulations of power, and to show that, under deconstructive scrutiny, these oppositions break down and collapse into each other" (Palmer 133-4). They break down because the meaning we assign them is randomly chosen as is the choice to esteem one over the other.

Male/Female
The foundational binary opposition that Woolf pierces is that of male/female in the relationship between the sexes; they are

both citizens, both human, but there is a hierarchy that allows one sex to receive more liberties and rights than the other. Men are the only ones who obtain positions in government, positions of power, to enforce laws. Women are restricted to childbearing and home-making. Woolf censured Englishmen's disparate liberties in *Three Guineas*:

> Your world, then, the world of professional, of public life, seen from this angle undoubtedly looks queer…Within quite a small space are crowded together St. Paul's, the Bank of England, the Mansion House, the massive if funeral battlements of the Law Courts; and on the other side, Westminster Abbey and Houses of Parliament. There we say to ourselves, pausing, in this moment of transition on the bridge, our fathers and brothers have spent their lives…It is from this world that the private house (somewhere, roughly speaking, in the West End) has derived its creeds, its laws, its clothes and carpets, its beef and mutton. (18-19)

The private house, the domestic sphere that women occupy is linked to the decisions made, but women have no say in them. They are barred from making decisions concerning the public institutions of their own nation. The mutton and the beef are rarely earned by women but by the fathers of the family. In this passage, the bridge serves as a metaphorical curtain between the professional and the domestic sphere. This curtain prevented women from entering the professional/public institutions. Women in Britain during the 1940s were still excluded from jobs in the stock exchange, in the clergy, the government, and in law:

> At any rate that method is not open us; both the Army and the Navy are closed to our sex. We are not allowed to fight. Nor again are we allowed to be members of the Stock Exchange. Thus we can

use neither the pressure of force nor the pressure of money. The less direct but still effective weapons which our brothers, as educated men, possess in the diplomatic service, in the Church, are also denied to us. We cannot preach sermons or negotiate treaties. Then again although it is true that we can write articles or send letters to the Press, the control of the Press—the decision what to print, what not to print—is entirely in the hands of your sex. It is true that for the past twenty years we have been admitted to the Civil Service and to the Bar; but our position there is still very precarious and our authority of the slightest (*Three Guineas* 12).

As a result, women were forced to depend on men economically and to take care of the children and the housekeeping. As Woolf claims, men had a monopoly on the professional world, on money, power; they restricted the role of women to mother and wife. The binary of gender and gender roles can again be understood through structuralism. Men are valued more, given a higher position in society, just as speech is preferred over writing (logocentrism). "Logocentrism comes from "*logos*," the Greek word that means word, truth, reason, and law. The ancient Greeks thought of *logos* as a cosmic principle hidden deep within human beings, speech and within the natural universe" (Powell 33).

In the English culture logos would be ascribed to God, the father, the ultimate meaning of everything that is and will be. God the Father is a man. So man takes precedence over woman. Such precedence is exemplified in "Thoughts" when Woolf states that the "idea makers who are in a position to make ideas effective are men" ("Thoughts on Peace" 1). Men are the ones entrusted with the reins of the nation because they were valued more than women.

Speaker/Listener

As stated in the introduction, Woolf's manuscript was written for an American symposium on current matters concerning women. Therefore one of the primary binary oppositions framing this piece is that of the speaker and the listener. This is embodied in the tone of immediacy that pervades "Thoughts on Peace in an Air Raid."

Two ways in which she creates this tone are through onomatopoeia and verb tense, particularly her choices regarding the use of present tense and past tense. "It is a queer experience, lying in the dark and listening to the zoom of hornet, which may at any moment sting you to death" ("Thoughts on Peace" 1). Hornets are the war planes being used by the English. By describing the experience with "is" happening in the moment of now, the present tense, readers are pulled into the immediate moment as Woolf is intently tuning in to the sound of the planes' drone. Urgency is also conveyed in her onomatopoeia; she declares that the "guns on the hill go pop pop pop" and the "drone of the planes" are like the "sawing of a branch overhead" (Ibid 1-2). Woolf includes such auditory devices to help the listener connect to what she experiences by appealing to their senses; it spreads to listeners filling them with a sense of anxiety and apprehension imagining the sound of gunfire and thinking of impending doom. This is also done during her concluding paragraph as she compares the sounds of war's gunfire to the sounds of the countryside, the sound of a nation without war, when she muses, "The innocent sounds of the country are heard again. An apple thuds to the ground. An owl hoots…" (Ibid 3). Again Woolf presents this as if it were occurring within this very moment by once more using present tense: "are heard again," while she uses the noises of the "innocent country" to stimulate the imagination and senses to fabricate the sounds of a peaceful night, which are more appealing and stand

in contrast to the zoom of the planes overhead.

Destruction/Creation

Within this frame of the speaker-listener binary, Woolf develops binary opposites that denote war and destruction versus creation. War which is propagated and fought by men is associated with the masculine sex and the ability to create is associated with women. She demonstrates this in her text by stating that "the defenders are men, the attackers are men" and that women are "weaponless tonight"; and that women cannot participate in combat but they can make "arms, or clothes or food" (Ibid 1). Making clothes and food are both tasks which women were often assigned to and were deemed appropriate to their sex.

An indirect irony lies in how she juxtaposes men's inclination for war and annihilation to women's maternal instinct. She cites one's soldier's words in "Thoughts." According to him, the war and the hope of gaining the honors of a soldier/nation-hero were his entire dream. He said that his entire training and life were devoted to becoming a soldier. She compares this "instinct" to a women's instinct to procreate. For Woolf, both these notions are not instincts found in men and women, who are instead "products and propagators of these material rituals and ideological systems in which they are enmeshed from birth" (Schisler 1). In other words, society has taught women that their role consists of mothering and marriage; while men are taught that violence is an instinct that human nature has endowed them with.

Annihilation is not a natural part of males just as domesticity and motherhood is not a women's instinct. It is ingrained in them as part of the ideology of their culture. She alludes to this very concept in "Thoughts on Peace" when she states, "The bomb did not fall…All feeling, save one dull dread, ceased…Directly that fear passes, the mind

reaches out and instinctively revives itself by trying to create…Therefore if we are to compensate the young man for the loss of his glory…we must give him access to the creative feelings" (3). Let us notice that she is writing this all from her personal experience as a woman. Woolf recounts that the instinct to create comes from the mind, from personal thoughts which manifest themselves in actions. Those actions spring forth through our bodies. But the mind precedes actions carried out by the body, and those thoughts are shaped by the values we have learned through education, culture, the media, our language, our families, etc.

However, Woolf avows that men's inclination toward violence is not entirely their fault. To change this flawed view of men as naturally violent beings she asks women to "help the young Englishmen to root out from themselves the love of medals and decorations" ("Thoughts on Peace" 3). What she wanted was for men and women to rectify their ethical values by suggesting that they might be able to do so through aesthetics. She promotes aesthetics when she mentions the creative feelings which provide any individual with joy. Society has inculcated this idea of violence in them so that men should use force to dominate a weaker foe or to gain honor; this concept embodies another binary opposite: the individual versus society.

Individual/Society in tandem with Nature/Nurture

The struggle between Germany and England during World War II was dependent on the view of each country seeing the other as an enemy. Patriarchy is also enabled in a similar fashion: men are ascribed more worth than women. The preference of one binary over the other by each nation is fed to the individuals in the society; again, it all depends on the meaning attached to the signifier and the signified.

The nation-state mobilizes soldiers to

defend its ideas but they are seen as perishable items, pawns in a game of win or lose. Virginia Woolf was disgusted with the objectification of the soldier fighting for the ideology of the nation because she had been objectified for years by her half-brothers and subservient to her father's will. In "Thoughts" as in *Three Guineas* she was trying to get the listeners and readers to infer for themselves "the institutionalized psychology of dominance and submission that shapes relationships between the sexes in both private and public spheres [which] bears fundamental similarities to the group psychology of fascism and war; that England's public institutions—its schools, professions, government, and Church—camouflage and mystify the collective violence that founds them, thereby perpetuating it; that the hope of preventing war rests in disabling the mechanism of collective violence as such" (Froula 28).

The norms in place at the time, the justification of war, the profession of soldier as a heroic act, and the subordination of women are all sanctioned by the government, the Church, and most of the people in positions of power. In turn, the individuals consent to this role by acting in accordance with those beliefs and conventions which subsequently reinforces conventions and customs like patriarchy and the justification of war. But through the binary oppositions and mimetic relationships Woolf "reminds us that human beings, not impersonal fates or forces, have made the decisions, participated or refrained from the actions, condoned or resisted the policies that precipitated historical events" (Detloff 3).

No culture or person is inherently better than another based on race, religion, nationality or gender. They are not ideas we were born with, ergo it is not part of human nature. In Woolf's diatribe against fascism, both in patriarchy and in government affairs, she does not place the blame on men but on "instincts fostered and cherished

by education and tradition" ("Thoughts on Peace" 2). Tradition and education are also responsible for women's submissiveness, her complaisance with said traditions (which are mainly that she is to find a husband who can take care of her and that she be in charge of the home). They have been taught to leave thinking to men, because they run the country and they are the ones providing a source of income. In "Thoughts" she exemplifies women's passivity: "We can see shop windows blazing; and women gazing; painted women; dressed-up women; women with crimson lips and crimson fingernails. They are slaves who are trying to enslave. If we could free ourselves from slavery we should free men from tyranny" (Ibid 2).

The imagery of the women "slaves" who are pampered and primped gives readers/listeners a sense that they are trying to gain favor by using their looks. They are slaves of the society's ideology and trapped within the domestic sphere. The make-up, the dresses, all these are products women are being told they need to conform to the view of society has on femininity. "Woolf's feminist politics, which foregrounds a liminoid individual's critical decision, with a strong political message that one should war against a love of thoughtless action and a blind faith in the discourse of the Other" (Wing-chi Ki 436). This is mirrored in modern day society as well. The media and advertisements try to sell women ideas of what femininity is (make-up, perfume, heels, and slender figures, so on). Woolf's derision at women's choice to conform to the doctrines of society are what Wing-Chi Ki refers to when she declares that Virginia foregrounds a message that everyone should "war against a blind faith in the discourse of the Other." She is asking women and men to question their fundamental beliefs on what it means to be a man and a woman and to measure that against a society in which they are valued equally, because after all

these beliefs are not stable, but in flux. They change with time and with an individual's choice to stop conforming to convention.

The "instincts" are characteristics endowed by nature and "education and tradition" are derived from nurture in the dichotomy of nature vs. nurture. But the "education and tradition" become fixed aspects of society, customs that become ingrained. Society shapes the individual. However, by pointing fingers towards education, tradition and patriarchy as catalysts of World War II, she is empowering the individual to change said traditions. It is a reminder that we are capable of molding the social codes to meet our needs.

This intent to change the social codes is most evident in her anecdote of the German soldier landing in a field in England. The purpose of giving Americans that account is to show that the enemy is another human being; it also reveals the arbitrariness of the "sign" of the "enemy." He is also a metaphor, a representation of Englishwomen, of the scapegoat, the excluded, and the minority. By giving an account of two English citizens being hospitable to the German pilot she is acknowledging that the Other is not too different from us. The "enemy" is a random construct stemming from our prejudices and beliefs. But those prejudices and beliefs can be altered. Woolf also decrees that unless those beliefs are changed "not this one body in this one bed but millions of bodies yet to be born—will lie in the same darkness and hear the same death rattle overhead" ("Thoughts on Peace" 1). The message being relayed is that war will continue to haunt generations to come unless personal perceptions of culture, of patriarchy, and of ethical values are addressed and reformed.

That particular narrative in "Thoughts" of the German soldier and the English man and woman highlights the binary opposition deconstructs the rift between these two countries and the ideology of us versus them. Deconstruction is "a philosophically skeptical approach to the possibility of coherent meaning in language, initiated by the French philosopher Jacques Derrida … [who claims] that the dominant Western tradition of thought has attempted to establish grounds of certainty and truth by repressing the limitless instability of language. This 'logocentric' tradition sought some absolute source or guarantee of meaning (a 'transcendental signified') which could centre or stabilize the uncertainties of signification, through a set of 'violent hierarchies' privileging a central term over a marginal one: nature over culture, male over female, and most importantly speech over writing" (Baldick 81).

In "Thoughts" Woolf tries to destabilize and expose the hierarchy of nurture over nature because English culture tries to cloak nurture as nature. Woolf is also asserting the precedence of nurture over nature to examine the root cause of men's disposition towards war as a means of resolving conflict. They are taught to outdo others in a race to be on top and that war brings glory. Medals are awarded to extraordinary soldiers; "the social institution of war, the ideals of valor and honor, are even now, as they have been since Homer, inextricably bound up with cultural notions of manhood and masculinity" (Hussey 2). It is part of the mores that make up the fundamental structure of society. Nature and nurture are intrinsically tied to individualism versus society. In stating that men's competitive attitudes derive from education and tradition she is declaring that patriarchy is sustained by nurture. Men were not born to be vicious and to engage in combat. They learned these attitudes. Woolf brings to the forefront the irony of war through the use of the binary opposition. Although men are fighting for freedom, trying to protect the liberties of its citizens and against the totalitarian government of Hitler they

also, blindly, inflict this violence upon the women of England.

Mimetic Relationships

The construct of war is possible through the objectification of the "other." To be able to murder another human being a person has to see the other person as something less than human, or to at least believe the atrocity is serving a higher cause. This is mirrored in the objectification of women and the objectification of soldiers. This mirror effect is called "mimesis." Woolf employs this device in "Thoughts" in deconstructing England's choices of resorting to violence and excluding women from the public sphere. Mimetic relationships can be explained through Girard's theory:

> Girard believed that all human relationships are in "mimesis"—that is, all of us are living in unconscious imitation of someone else's thoughts and desires. As human cultures develop, this desire for similar things leads to conflict. Further, because this "mimesis of desire" escalates to socially uncontrollable levels and leads to violence, a way of stabilizing societies has involved projecting the difficulties on one member or one group (scapegoating) and directing violence at them (Wells 78).

Woolf advocates for a resolution based on protecting life and on finding common ground, even with the supposed enemy. "It issues in a spate of words from the loudspeakers and the politicians. Every day they tell us that we are a free people, fighting to defend freedom. That is the current that has whirled the young airman up into the sky and keeps him circling there among the clouds" ("Thoughts on Peace 1"). Then she contradicts this statement by saying that they are not a free people at all; it is a misconception that masks the role free will has played on this war and patriarchy. They are all prisoners of a half-truth and of distorted realities. It is a misconception

that men are more deserving than women of receiving higher education, of serving in the public sphere, just as it a misconception that German and England are enemies or that they must solve their differences through bloodshed. There is a mirroring or mimetic relationship between these two conflicts. Women are the scapegoat of men and England is the scapegoat of Germany. But both problems are rooted in the consciousness of the individuals.

Woolf's intention is to sound a wakeup call to England by exhibiting the parallel between the despotism of Hitler and the despotism of men. In "Thoughts on Peace in an Air Raid" she reveals a nascent insight that the soldiers were also subjugated by the nation, objectified, and used for the government's superior purpose. She likens Englishmen to Hitler who encroached on the liberty of Britain, except they were encroaching on the liberties of women; yet she feels these men cannot be blamed because they have been molded by the values of education, their families, and the conventions of society. So as she perceives, there is a "'double objectification' suffered by the soldier at the hands of the patriarchy (124) that, she says, is similar to that suffered by minority women" (Hussey 8).

The problem, Woolf denounces, cannot be fought externally like Britain and Germany were fighting. It was rooted within the fabric of the social norms in England as well as without it. Men were subduing women and this was obvious in that there was "no women in the Cabinet; nor in any responsible post" ("Thoughts on Peace" 1). Therefore fascism was a problem within the borders of England itself.

While men are fighting the war Woolf emphasizes that both the soldiers and the women of England can relate in terms of feeling that their rights are limited or being limited. Woolf captures the sentiment by stating that men and women both are

"prisoners tonight—the Englishmen in their planes, the Englishwomen in their beds" ("Thoughts on Peace" 2). Again she brings a focus to the gender roles of men and women and the constraint of women to the domestic sphere because they are trapped in their "beds" at home. Men are simultaneously trapped within their planes, chained to the possibility of death, and to their erroneous belief that they are conquering tyranny when it is a problem inherent within their country and personal beliefs. Woolf stresses the fascism of England's men to the German fascism which England is trying to defeat:

> And abroad the monster has come more openly to the surface. There is no mistaking him there. He has widened his scope. He is interfering now with your liberty; he is dictating how you shall live; he is making distinctions not merely between the sexes, but between the races. You are feeling in your own persons what your mothers felt when they were shut out, when they were shut up, because they were women. Now you are being shut out, you are being shut up, because you are Jews, because you are democrats, because of race, because of religion…The whole iniquity of dictatorship, whether in Oxford or Cambridge, in Whitehall or in Germany, in Italy or Spain is now apparent to you (Three Guineas 102-3).

Closing Thoughts

Imitation was at play within the generations of England where patriarchy had worked for the older generations but was becoming an archaic notion in the 1940s. However, the issue of tyranny is even deeper than a conflict between nations, between men and women; it is an issue that afflicts everyone's perception of themselves and others. It is a problem of mistaken beliefs, mindsets, and attitudes. The values of England's society at large are under Woolf's scrutiny when she declares that England should "drag up into

consciousness the subconscious Hitlerism that holds us down" ("Thoughts on Peace" 2).

The values of society that war is an honor are at odds with the anguish and unease evoked by the sounds of gunfire and the sounds of bombs detonating. England's social codes place value on women for their reproductive capacity as mothers and as housewives while men are valued for their capacity to earn money and be providers. Woolf's awareness of the social norms and her exemplification of these through her binary opposites try to paradoxically, help women and men build common ground.

The binary opposites are a magnifying glass through which Woolf refracts light on the similarities of men's limited rights when they are being attacked by Germany and the limited rights of women in England because men exclude them from the professional sphere and deny them equal education opportunities. However even until recently this stands true for a majority of the modern world's women. "Women are 40% more likely to be poor than men, almost one of every eight women in the US is poor, families headed by single women are twice as likely to be poor as those headed by single man, and 60% of the extreme poor are women ("Reading"). Worldwide, women at best earn an average of 70% of what men earn, spend twice as much time as men on unpaid labor, and own 1% of the world's land" (Barrett 26).

There is also a strong mimetic relationship between Woolf's references to creation/destruction and aesthetic/ martial forces. They are mirrors of each other. Both feed each other and are interdependent within the context of Woolf's typescript. According to her if women are to help men and help England achieve peace one of the main factors is finding a way to "compensate the man for the loss of his gun" ("Thoughts on Peace" 3). The Englishmen have been taught

to glorify war and instructed to compete for medals. How can men be taught to put aside their education and the values they have been taught so that they no longer believe in the use of violence? "We must give him access to the creative feelings" ("Thoughts on Peace" 3).

Woolf conveyed the arbitrariness of the sign and the signified through the foundational binary opposition of male/female in relation to speaker/listener, destruction/creation, nature/nurture, and individual/society. Her use of these and her exposure of the cultural manipulation of power, through the higher regard for one binary over another by employing mimetic relationships, subvert the current conventions. Woolf wanted every man and woman to evaluate and question their beliefs by proclaiming that the rules and conventions were in flux. Through personal will and desire the established roles of women could be changed. Resorting to violence as a form of power could also be changed. Violence is a form trying to assert control outside ourselves. She posits that this can be healed through aesthetics by searching for ways to create rather than destroy. There is honor to be found in the act of bringing life, bringing new ideas; war is only a response made from biases and prejudices. "Thoughts" was one of Woolf's calls to peace but in order to make it a concrete reality each individual must be willing to probe their deepest-held ideas and risk being the subject of "contempt." ("Thoughts on Peace" 1).

Works Cited

Barrett, Eileen. "The value of Three Guineas in the twenty-first century." *Virginia Woolf Miscellany* 66 (2004): 25+. *Literature Resource Center*. Web. 1 June 2013.

Detloff, Madelyn. "Thinking Peace Into Existence: The Spectacle Of History In Between The Acts." *Women's Studies* 28.4 (1999): 403. *Academic Search Complete*. Web. 4 June 2013.

Froula, Christine. *Virginia Woolf And The Bloomsbury Avant-Garde : War, Civilization, Modernity*. New York: Columbia University Press, 2005. eBook Collection (EBSCOhost). Web. 27 April 2013.

Gordon, Lyndall. *Virginia Woolf, a Writer's Life*. New York: Norton, 1984. Print.

Gordon, W. Terrence, and Abbe Lubell. *Saussure for Beginners*. New York: Writers and Readers Pub., 1996. Print.

Hussey, Mark. *Virginia Woolf and War: Fiction, Reality, and Myth*. Syracuse, NY: Syracuse UP, 1991. Print.

Ki, Magdalen Wing-chi. "Structure And Anti-Structure: Virginia Woolf's Feminist Politics And "The Mark On The Wall". "*English Studies* 91.4 (2010): 425-442. *Academic Search Complete*. Web. 14 June 2013.

Lewis, John E. "WW2 - The Blitz Hits London." - *History of London on History*. HISTORY Channel, n.d. Web. 16 June 2013.

Nicolson, Nigel. *Virginia Woolf*. New York: Viking, 2000. Print.

Palmer, Donald D. *Structuralism and Poststructuralism for Beginners*. New York, NY: Writers and Readers, 1997. Print.

Powell, Jim, and Van Howell. *Derrida for Beginners.* New York, NY: Writers and Readers Pub., 1997. Print.

Schisler, Rebecca D. "Toward a theory of violence: nature, ideology, and subject formation in Virginia Woolf. "*Virginia Woolf Miscellany* 81 (2012): 18+. *Literature Resource Center.* Web. 9 June 2013.

Woolf, Virginia. *The Waves.* New York: Harcourt, Brace and, 1931. Print.

Woolf, Virginia. *Three Guineas.* New York: Harcourt, Brace and, 1938. Print.

Woolf, Virginia. *Thoughts on Peace in an Air Raid.* 1940. Ms. Virginia Woolf's Collection. Harry Ransom Research Center, University of Texas at Austin.

Woolf, Virginia. *A Room of One's Own.* San Diego: Harcourt Brace Jovanovich, 1989. Print.

Woolf, Virginia, and Walter Boehlich. *Mrs. Dalloway.* Frankfurt Am Main: S. Fischer, 1997. Print.

An Exploratory Study of the Factors that Influence Small Firm Expansion

in Newaygo County, Michigan

Samantha Padilla

Mentor: Dave Weatherspoon, PhD & Maria Steele
Agricultural, Food and Resource Economics Department;
Michigan State University

Abstract

Firm expansion is a topic that has intrigued economists for decades. Expansion, used interchangeably with growth in this research, refers to a firm hiring more employees or increasing facilities. This paper uses a probit regression model to examine the main factors that influence the decision of small firms in Newaygo County, Michigan to expand their business. The probit regression model was selected because the dependent variable is binomial. Past research identifies entrepreneurial attitude, economic and policy factors, and availability of internal capital, as determinants that affect whether a firm will make the strategic decision to expand. The results show that unemployment insurance, change in business sales, cost of shipping, and a strong business climate positively influence firms to expand. Newaygo County's workforce, sustaining market share and the cost of water were negatively related to expansion decisions. Firms in Newaygo County may experience growth through addressing their concerns collaboratively, working together to attract new customers to the country, reduce costs and communicating to the local government which policies are not promoting growth.

The importance of small firms has been recognized by both economists and politicians. In 1999, President Clinton wrote to congress about the role of small firms stating that, "The freedom of America's small businesses to experiment, create, and expand makes them powerhouses in our economic system." Currently, 90% of all firms in the United States have less than 20 employees (Census, 2010). Hence, small firms are a significant aspect of the U.S economy. Understanding how they make decisions and what aids their growth

are key to the overall improvement of the economy (Carpenter & Petersen, 2002).

Due to the distinctive nature of small businesses, economists often focus on firms of a particular size (i.e. either study only large or small firms). Bates (1971) argues that the study of small firms is different than the study of large firms since small firms have lower liquidity and rarely issue stock. Likewise, Nooteboom (1994) explains that small firms are different than large firms because they bring diversity of products and can accommodate the consumers'

individual demands easier than a large mass-producing firm. Small businesses are indispensable to the development of a stable economy and because of their size, management and availability of capital.

The objective of this paper is to identify which factors influence whether a small firm decides to expand or not in Newaygo County, Michigan. This research will contribute to the study of decision making and the determinants of growth within small firms.

Newaygo County

Newaygo County is the 36th largest county in Michigan out of 83, located in the northern tip of the Grand Rapids-Wyoming Metropolitan Statistical Area. The county is part of the Manistee National Forest and is surrounded by other metropolitan areas, making it a popular spot for tourists (Miller, 2013).

With respect to demographics, 96% of Newaygo County's population is Caucasian, compared to the state of Michigan, the county has both a higher percentage of people under the age of 5 and over the age of 65. In addition, Newaygo County has a lower: educational attainment level, median income, family income and household income compared to the state of Michigan (Census, 2013).

Miller (2013) describes the employment environment in Newaygo County as being more skewed towards the sectors of natural resources, construction and manufacturing relative to the state of Michigan. Additionally, Miller (2013) decomposes the local economy in Newaygo County, using location quotient[1] and the demand pull factors in order to estimate the current status of the local economy.

The quotient demonstrates that Newaygo County produces enough output for the local demand and to export in the following sectors: agriculture, forestry, fishing & hunting and mining, construction, manufacturing, transportation and warehousing. Nonetheless, the majority of the sectors such as finance and insurance, real estate and leasing, scientific, management, administration and waste management services, educational services, health care and social assistance, arts and entertainment, and food services have a location quotient less than 1 meaning that producers do not meet local demand and there is a need to import.

The second technique used by Miller (2013) to understand the economy of Newaygo is the pull factors[2]. A pull factor greater than one indicates the region is attracting shoppers from other regions, and less than one indicates that local residents leave the county to shop elsewhere. The only two sectors with a pull factor greater than one were gasoline stations and non-store retailers (i.e. home delivery sales and door-to-door sales). Retail trade, motor vehicle and parts dealers, building material and garden equipment and supplies dealers, food and beverage stores, health and personal care stores, clothing and clothing accessories stores, sporting goods, among others, all have a pull factor less than one indicating a weakness in the Newaygo local economy.

Newaygo County has the potential to improve and develop if it focuses on the growth and development of its small businesses. Edminston (2007) argues that the government should focus on the growth of small businesses because it is less costly than helping larger business and in the future, small firms have the potential to become larger.

---

1 The location quotient estimates the proportion of local population in each industry and compares that to the state or the U.S.

2 A proportion of per-capita sales of the native region to a region of reference

Newaygo County Firms by the Numbers
The data was collected by Dr. Steve Miller through the Center of Economic Analysis at Michigan State University during February and March 2013. The survey was mailed to 711 businesses in Newaygo County and 76 firms responded (10.5% response rate). All of the survey questions used in this analysis were based on a Likert scale (1 to 5 or 1 to 6 point scale) and recoded into dichotomous variables. For example, there were several questions asking the participants how much of an obstacle they considered certain job/market aspects. However this paper is interested in whether the variables are an obstacle or not, not specifically the degree to which each firm considers the variable an obstacle. Additionally, the interpretations of the regression coefficients are more intuitive with binomial rather than an ordinal Likert scale.

Table 1 shows the independent variables, their code name, the label and how they are coded in the model and Table 2 shows the descriptive statistics (number of observations, mean, and standard deviation) for all the variables in the model. In addition to assessing the quality of the data by reviewing the information in Table 2, a correlation matrix revealed that none of the variables where correlated (all coefficients less than 0.6).

This paper uses three different kinds of variable groupings mentioned by Miller (2013) as the independent variables: economic, managerial, and policy/governmental.

Table 1— Variable Names and Labels

Variable	"Variable form"
Economic variables	
High volatility of revenues	0=not an obstacle to growth, 1=obstacle
Change in business sales	0=Decrease, 1=increase
Cost of Shipping	0=not an obstacle to growth, 1=obstacle
Cost of unemployment insurance	0=not an obstacle to growth, 1=obstacle
Cost of water	0=not an obstacle to growth, 1=obstacle
Cost of energy	0=not an obstacle to growth, 1=obstacle
Cost of services (legal, etc.)	0=not an obstacle to growth, 1=obstacle
Total gross revenue	0=Greater than 500,000 1=Less than 500,00
Management variables	
Business objective is to sustain market share	0=Not an objective 1=Yes, this is the objective of the firm
Enter new markets offering same products and services	0=Not an objective 1=Yes, this is the objective of the firm
Expand market share	0=Not an objective 1=Yes, this is the objective of the firm
Keep and locate qualified employees	0=not an obstacle to growth, 1=obstacle
Gaining new customers	0=not an obstacle to growth, 1=obstacle
Policy/Government related variables	
Newaygo County has a strong workforce	0=disagree, 1=agree

The business climate of Newaygo County is expanding and growing	0=disagree, 1=agree
High State Tax	0=not an obstacle to growth, 1=obstacle
Cost of mandatory health care	0=not an obstacle to growth, 1=obstacle

Descriptive Statistics

Table 2— Descriptive Statistics of the Dependent and Independent Variables

Variable	N	Mean	Std. Dev.
Economic variables			
Expansion	70	0.286	0.455
High volatility of revenues	66	0.318	0.469
Change in business sales	73	0.699	0.462
Cost of shipping	67	0.313	0.467
Cost of unemployment insurance	67	0.522	0.503
Cost of water	68	0.221	0.418
Energy expenses	69	0.449	0.501
Cost of business services (legal, accounting, etc.)	68	0.294	0.459
Total gross revenue	76	0.526	0.502
Management variables			
Business objective is to sustain market share	76	0.316	0.468
Enter new markets offering same products and services	76	0.184	0.390
Expand market share	76	0.197	0.401
Keep and locate qualified employees	68	0.309	0.465
Gain new costumers	66	0.470	0.502
Policy/government related variables			
Newaygo County has a strong workforce	66	0.606	0.492
Business climate in Newaygo is growing	66	0.576	0.498
High state tax	67	0.504	0.504
Cost of providing mandatory health insurance	69	0.652	0.480

Method

The dependent variable of the model is whether a firm decides to expand or not. Expansion, for the purpose of this research, is defined as an increase in size, whether it is in the form of creating new facilities or hiring more employees. This definition of expansion is similar to the definition of growth used by Davidsson, Achtenhagen, & Naldi (2005), therefore expansion and growth are used interchangeably throughout this paper. Similarly, Scott & Bruce (1987) identified five stages of small business growth in which stage four is expansion defined as a form of growth, supporting the use of growth and expansion interchangeably.

The research uses a probit regression model because the dependent variable is dichotomous (the firm either expands or not). Park (2010) indicates that if an ordinary least squares (OLS) method was chosen using a binary dependent variable, the method would no longer produce the best linear unbiased estimation (BLUE) because it would be biased.

Three regression models were estimated and the only difference between the models was the number of independent variables used in each regression. Since the sample size was small, the robustness of Model 1 was a concern; therefore, the two other models have less

independent variables.

Results and Analysis

Model 1 used 17 of the independent variables as shown in Tables 1 and 2. The Pseudo R^2 of 0.50 indicates that the model fit the data well. The significant independent variables are change in business sales, finding the cost of shipping an obstacle, the business objective is to sustain market share, firms agree that Newaygo has a strong workforce, and firms agree business climate is growing. The results show that there is a positive relationship between a firm deciding to expand and the cost of shipping, the business climate, and change in business sales, which is consistent with previous research. As these significant variables increase to 1 (since all the independent variables are binary), the probability of a firm deciding to expand is more likely. For example in Model 1, as change in business sales increase, the probability of a firm deciding to expand is 26.9%. Rosenthal (2001) concluded that there is a positive relationship between costs of shipping and the agglomeration of industries. Hence, a firm might decide to expand into an area in order to decrease the costs of shipping. In the case of the business climate, there is a positive significant relationship between the probability a firm deciding to expand and if the firm agrees that Newaygo county has a growing business climate. This result aligns with the study done by Beck & Kunt (2006), where they determined that in a good business environment is essential to the development of small businesses.

In Model 1, there is a negative relationship between if firms agree Newaygo County has a strong workforce and their decision to expand. This result contradicts the past research done by Lewis & Churchill (1983), which suggests personnel is a determinant factor in firm growth. The findings regarding this variable might be biased because of the coding from a 5-point Likert scale variable to binomial variable.

There is a negative relationship between the probability of a firm deciding to expand and the business objective of sustaining the current market share. Lewis & Churchill (1983) found a positive relationship between small business growth and business objective and strategy. Hence, a business objective of sustaining the market share can be interpreted as an objective that is not planning for growth, explaining the negative relationship among the variables.

Model 2 includes 15 independent variables. All the business objectives were dropped with the exception of the objective of sustaining market share. Similarly to Model 1, change in sales, cost of shipping, sustaining market share, and business climate remained significant and maintained the same sign. The strong workforce variable also remained significant and was still negative. Cost of water became a significant variable, suggesting that if the cost of water is perceived as an obstacle, the firm is less likely to expand by 23.4%. Finally, the Pseudo R^2 declined from 0.50 to 0.484 because of the removed variables.

In Model 3, total revenue was dropped from the model because it was the most statistically insignificant variable in Model 2. In this regression, all the same variables as in Model 2 remained significant, with the exception of cost of unemployment insurance. Likewise, all of the variables preserved the same sign. Pseudo R^2 slightly declined from 0.484 to 0.481.

Table 3— Probit Regression Results

   Model 1

Dependent Variable: Decision to expand	Model 1 (17 variables)	Model 2 (15 variables)	Model 3 (14 variables)
ECONOMIC VARIABLES			
Find high volatility of revenues an obstacle	0.165 (0.78)	0.114 (0.66)	0.111 (0.65)
Change in business sales	0.269* (1.62)	0.267* (1.70)	0.238** (1.84)
Find cost of shipping an obstacle	0.594** (2.13)	0.593** (2.18)	0.561** (2.19)
Find cost of unemployment insurance an obstacle	0.284 (1.51)	0.308* (1.67)	0.298 (1.60)
Find cost of water an obstacle	-0.228 (-1.46)	-0.234* (-1.77)	-0.242* (-1.83)
Find cost of business services an obstacle	0.233 (0.88)	0.167 (0.75)	0.122 (0.63)
Find energy expenses an obstacle	0.250 (0.93)	0.273 (1.08)	0.336 (1.41)
Total revenue	0.108 (0.64)	0.085 (0.53)	-
MANAGERIAL VARIABLES			
Business objective is to sustain market share	-0.312** (-1.99)	-0.271* (-1.90)	-0.254** (-1.94)
Enter new markets offering same products and services	-0.141 (-0.82)	-	-
Expand market share	-0.069 (-0.38)	-	-
Keeping employers an obstacle	0.222 (0.94)	0.312 (1.41)	0.337 (1.51)

Gain new costumers an obstacle	0.083	0.056	0.041
	(0.50)	(0.35)	(0.25)
POLICY/GOV. VARIABLES			
Agree that Newaygo has a strong workforce	-0.478***	-0.468***	-0.481***
	(-2.54)	(-2.50)	(-2.60)
Agree business climate is growing	0.367**	0.373*	0.365**
	(1.88)	(1.91)	(1.86)
Find high state tax an obstacle	-0.237	-0.249	-0.299
	(-0.96)	(-1.02)	(-1.24)
Find cost health insurance an obstacle	-0.304	-0.389	-0.339
	(-1.14)	(-1.56)	(-1.50)
Pseudo R^2	0.50	0.48	0.48
N	54	54	54

The z statistic is in parenthesis   *** p<0.01   ** p < 0.05   * p < 0.10

Conclusions and Limitations

The relationships between the decision of expanding and the significant independent variables highlight important aspects that can be improved in order to promote growth within Newaygo County.

The county government can support the firms and influence their decision to expand by promoting a strong, growing business climate in which more firms enter the market in Newaygo County. The firms could also collaborate together and create a festival that promotes their products and attracts customers to the area and encourages new firms to enter.

In relation to shipping and water costs, the firms could agree to expand within close proximity to one another, similar to an industrial park, in order to reduce shipping costs and to lower water costs which were shown to be inhibitors to expansion. The government could also subsidize part of the water cost or provide a voucher to firms that are increasing their number of employees each year.

Finally, a committee dedicated to mediate between the government and firms could be organized in order to establish how the firms' perception of the county, the business climate and the workforce is changing over time. If the government is implementing new policies, feedback from the firms and data on how many new firms are establishing businesses could benefit future research and determine what is helping firms grow.

This study is a possible starting point for future research about Newaygo County and with a larger sample size, more accurate results can be estimated in order to help the county achieve its full potential.

References

Aldrich, J. H., & Nelson, F. D. (1984). *Linear probability, logit, and probit models* (Vol. 45). Sage.

Bates, J. (1971). The Financing of Small Business. *London: Sweet and Maxwell*

Beck, T., & Demirguc-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking & Finance*, 30(11), 2931-2943.

Carpenter, R. E., & Petersen, B. C. (2002). Is the growth of small firms constrained by internal finance?. *Review of Economics and statistics,* 84(2), 298-309.

Davidsson, P., Achtenhagen, L., & Naldi, L. (2005). Research on small firm growth: a review.

Edmiston, K. (2007). The role of small and large businesses in economic development. *Available at SSRN 993821.*

Lewis, V. L., & Churchill, N. C. (1983). The five stages of small business growth. *Harvard business review*, 61(3), 30-50.

Mazzarol, T., & Choo, S. (2003). A study of the factors influencing the operating location decisions of small firms. *Property Management*, 21(2), 190-208.

Miller, S (2013). Survey and Landscape of the Newaygo County Business Environment. *Center for Economic Analysis, Michigan State University*. Retrieved June 1, 2013.

Nooteboom, B. (1994). Innovation and diffusion in small firms: theory and evidence. *Small Business Economics*, 6(5), 327-347.

Park, H. (2010). Regression Models for Binary Dependent Variables Using Stata, SAS, R, LIMDEP, and SPSS. *Indiana University*. Retrieved from: http://www.indiana.edu/~statmath/stat/all/cdvm/cdvm.pdf

Rosenthal, S. S., & Strange, W. C. (2001). The determinants of agglomeration. *Journal of Urban Economics*, 50(2), 191-229.

Scott, M., & Bruce, R. (1987). Five stages of growth in small business. *Long range planning*, 20(3), 45-52.

U.S. Census Bureau. (2013, June 27). *State & county Quickfacts: Newaygo County, MI*. Retrieved July 4, 2013, from http://quickfacts.census.gov.

"Come Again?" Accents! Blinded by Bias in Customer Service Settings

Domonique Ramirez

Mentor: Jessica Cohen, PhD
Department of Sociology; St. Mary's University

Abstract

U.S. corporations have increasingly turned to outsourcing their customer service positions to other countries in an attempt to save money. However, there are some potential limitations associated with this strategy that can potentially reduce the overall profit margin. Specifically, if customers are displeased with the service they receive, they may be less likely to do business with the corporation again in the future. Given that outsourcing often involves hiring customer service representatives for whom English is a second language, the association between a "foreign" accent and poor customer service could become a socially ordained fact that people simply believe to be "the truth". As a result, they may be more inclined to judge people with foreign accents more negatively than people with "domestic" accents. In the present study, participants heard either a foreign accented or a domestic accented customer service representative exchange with a customer that ended without resolution. They were then asked whether the failure to resolve the issue was mainly due to internal characteristics (i.e., it was the customer service representative's fault) or external factors. The implications of the results are discussed in the context of prejudice, attributional errors and who may embody the prejudice.

Introduction

The individuals that we pass every day are complex, self-identifying with a number of different social groups. When these social memberships are perceived by others, it leads to categorization. Categorization occurs naturally in the mind and helps us to organize and simplify the complex world that surrounds us (Rakic, 2010). These categories are usually accompanied by an evaluative component. People tend to like or dislike elements within a category based on whether they like or dislike the category itself. In one experiment, researchers used a visual search task that showed the gathering and the successful processing of an accent required more cognitive help than when processing a non-accent. Furthermore,

individuals who saw and heard a perpetrator with an accent had a hard time physically describing him (Pickel, 2012).

More research on verbal labels, as a key determining factor for categorization, is needed to understand what makes up ethnic identity. Verbal labels actually become part of social categorization as individuals communicate amongst each other. People make and place others in categories within seconds based on ethnicity, verbal labels, and other automatic groupings that people distinguish. During two different experiments that used the "Who Said What?" paradigm, visual and auditory stimuli were tested to separate ethnicities between individuals to see if

there was a correlation between visual stimuli, auditory stimuli, and social categorization. In the two experiments, the researchers found that both visual (looks) and auditory (accents) are correlated with social categorization. Type of accent was stronger for social categorization than looks (Wang, 2012). Although judging people based on their perceived group membership may not sound like a good idea, without categorization we would be overwhelmed with data processing and rendered intellectually paralyzed.

Human behavior does not often lend itself to clear, simple explanations. Behavior is driven by the dynamic interplay of internal characteristics and external constraints that are rarely known or carefully considered by the actor, much less by casual observers. The resulting ambiguity lends itself to predictable biases in attributional processing, many of which are influenced by beliefs about the actor's tendencies. These tendencies, of course, are based on perceived social group membership. Admirable behavior that is not the result of a clear cause can thus be seen as emanating from good internal traits. If the actor belongs to a dominant racial ethnic group and if there are favorable external circumstances like good customer service they are considered a member of a respectable social group (Adank, Evans, Stuart-Smith, & Scott, 2009; Floccia, Goslin, Girard, & Konopczynski, 2006). The attributions are reversed if the behavior is deemed to be negative.

In this study, I applied these basic psychological principles to exploring how people explain the causes of behavior within the context of a customer service call. Based on prior research, I predict that customer service representatives who are members of a socially stigmatized group may be judged more harshly than representatives who are members of a socially valorized group. If the hypothesis is supported, there may be implications for corporations considering offshoring customer service positions to countries that are stigmatized by many Americans (Hebl & Dovidio, 2005; Shelton, 2003).

Background

A current trend in the United States customer service industry is to outsource customer service positions abroad, especially India, which is the most common outsourcing venue that companies like Dell, Microsoft and Apple use as their most convenient venues. Many major corporations have found outsourcing to be financially advantageous due to the lower labor costs, training and materials in India. Alternatively, the chances for employee turnover are higher in the United States and it is more expensive for companies to provide customers with twenty-four hour service (O'Neil, 2003). Unfortunately, the money invested into offshoring has financially crippled companies that do not effectively train their international employees. As a result, damaging biases and stigmas have increased, not only for individuals of Indian descent, but for other foreign accented individuals. There are also indirect costs associated with the decision to outsource. Companies are concerned with customer satisfaction and have invested money into teaching their foreign employees how to be more likeable (Wang, 2012). Many individuals do not like change and to some hearing an unfamiliar accent on a customer service call feels like a fairly significant change. For those people, hearing a stigmatized accent could elicit negative feelings about the speaker (Wang, 2012).

In a continuous developing industrialized nation where robots, flying cars and trips to space for the simple person seem to be becoming a possibility, such things like our social community needs to be examined. An ecosystem is destroyed by one change

in its closely knitted web and can be held comparable to that of our social atmosphere. One such change in the community is corporations out shoring their human relations division to other countries like India and the Philippines (Hill, 2010).

Outsourcing has become increasingly important the in the 20th century and specifically in the last decade due to financial crises like the recession. There is an increase in the number of U.S citizens who wantlarge corporations, who are outsourcing, to bring their jobs back to the states, justifying that if they do so, the unemployment rate will decrease. The issue is that outsourcing saves money in labor where the minimum wage is a lot less than that of the U.S., bringing the work back may become more of a burden on corporations and so much so that they may begin to shut down and not be able to sustain themselves while paying U.S citizens (Smith, 2006).

Although outsourcing is an excellent business concept, it has caused a lot of controversy in the U.S (Smith, 2012). Many companies outsource because of cheaper labor costs outside the U.S. A limitation of outsourcing may be less control over any issues that a customer may be dealing with. There can be several cons with the idea of offshoring that customers or companies have. In order to reduce the opposition to offshoring, companies must try to improve the ability of overseas service employees to communicate/culturally connect with customers, alleviate security concerns, and change the way their operations function according to the customers' needs (Honeycutt Jr. 2012). An issue a customer can feel about offshoring is communication due to differences in accents. Some view a foreign accent as a level of dissatisfaction. A solution that many companies have done is to offer accent reduction and neutralization classes as well as English as a second language class. The goal should be making the speaker more understandable to the customer to provide better service ratings.

Another issue offshoring can rise is the ability to fail culturally with the representative. A solution that companies could offer is a cross-cultural class that teaches the different characteristics of the domestic culture the company provides for like current events, sporting events, and others. "Security of personal information was one of the primary reasons cited by Ted Strickland, Ohio ex-governor, in the criticism of offshoring and order prohibiting state agencies from hiring offshore firms to perform state government work" (Honeycutt Jr. 2012). People see identity theft being worse when stolen from someone abroad instead of being stolen from a "domestic" person. A possible solution should be to assure their customers that their security and privacy is covered. Some companies put a symbol of the security company on their website. Other companies may have an independent third party gather and store their information. Another issue that many people have is employment. Many feel that maintaining or finding a job can be harder when there are fewer jobs available because of offshoring. Companies should highlight the number of jobs available domestically as well as a stronger domestic presence throughout the company. The main solutions of trying to get customers more on board with the usage of offshoring should determine the needs of the customers, evaluating the likelihood of customer disloyalty, and changing the structure of the service delivery. Offshoring is growing more increasingly used by companies and although there may be issues because of the representatives being used, offshoring can be widely beneficial to the company.

Attribution errors

Prior research indicates that individuals make global evaluations about people based on single characteristics (Nguyen, 1993). For example, a star Volleyball

player is likely to be described to as more physically attractive than an athlete who is supposed to be less capable. More research proposes that people make unsympathetic attributions toward members of derogated racial or ethnic groups (Nguyen, 1993). An attribution error occurs when people are attempting to explain a certain behavior of another person. Attribution errors can lead to racism and bias against a minority group. For example, when someone says that all Asian people are bad drivers, this is a stereotype, so if you were cut off on the freeway and you thought to yourself, "They must be Asian, because all Asians are bad drivers", this would be considered an attribution error. Attribution errors are important to consider when looking at bias of minority groups.

Stereotypes and attribution errors
Past research suggests that accents are a large barrier in communication (Jenkins, 2000; Rubin, 1992). Individuals hearing an accented person usually see them as different from themselves. A negative evaluation is usually a result of someone being different from the judging individual (Deprez-Sims, 2010). An individual may think that they are making evaluations that are representative of their own thoughts and feelings without understanding how biases and the opinions of others effect their decisions (Nisbett, 1977). Pantos (2012) examined Korean and American accented witness' testimony and found that individuals rate those with an American accent better than those with a Korean accent. Participant's attitudes toward the witnesses were based on the witnesses' accents not their roles or actions in the study. .

People may conceal their biases if customer service outcomes are favorable when dealing with Indian accented customer service representatives. In the present study, the outcome was unfavorable in both situations, for the Anglo and for the Indian. It has yet

to be determined if there is a fundamental attribution error in applying characteristics in error due to bias. A comparison will help in determining if there is a bias when an Indian accent is compared to an Anglo accent. In this study it is important to understand accents and how they affect corporations, employees, employers, and the customers. The importance of success and high efficient working environments is imperative to our society. In this study it is expected that individuals who hear accents over the phone in customer service related atmospheres will rate Anglos as more helpful than Eastern Indian customer service representatives. In relation to this, people will also relate the problem to situational events for Anglo customer service representatives and dispositional for the Indian customer service representatives. Individuals will also feel less frustrated with Anglo customer service representative than Indian customer service representatives.

Attributions for customer service behavior
For the benefit of major corporations and the customers, it is best that employers understand the nature of the problem. Understanding Indian accent biases is imperative for the success of this transition to outsourcing. Customers have shown to suppress negative biases unless there is justification that acts as a foundation to their bias. When there is an unfavorable outcome, positive biases are shown to dissipate. Services that are likely to end favorably would be the best fit for accented employees as well as statements of what the customer is to expect like wait times and what can possibly be helped (Wang, 2012). Most would think that biases for being hired for a job are held within the domain of ethnicity, race, and gender. There is now a place for accent biases in interview processes that could hinder an individual from obtaining a job. The study simulated an interview so that researchers could access biases that could be held by employees and

to measure if accent is just as salient as race, skin color, or ethnicity. There was in fact a direct correlation between an accent bias and a prospective employee getting a job (Deprez-Sims, 2010).

An accent fits a person into a social category that places a them in a country and a culture. Along with the automatic social categorization comes the opportunity for stereotypes that are held with particular cultures, countries, and ethnicities. In this study 63 college students were recruited from universities to participate. All were English speaking and claimed that it was actually their first language. The participants were to evaluate characteristics of individuals after hearing a part of an interview and could replay it as much as they wanted. The results of this study showed that accent had an effect on the employability of an individual. Another important finding was that people may not like that others are different from them so they may rate them negatively (Deprez-Sims, 2010). Accents have also shown to put a strain on working memory as well. Working memory is problem solving memory that you engage in when solving a mental problem. Researchers wanted to measure if people would remember a perpetrator's accent. In doing so they found that accents could very well be an exhaustive memory task. To make this easier to understand take a mental math problem for instance. You must remember all the steps that were taken in order to eventually solve the problem. Similarly, you need to remember the steps you had to take to filter through accents to find one that represented a perpetrator (Pickel, 2012).

There have been quite a few studies about bias looking at gender and ethnicity, but very few looking into accents specifically. The present study will link the gap between the two lines of research by observing whether people will judge customer service representatives as less helpful and more to blame for an unresolved issue when they have an Indian accent than when they have a European-American accent. I examine the following hypotheses:

H1: Individuals who hear accents over the phone in customer service related atmospheres will rate Anglos as more helpful than Eastern Indian customer service representatives.

H2: Individuals will relate a problem to situational events for Anglo customer service representatives and dispositional attributes for the East Indian customer service representatives.

H3: Individuals will relate the problem to dispositional attributes for Eastern Indian customer service representatives and situational events for Anglo customer service representatives.

H4: Based on the picture, the Anglo will be seen as more favorable than the Indian.

Methods

Participants
Sixty-four participants gathered from social networking sites were asked to complete a survey. In order for all participants to complete the survey they were presented with an informed consent form, which was approved by the institutions research review board (*see Appendix A*). The participants were also notified that, in order to maintain confidentiality, all results would be kept with the study's supervisor (see *Appendix A*).

Measures

The possibility of accent bias was measured with a survey developed for the use of this study through St. Mary's University Qualtrics software. The survey contained dialogue between both an Anglo and Indian customer service representative and a customer where a problem was left unresolved. The survey measured six statements. The first was to determine the helpfulness of a customer service representative; the second was to measure the overall evaluation of the Anglo and Indian customer service representative, the likelihood of a recommendation for each customer service representative, blame placed on representative, blame placed on caller, and blame placed on company. Participants were asked to rate statements on a five-point scale from 1(strongly disagree) to 5 (strongly agree). The rating of the Indian and Anglo part of the questionnaire is shown in *Appendix C*.

Procedure

Participants were first presented with a screen showing a letter of consent. In order to continue with the study, they had to check the "I agree" box. Those who consented to participate were randomly assigned to one of two conditions. Participants assigned to the "Indian accent" condition heard a customer service representative try and resolve an issue with a customer in. Participants assigned to the "European-American accent" condition heard a customer service representative try and resolve an issue with a customer. Participants in both groups heard a condition where the problem was left unresolved. Then the participants completed a questionnaire that asked them about the overall helpfulness, overall evaluation of the Anglo and Indian customer service representative, the likelihood of a recommendation for their customer service representative, blame placed on representative, blame place on

caller, and blame placed on company. This was followed by a questionnaire that covered demographics and prompted them to identify the locus of responsibility (e.g., caller, customer service representative, company) for the failure to resolve the caller's complaint.

Results

Twelve variables that measured helpfulness and attributions of the customer service representative and the company, these variables included attentiveness, understanding, respect, knowledge, support, future recommendations, community organization, caller, company, customer service 1, customer service 2, customer service 3. To determine the results, an independent sample t-test was performed in SPSS. The participants in this study were assigned to one of two conditions, one being an Indian accented voice and the other being an Anglo accented voice. These two conditions were measured against the variables to determine whether or not bias existed toward a specific accent. For the results, the alpha was set at .05 meaning there was a 95% confidence interval.

For the variable attentiveness there was no significant difference in the scores for Anglo (M= 3.45, SD= 1.21) and Indian (M= 3.32, SD= 1.33) conditions; $t(60)= .40$, p= .690). *Understanding* there was no significant difference in the scores for Anglo (M= 3.39, SD= 1.02) and Indian (M= 3.29, SD= 1.32) conditions; $t(60)= .32$, p= .748). For the *Respect* measure, there was no significant difference in the scores for Anglo (M= 3.58, SD= 1.205) and Indian (M= 3.68, SD= 1.275) conditions; $t(60)= .40$, p= .760). For the variable *Knowledge*, there was no significant difference in the scores for Anglo (M= 3.42, SD= 0.92) and Indian (M= 3.29, SD= 1.20) conditions; $t(60)= .40$, p= .630). For *Support*, there was no significant difference in the scores for Anglo

(M= 3.42, SD= 1.15) and Indian (M= 3.32, SD= 1.33) conditions; $t(60)$= .40, p= .760). For the *Recommendations* measure, there was no significant difference in the scores for Anglo (M= 3.61, SD= 1.15) and Indian (M= 3.26, SD= 1.20) conditions; $t(60)$= .40, p= .235). Community organization was also showed no significant difference in the scores for Anglo (M= 1.71, SD= 0.59) and Indian (M= 1.58, SD= 0.56) conditions; $t(60)$= .40, p= .382). For variable *Caller* there was no significant difference in the scores for Anglo (M= 10.07, SD= 2.52) and Indian (M= 10.39, SD= 2.58) conditions; $t(60)$= .40, p= .620). *Company* there was no significant difference in the scores for Anglo (M= 9.78, SD= 1.94) and Indian (M= 10.10, SD= 1.54) conditions; $t(60)$= .40, p= .471). *Customer Service* 1 there was no significant difference in the scores for Anglo (M= 9.26, SD= 1.98) and Indian (M= 9.26, SD= 2.45) conditions; $t(60)$= .40, p= 1.00). *Customer Service 2* there was no significant difference in the scores for Anglo (M= 3.19, SD= 1.01) and Indian (M= 3.16, SD= 1.13) conditions; $t(60)$= .40, p= .906). *Customer Service 3* there was no significant difference in the scores for Anglo (M= 2.61, SD= 0.72) and Indian (M= 2.74, SD= 1.13) conditions; $t(60)$= .40, p= .592).

Analyzing the twelve variables there was no significant difference found between the two conditions in any of the variables measuring helpfulness and attributions. These results suggest that there is no bias between Anglo accented customer service representatives and Indian accented customer service representatives.

Discussion
U.S. corporations have increasingly turned to offshoring their customer service positions to other countries in an attempt to save money (O'Neil, 2003). However, there are some potential limitations associated with this strategy that can potentially reduce the overall profit margin. Specifically, if customers are displeased with the service they receive, they may be less likely to do

business with the corporation again in the future. Given that offshoring often involves hiring customer service representatives for whom English is a second language, the association between a "foreign" accent and poor customer service could become a socially ordained fact that people simply believe to be "the truth." As a result, they may be more inclined to judge people with foreign accents more negatively than people with "domestic" accents (Wang, 2012). In this study, we examined whether participants exhibit an anti-foreign accent bias when evaluating a customer service representative's helpfulness, recommending the representative's company to a friend or relative and assigning blame for the failure to resolve a caller's technical issue. With our hypotheses, we are exploring whether there is a bias against people who have foreign accents. The results of this study did not support our research hypothesis that people would disfavor a customer service representative on the basis of accent. This was a consistent finding across all criterion variables, including evaluations of helpfulness; desire to recommend the representative's company to another person, and focus of responsibility for a failure to resolve a customer service issue. In our previous pilot study a bias was becoming apparent prompting us to continue the research. Changing the Anglo voice to seem less confident and less flowing like the Indian accent may have upset the results of this study. With the findings of this study compared to the pilot, there is a good chance that an unconfident domesticated accent with the same inflections as an Indian accented individual may receive the same ratings as an Indian accented individual. In the future it is wise to redo the survey and change the Anglo voice back to the original confident and flowing voice. Future research in this area should focus on the relationship of an accent bias and who holds the bias. This can be done by expanding the demographic section and reviewing it more in detail.

References

Adank, P., Evans, B. G., Stuart-Smith, J., & Scott, S. K. (2009). Comprehension of familiar and unfamiliar native accents under adverse listening conditions. *Journal of Experimental Psychology: Human Perception and Performance*, 35, 520-529.

Deprez-Sims, A. B. (2010). Accents in the workplace: Their effects during a job interview. *International Journal Of Psychology*, 45(6), 417-426. Retrieved from http://web.ebscohost.com

Gluszek, A., & Dovidio, J. F. (2010). Speaking with a nonnative accent: Perceptions of bias, communication difficulties, and belonging in the United States. Journal of Language and Social Psychology, 29, 224-234.

Hebl, M. R., & Dovidio, J. F. (2005). Promoting the "social" in the examination of social stigmas. *Personality and Social Psychology Review*, 9, 156-182. Retrieved from http://web.ebscohost.com.

Jenkins, J. (2000). *The phonology of English as an international language*. Oxford, UK: Oxford

University Press. Retrieved from http://web.ebscohost.com.

Nisbett, Richard E.; Wilson, Timothy D. (1977, April).The halo effect: Evidence for unconscious alteration of judgments. *Journal of Personality and Social Psychology*, 35(4), 250-256. Retrieve from http://web.ebscohost.com.

Nguyen, B. (1993). Accent discrimination and the T-test of spoken english: A call for an objective assessment of the comprehensibility of nonnative speakers. *California*

Law Review, 81(5), 1325. Retrieved from http://web.ebscohost.com.

O'Neil, D. A. (2003). Offshore outsourcing takes hold. *Mortgage Banking*, 64(3), 38-43. Retrieved from http://web.ebscohost.com.

Pantos, A. J., & Perkins, A. W. (2013). Measuring implicit and explicit attitudes toward foreign accented speech. *Journal of Language & Social Psychology*, 32(1), 3-20. doi:10.1177/0261927X12463005

Pickel, K. L., & Staller, J. B. (2012). A perpetrator's accent impairs witnesses' memory for physical appearance. *Law And Human Behavior*, 36(2), 140-150. doi:10.1037/h0093968

Rakić, T., Steffens, M. C., & Mummendey, A. (2011). Blinded by the accent! The minor role of looks in ethnic categorization. *Journal Of Personality And Social Psychology*, 100(1), 16-29. doi:10.1037/a0021522

Singer, M. S. (1989). Effects of Ethnicity, Accent, and Job Status on Selection Decisions. *International Journal Of Psychology*, 24(1), 13.

Walsh, G., Gouthier, M., Gremler, D., & Brach, S. (2011). What the eye does not see, the mind cannot reject: Can call center location explain differences in customer evaluations?. *International Business Review*, 21(5), 957-967.

Wang, Z., Arndt, A. D., Singh, S. N., Biernat, M., & Liu, F. (2012). "You lost me at hello": How and when accent-based biases are expressed and suppressed. *International Journal Of Research In Marketing*, doi:10.1016/j.ijresmar.2012.09.004

(Appendix A)

Letter of Consent

Thank you for your interest in our research project. The purpose of this study is to help us learn more about how people think about customer service. You will also be asked to read a transcript of a customer service call and complete a questionnaire about it. You will also be asked to complete a demographic sheet that inquires about your race/ethnicity, gender, social class, year in school, and political orientation. I anticipate that it will take you about 20 minutes to complete all aspects of the study.

I do not anticipate that there will be any risks or monetary costs associated with your participation in this research study. However, if you are enrolled in a General Psychology course, you may benefit from this research by earning credit toward your research requirement. If you choose not to participate, there will be other opportunities for you to satisfy this requirement. In the event that you are not enrolled in a General Psychology course, you may still earn extra credit per your instructor's approval.

Participation in this study is entirely voluntary. You are free to refuse to be in the study, and your refusal will not influence current or future relationships with St. Mary's University. If you wish to stop your participation for any reason, you are free to do so without penalty or loss of benefits for which you may be entitled.

Every effort will be made to maintain the confidentially of your responses. You will need to provide personal information, including your name, course, and instructor, in order to receive credit for participation. However, your name will not be associated with any of the research materials in order to protect your privacy.

Authorized persons from St. Mary's University have the legal right to review your research records and will protect the confidentiality of those records to the extent permitted by law. Your research records will not be released without your consent unless required by law or a court order. Finally, if the results of this research are published or presented at scientific meetings, your identity will not be disclosed.

If you have questions about your rights as a research participant, please contact the St. Mary's University Institutional Review Board-Human Subjects at (210) 436-3315. You may also contact the principal investigator for questions about the study at (210) 436-3314. All research projects that are carried out by investigators are governed by requirements of the university and the federal government.

Thank you!

Do you agree to participate in the study?

(Appendix B)

Participant Demographics

Characteristics	Number	%
Anglo Accent	31	50%
Indian Accent	31	50%
White	25	40.3%
Hispanic	28	45.2%
Black	1	1.6%
Asian	1	1.6%
Multiracial	7	11.3%
18-24	35	56.5%
25-34	8	12.9%
35-44	6	9.7%
45-54	5	8.1%
55-65+	8	12.9%
High School or GED	17	27.4%
Associates or Bachelors	40	64.6%
Masters or Doctorate	5	8%
Liberal	24	38.7%
Conservative	16	25.8%
In Between	12	19.4%
Other	10	16.1%

Qualtrics Survey Software

(Appendix C)

Helpfulness

How would you rate his attentiveness to the caller's needs?

	Very poor	Somewhat poor	Neutral	Somewhat good	Very good
Attentiveness	○	○	○	○	○

How would you rate the customer service representative in terms of his understanding of the caller's needs?

	Very poor	Somewhat poor	Neutral	Somewhat good	Very good
Understanding	○	○	○	○	○

How would you rate the level of respect that the customer service representative showed for the caller?

	Very poor	Somewhat poor	Neutral	Somewhat good	Very good
Respect	○	○	○	○	○

How would you rate the customer service representative in terms of his knowledge of the kinds of problems callers like this one present?

	Very poor	Somewhat poor	Neutral	Somewhat good	Very good
Knowlegeable	○	○	○	○	○

Overall, how would you rate his technical support?

Very poor	Somewhat poor	Neutral	Somewhat good	Very Good
○	○	○	○	○

How likely would you recommend us to a friend?

Very Unlikely	Unlikely	Neither likely nor unlikely	Likely	Very Likely
○	○	○	○	○

Attributions

Clearly, the caller's problem was not resolved. We would like you to think about who was at fault. Please answer the following questions honestly. Remember, there are no right or wrong answers.

The customer service representative did not try hard enough to help the caller

○ Strongly disagree
○ Disagree
○ Neither Agree nor Disagree
○ Agree
○ Strongly Agree

The caller did not explain the problem clearly.

○ Strongly disagree
○ Disagree
○ Neither Agree nor Disagree
○ Agree
○ Strongly Agree

The caller did not give the customer service representative a chance to do his job.

○ Strongly disagree
○ Disagree
○ Neither Agree nor Disagree
○ Agree
○ Strongly Agree

The company lacked a good method for delivering the software to its customers.

○ Strongly Disagree
○ Disagree
○ Neither Agree nor Disagree
○ Agree
○ Strongly Agree

The customer service representative was unable to communicate effectively with the caller.

○ Strongly disagree
○ Disagree
○ Neither Agree nor Disagree
○ Agree
○ Strongly Agree

The way the company is set up, the customer service representative was bound to fail.

○ Strongly disagree
○ Disagree
○ Neither Agree nor Disagree
○ Agree
○ Strongly Agree

The company should provide customer service representatives with more options for helping callers.

○ Strongly disagree
○ Disagree
○ Neither Agree nor Disagree
○ Agree
○ Strongly Agree

The customer service representative lacked the necessary intelligence to be good at his job.

○ Strongly disagree
○ Disagree
○ Neither Agree nor Disagree
○ Agree
○ Strongly Agree

The caller did not communicate effectively.

○ Strongly disagree
○ Disagree
○ Neither Agree nor Disagree
○ Agree
○ Strongly Agree

5-HT$_{1A}$ Receptor Function in Epilepsy-Associated Depression

Hannah Redwine

Mentor: Eric Powell, PhD
Department of Psychology;
St. Mary's University
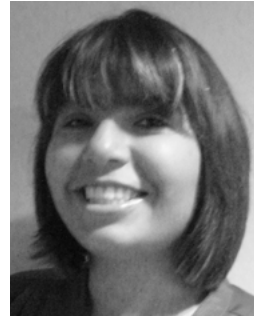
Hannah M. Redwine[1], Eduardo A. Pineda[2], Teresa F. Burke[3], Don Shin[2], Andrey M. Mazarati[2], and Julie G. Hensler[3].

[1]Departments of Biology and Psychology, St. Mary's University, San Antonio, Texas; [2]Department of Pediatrics, David Geffen School of Medicine, University of California Los Angeles; [3]Department of Pharmacology, University of Texas Health Science Center San Antonio.

Abstract

Depression is one of the most frequent comorbidities of temporal lobe epilepsy. Rats subjected to pilocarpine-induced status epilepticus (SE), develop depressive impairments that may stem from the dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis and/or a decrease in central serotonin neurotransmission. In addition to changes in serotonin neurotransmission, dysfunction in central noradrenergic pathways has been implicated in major depression. In this study we have examined underlying neuroendocrine changes, and the possible role of alpha2 adrenergic receptors and pre- and post-synaptic serotonin 5-HT$_{1A}$ receptors in epilepsy-associated depression. Based on performance in the forced swim test and increased activity of the HPA axis, post-SE animals were classified as those with moderate and severe depressive impairments. In both moderately and severely impaired rats, raphe-to-hippocampus serotonergic neurotransmission was decreased and the function of post-synaptic 5-HT$_{1A}$ receptors in hippocampus was diminished. In post-SE rats with moderate depressive impairments, we found no change in alpha2 adrenergic receptor function in hippocampus or dorsal raphe, and the functional capacity of pre-synaptic 5-HT$_{1A}$ receptors in dorsal raphe remained unaltered. The attenuation of hippocampal 5-HT$_{1A}$ receptor function may play a role in the behavioral phenotype of post-SE rats with moderate depressive impairments. A deficiency in post-synaptic 5-HT$_{1A}$ receptor function is implicated in the pathophysiology of major depression. By contrast in post-SE rats with severe depressive-like behavior, the function of pre-synaptic 5-HT$_{1A}$ receptors in the dorsal raphe was increased compared to naïve and moderately depressive rats. In these rats depressive impairments may be further exacerbated by the up-regulation of pre-synaptic inhibitory 5-HT$_{1A}$ autoreceptors. Given the heterogeneous nature of major depression, understanding the underlying pathophysiology may better guide therapeutic strategies with improved clinical outcomes.

Introduction

Depression and epilepsy have a high comorbidity (~29 % of the epileptic population suffers from major depression). It is important to understand where the depression essentially begins physiologically in order to prescribe the best treatment. Effective treatment is especially important in suicide prevention, because suicide is ten times more likely in those with this comorbidity (1).

Dysfunction of the HPA axis and deficits of serotonin neurotransmission are recognized as hallmarks and possibly mechanistic factors of major depression (2). Rats in previous studies that were subjected to pilocarpine induced status epilepticus (SE) show depressive-like behavioral impairments and HPA axis dysregulation, and decreased serotonin neurotransmission between the dorsal raphe and the hippocampus (3,4,5). Dysfunction in central noradrenergic pathways has also been implicated in major depression (6,7).

Our objective is to examine the underlying neuroendocrine changes, the possible role of alpha2 adrenergic receptors, and the pre- and post-synaptic serotonin 5-HT$_{1A}$ receptors in epilepsy-associated depression. Alpha2 pre- and post-synaptic receptors are inhibitory and play a key role in regulating noradrenergic neurotransmission. The alpha2 receptors are autoreceptors for the noradrenergic cell bodies in the locus coeruleus and heteroreceptors on other cell bodies, as in areas like the hippocampus or on serotonin cell bodies in the dorsal raphe nucleus. Presynaptic 5-HT$_{1A}$ receptors act as autoreceptors on the serotonin cell bodies in the dorsal raphe nucleus. A decrease in postsynaptic 5-HT$_{1A}$ receptors, in the dorsal raphe and hippocampus, has been implicated in major depression (8, 9).
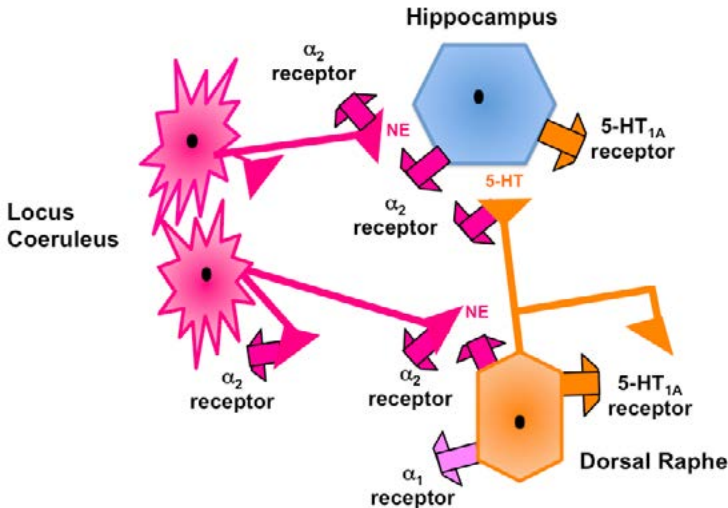
Figure 1. The dorsal raphe is innervated by the adrenergic neurons of the locus coeruleus and both the adrenergic and the serotonin neurons innervate the Hippocampus. The alpha1 (excitatory), alpha2 (inhibitory), and serotonin 5-HT$_{1A}$ receptors are shown above.

Results

The rats with pilocarpine (muscarinic acetylcholine receptor)-induced status epilepticus are labeled Post-SE after two weeks of no induced seizures, only if they had induced seizures in stages 4-5. Figure 2 displays how the grouping of the epileptic rats into Moderate and Severe categories was accomplished. The naïve or non-epileptic rats are included in Figure 2 to show the marked differences between the three cohorts of rats. The naïve rats show lower immobility times and plasma corticosterone (CORT) responses to corticotrophin-releasing hormone (CRH). The rats with moderate impairments are grouped by having an immobility time of ≤ 100 seconds in the forced swim test (FST) and plasma CORT response to CRH of <115 ng/ml (2). The rats with moderate impairments are grouped by an immobility time of >100 seconds and have a plasma CORT response to CRH of ≥ 115 ng/ml. Figure 2 uses the data from both experiments to create breakout groups of epileptic rats, termed Post-SE rats (2).

Figure 2. Behavioral and Endocrine Impairments in Post-SE Rats
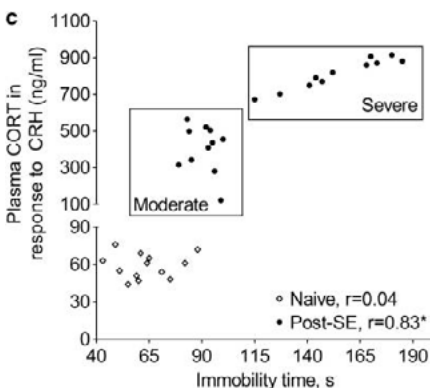
Figure 2. Immobility time in the Forced Swim Test is plotted against plasma CORT levels in response to CRH injection (n=13,naïve and n=22, post-SE). (2)

Figure 3 contains the Fast Cyclic Voltometry voltagrams, which were obtained using an electrode in the hippocampus to measure serotonin neurotransmission from the dorsal raphe nucleus (DRN) when the DRN is stimulated. The moderately impaired rats have decreased serotonin neurotransmission, but the severely impaired rats display a marked decrease in serotonin neurotransmission (2).

Figure 3. Diminished Raphe-Hippocampal Serotonergic Neurotransmission in Post-SE Rats
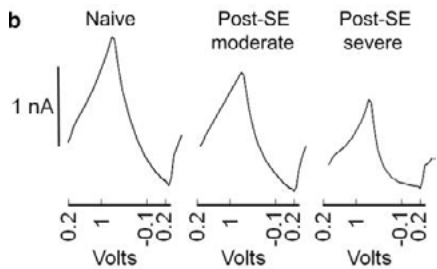
Figure 3. Representative voltagrams generated by Fast Cyclic Voltammetry measuring the release of serotonin in the Hippocampus in response to Raphe stimulation. (2)

A serotonin receptor agonist, 8-OH-DPAT, binds to the serotonin 5-HT$_{1A}$ receptor and changes the receptor conformation. This change in conformation causes the G-protein to dissociate and the ligand, [^{35}S] GTPγS, to bind to the G-protein and is used to measure receptor function. Figure 4a denotes that there is decreased function in the post-synaptic serotonin receptors in the hippocampus (CA1 and CA3), but not a decreased number of receptors in either of the Post-SE groups. Interestingly, there is no change in receptor function in the dentate gyrus, but there are an increased number of receptors in this area that may account for that lack in difference. The serotonin receptor antagonist, [^{3}H]WAY-100635,

binds to the serotonin 5-HT$_{1A}$ receptor, allowing receptor number to be measured. Figure 4b shows that there is no difference in receptor number in CA1 and CA3 hippocampal areas.

Figure 4. Decreased Function of Post-Synaptic 5-HT$_{1A}$ Receptors in Hippocampus of Post-SE Rats
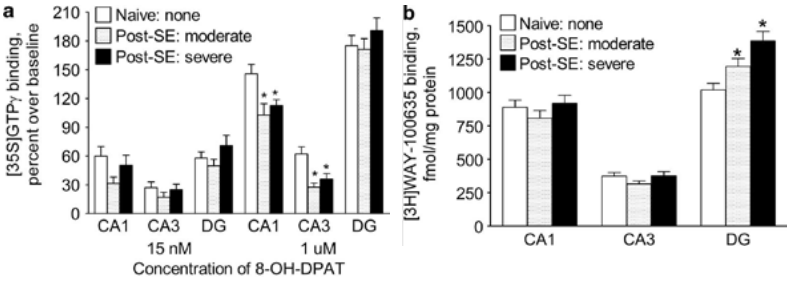
Figure 4a. [35S]GTPγS binding stimulated by the 5-HT1A receptor agonist 8-OH-DPAT (15nM, 1uM). (2)

Figure 4b. The specific binding of the antagonist radioligand [3H]WAY-100635 (1.5nM). Nonspecific binding was defined in the presence of 1uM NAN190. (2)

The alpha2 receptors are inhibitory receptors (in Figure 1). We hypothesized what increased function or number of alpha2 receptors would decrease serotonin neurotransmission in the moderately impaired rats, as in Figure 3. However, in Figure 5 there is no change in the alpha2 receptor function for the moderately impaired rats. The dorsal raphe nucleus, locus coeruleus, and CA1 region of the hippocampus do not show an increase in receptor function. Only the moderate rats were tested for this change and receptor number was not tested.

Figure 5. No Change in α2 Receptor Function in Post-SE Rats with Moderate Depressive Behavior
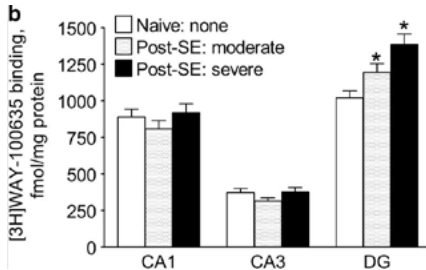
Figure 5. [^{35}S]GTPγS binding stimulated by the alpha2 receptor agonist dexmedetomidine (1uM). DRN, Dorsal Raphe Nucleus; LC, Locus Coeruleus; CA1, Hippocampus.

Figure 6 indicates an increase in serotonin 5-HT$_{1A}$ receptor function in the dorsal raphe nucleus in severely impaired rats, but not an increase in receptor number; this was determined using the same agonist and antagonist as in Figure 4. This pre-synaptic increase in serotonin 5-HT$_{1A}$ receptor function is only seen in the severely impaired rats, suggesting that this increased inhibition by the autoreceptor may be the cause of the decreased serotonin neurotransmission in the hippocampus.

Figure 6. Increased 5-HT$_{1A}$ Receptor Function in the DRN in Post-SE Rats with Severe Depressive-like Behavior
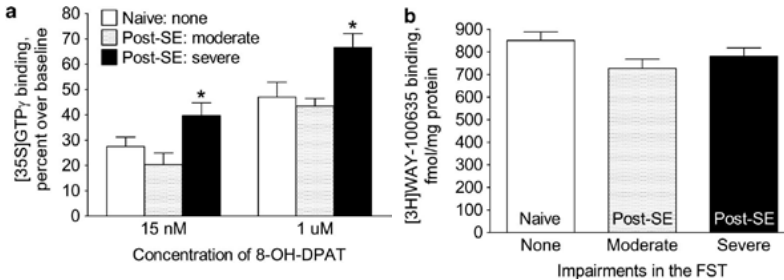
Figure 6a. [35S]GTPyS binding stimulated by the 5-HT$_{1A}$ receptor agonist 8-OH-DPAT (15nM, 1uM). (2)

Figure 6b. The specific binding of the antagonist radioligand [^{3}H]WAY-100635 (1.5nM). Nonspecific binding was defined in the presence of 1uM NAN190. (2)

Discussion

The increased immobility time of both the moderately and severely impaired groups of rats were expected, as were the increased plasma CORT responses to CRH, as hallmarks of depression (Figure 1). Immobility time is an indicator of helplessness and despair, which are hallmarks of depressions, as are the increased plasma CORT levels (Figure 2). The apparent depressive symptoms in the Post-SE rats include decreased serotonin neurotransmission, which is displayed in both the moderately and severely impaired groups (Figure 3). A decrease in post-synaptic serotonin 5-HT$_{1A}$ receptor function does not explain the decrease in serotonin neurotransmission in the moderately impaired rats or severely impaired rats. The attenuation of hippocampal 5-HT$_{1A}$ receptor function may play a role in the depressive phenotype of both moderate and severe post-SE rats (Figure 4). The severely impaired rats, however, have increased serotonin 5-HT1A autoreceptor function in the dorsal raphe nucleus, which causes decreased serotonin neurotransmission.

Our preliminary data suggests that changes in the alpha2 receptors do not play a role in the post-SE rats with moderate depressive-like behaviors (Figure 5). An increase in the alpha2 receptor function (inhibitory) was hypothesized to explain the decreased serotonin neurotransmission in the moderately impaired rats. The lack of receptor function difference between the naïve and moderately impaired rats does not support this hypothesis. An increase in pre-synaptic serotonin receptor function in the severely impaired rats would cause decreased serotonin neurotransmission in that group (Figure 6). This signifies that the depressive phenotype may be further exacerbated by the up-regulation of pre-synaptic inhibitory 5-HT$_{1A}$ autoreceptors observed in post-SE rats with severe depressive impairments.

In the future we plan to measure alpha2 function by dexmedetominidine–stimulated [^{35}S]GTPγS binding in the Post-SE rats with severe impairments. Currently we are measuring alpha2 receptor number with [^{3}H] RX-821002 binding in both the moderately and severely impaired rats. The alpha1 receptor is an excitatory receptor, which could decrease serotonin neurotransmission if the receptors have decreased function or there is a decrease in receptor number (Figure 1). We are currently measuring alpha1 receptor number with [^{3}H] prazosin binding to see if the alpha1 receptor is the cause of the decreased serotonin neurotransmission.

Literature Cited

1. *Epilepsy Foundation of America.* http://www.epilepsyfoundation.org/

2. Pineda EA, Hensler JG, Sankar R, Shin D, Burke TF, Mazarati AM (2011) Plasticity of presynaptic and postsynaptic serotonin 1A receptors in an animal model of epilepsy-associated depression. Neuropsychopharmacol 36:1305-1316.

3. Mazarati A, Siddarth P, Baldwin RA, Shin D, Caplan R, Sankar R (2008) Depression after status epilepticus: behavioural and biochemical deficits and effects of fluoxetine. Brain 131:2071-2083.

4. Mazarait AM, Shin D, Kwon YS, Bragin A, Pineda E, Tio D et al., (2009) Elevated plasma corticosterone level and depressive behavior in experimental temporal lobe epilepsy. Neurobiol Dis 34:457-461.

5. Mazarati AM, Pineda E, Shin D Tio D Taylor AN Sankar R (2010) Comorbidity between epilepsy and depression: role of hippocampal interleukin-1 beta. Neurobiol Dis 37:416-467.

6. Arango V, Underwood MD, Mann JJ (1996). Fewer pigmented locus coeruleus neurons in suicide victims: preliminary results. Biol Psychiatry 39:112-120.

7. Kitayama IT, Otani M, Murase S (2008) Degeneration of the locus coeruleus noradrenergic neurons in the stress-induced depression of rats. Ann N Y Acad Sci 1148:95-98.

8. Ordway GA, Schenk J, Stockmeier CA, May W, Klimek V (2003) Elevated agonist binding to alpha2-adrenoceptors in the locus coeruleus in major depression. Biol Psychiatry 53:315-323.

9. Savitz J, Lucki I, Drevets WC (2009) 5-HT1A receptor function in major depressive disorder. Prog Neurobiol. 88:17-31.

Analyzing solubility descriptors using the Abraham Solvation Parameter Model

Jesus Reyes

Mentor: Susan Oxley, PhD
Department of Chemistry; St. Mary's University

Abstract

The Abraham Solvation Parameter Model has become a useful tool when deciphering solvating descriptors for various partition processes. One of the many attributes that the Abraham Model possesses is its versatility to be modified to fit most solvation problems and serves as a predictor of enthalpies of solvation, entropies of solvation, solvent-water partitioning, air-solvent partitioning, portioning into micelles, partitioning into lipid membranes and lipids, and chromatographic retention quantities. The objective of this project was to correlate entropy values calculated from analyzing solvation descriptor data to determine the robustness of the Abraham model.

Keywords: Partition coefficient, ionic liquids, temperature dependence, linear free energy relationships, entropies of solvation.

Introduction

Room-temperature ionic liquids (RTIL's) have been examined in the past two decades with regards to their chemical separation capacity. This is because the study of RTIL's provide a prediction for the solvation process occurring in a solvent system such as partitioning of micelles, partitioning within important biological systems (the air-lung1 barrier and blood-brain barrier[2,3]), solute partitioning in RTIL's, and solute partitioning in binary solvent systems.[4]

The way in which predictions are made is through the application of the Abraham solvation parameter model. This model is useful in the pharmaceutical and environmental industry because of its efficacy in determining the rate at which a system will take place[2]. The Abraham model

had a limitation that Sprunger and Mintz et al discovered and modified individually, which was that of ionic-specificity and temperature independence, respectively.[5,6,7] This characteristic proved important because data could only be obtained at room temperature. Mintz et al accomplished to combine experimental partition coefficients at different temperatures into one regression correlation. Based on this correlation, entropy values of two RTIL's will be reported.

Theory

Abraham Solvation Parameter Model

The Abraham model is one of the more useful approaches for the analysis and prediction of the adsorption, distribution, and toxicological properties of potential

drug candidates (ADMET- adsorption, distribution, metabolism, elimination, and toxicity). The Abraham model has allowed the pharmaceutical industry to identify the less promising drug candidates in the early developmental stages in order to save time and resources.

The model relies on two linear free-energy relationships (LFER's) one for transfer processes occurring within condensed phases[8]:

$$SP = c + eE + sS + aA + bB + vV \quad (1)$$

and one for processes involving gas-to-condensed phase transfer

$$SP = c + eE + sS + aA + bB + lL \quad (2)$$

where,

- E,S,A,B are measures of the tendency of the given solute to undergo various solute-solvent interactions.

- L and V are measures of solute size as well as describe general solute-solvent interactions.

The variables above are commonly known as solute descriptors and each represent individual physical properties involved in the solute-solvent interactions. Table 1 shows the different solute descriptors and what they represent:

Table 1. Solute descriptor index.

Table 1. Solute descriptor index.

Solute Descriptor	Process Coefficient
	c: Linear Regression Constant
E: Excess Molar Refraction	e: Interaction of the process phase with solute; dispersion interactions.
S: Dipolarity/ Polarizability	s: Measure of phase's dipolarity/ polarizability
A: Hydrogen Bond Acidity	a: Measure of solvent's base properties
B: Hydrogen Bond Basicity	b: Measure of solvent's acid properties
L: Ostwald Solubility	l: Measure of work needed to create solvent cavity and dispersion forces of a gas.
V: McGowan Volume	v: Measure of the work needed to create solvent cavity and dispersion forces.

Sprunger et al modified the Abraham model by rewriting each of the six equation coefficients (as seen in Equation 3 and Equation 4) as a summation of the respective cationic and anionic contributions, which proves as a major advantage due to the fact that one could make predictions for more RTIL's.

$$\log K = ccation + canion + (ecation + eanion) * E + (scastion + sanion) * S + (acation + aanion) * A + (bcation + banion) * B + (vcation + vanion) * V$$

Sprunger discovered positive results with the modification of the Abraham model having

into account the limited number of solute descriptors available. Although, there was still temperature dependency which in turn limited the amount of solute descriptors Sprunger et al could obtain at room temperature.

Mintz et al achieved to break the temperature barrier and proposed the following variation to the model:

$$\log K = \left(cs - \frac{cH}{T} \right) \frac{1}{2.303R} + \left(eS - \frac{eH}{T} \right) \frac{E}{2.303R} + \left(sS - \frac{sH}{T} \right) \frac{S}{2.303R} + \left(aS - \frac{aH}{T} \right) \frac{A}{2.303R}$$

$$\boxplus \left(bS - \frac{bH}{T} \right) \frac{B}{2.303R} + \left(lS - \frac{lH}{T} \right) \frac{L}{2.303R}$$

This variation demonstrates that solute descriptors could be calculated at different temperatures and thus one used this model to calculate the entropy of solvation (ΔSsolv) for two ionic liquids, which will be discussed in detail below (please refer to results section).

In studying the Abraham model, normally one needs data for partition coefficients and that is done through obtaining 40 or 50 solutes dissolved in an RTIL of preference to develop an Abraham correlation.[7]

Computational Methodology

Literature revealed that one could use the Experimental Raoult's Law of infinite dilution activity coefficient and Henry's Law constants, Khenry[9,10,11] for gases and solutes in various ionic liquids. These values are transformed into log K values from the following relationships:

$$\log k = \log \left(\frac{R*T*\rho_{solvent,T}}{\Upsilon_{solute}^{\infty} * P_{solute,T}^{0} * MW_{solvent}} \right)$$

$$\log k = \log \left(\frac{R*T*\rho_{solvent,T}}{K_{Henry} * P_{solute,T}^{0} * MW_{solvent}} \right)$$

When performing calculations, log K values were recorded with necessary solute descriptors into a 13485 row by 480 column matrix provided from a database that authors and Michael H. Abraham calculated experimentally to predict solute-to-solvent partition coefficents using refractive indices, spectrophographic data, and chromatographic retention factors. The process of calculating partition coefficients was done through the use of software program SPSS 20.0. For each ion, the N (number of data points) values are reported as well as the temperature range. For the entire correlation, N, SD (standard deviation), R2 (linear regression), and F (Fisher F-statistic) values are reported.

Results and Discussion

When performing the calculations to determine the temperature independent ion-specific terms, it is important to define some of the ion-specific terms (refer to Table 2). Table 3 and Table 4 are temperature independent cation-specific and anion-specific Abraham coefficients.

Table 2. Ion Names and Abbreviations

Abbreviation	Name
[MBIm]+	1-butyl-3-methylimidazolium
[MEIm]+	1-ethyl-3-methylimidazolium
[MHIm]+	1-hexyl-3-methylimidazolium
[MOIm]+	1-octyl-3-methylimidazolium
[MDIm]+	1-decyl-3-methylimidazolium
[PMMIm]+	1-propyl-2,3-dimethylimidazolium
[EMMIm]+	1-ethyl-2,3-dimethylimidazolium
[(Meo)2Im]+	1,3-dimethoxyimidazolium
[CNPrMIm]+	1-(3-cyanopropyl)-3-methylimidazolium
[EtOHMIm]+	1-ethanol-3-methylimidazolium
[4-MBPy]+	1-butyl-4-methylpyridinium
[EPy]+	N-ethylpyridinium
[PrOHPy]+	1-(3-hydroxypropyl)pyridinium
[M3BAm]+	butyl(trimethyl)ammonium
[MO3Am]+	methyl(trioctyl)ammonium
[HM3Am]+	hexyl(trimethyl)ammonium
[BMPyrr]+	1-butyl-1-methylpyrrolidinium
[MeoeMPyrr]+	1-(2-methoxyethyl)-1-methylpyrrolidinium
[H3TdP]+	trihexyltetradecylphosphonium
[MeoeMMorp]+	4-(2-methoxyethyl)-4-methylmorpholinium
[MeoeMPip]+	1-(2-methoxyethyl)-1-methylpiperidinium
[HMPip]+	1-hexyl-1-methylpiperidinium
[PeMPip]+	1-pentyl-1-methylpiperidinium
[BMPip]+	1-butyl-1-methylpiperidinium
[MTBDH]+	1,3,4,6,7,8-hexahydro-1-methyl-2H-pyrimido[1,2-a]pyrimidine
[Tf2N]-	bis(trifluoromethylsulfonyl)imide
[BF4]-	Tetrafluoroborate
[CF3SO3]-	Triflate
[PF6]-	Hexafluorophosphate
[SCN]-	Thiocyanate

[B(CN)4]-	Tetracyanoborate
[N(CN)2]-	Dicyanamide
[NO3]-	Nitrate
[AcF3]-	Trifluoroacetate
[OtSO4]-	Octylsulfate
[EtSO4]-	Ethylsulfate
[MeSO3]-	Methanesulfonate
[E2PO4]-	Diethylphosphate
[FAP]-	trifluorotris(perfluoroethyl)phospate
[BETI]-	bis(pentafluoroethylsulfonyl)imide

Table 3. Cation-Specific Abraham Coefficients

	$c_{cation.H}$	$e_{cation.H}$	$s_{cation.H}$	$a_{cation.H}$	$b_{cation.H}$	$l_{cation.H}$	$c_{cation.S}$	$e_{cation.S}$	$s_{cation.S}$	$a_{cation.S}$	$b_{cation.S}$	$l_{cation.S}$	Temperature Range
[MBIm]+	-6124	-7914	2394	-28165	-4138	-5765	-31.145	-21.886	44.669	-40.677	2.648	-4.196	273.15 K - 403.15 K
N=1517	(1259)	(4732)	(5491)	(5495)	(6606)	(500)	(4.025)	(14.610)	(16.993)	(16.828)	(20.285)	(1.568)	
[MEIm]+	-2772	-5130	0^b	-37346	-7444	-7921	-18.668	-15.307	44.860	-75.448	-13.155	-13.778	273.15 K - 396.10 K
N=2432	(1471)	(3193)		(4817)	(3786)	(539)	(4.632)	(9.886)	(0.954)	(14.765)	(11.624)	(1.683)	
[MHIm]+	0^b	283	-6835	-36776	-4346	-10171	-7.621	-4.202	17.945	-73.150	-6.437	-19.104	283.32 K - 413.30 K
N=1053		(4389)	(5238)	(5578)	(5866)	(319)	(0.348)	(13.191)	(15.815)	(16.835)	(17.877)	(0.957)	
[MOIm]+	-3491	-12	-1184	-29320	-5005	-7875	-18.667	-9.513	32.611	-49.000	-7.028	-9.202	295 K - 396.35 K
N=654	(2972)	(6500)	(7546)	(9350)	(9778)	(886)	(9.249)	(19.810)	(22.822)	(28.929)	(29.703)	(2.716)	
[MDIm]+	3464	-1618	-5413	-38523	-6947	-10768	0.000^a	-11.061	19.942	-82.125	-14.068	-19.215	318.15 K - 378.15 K
N=242	(427)	(13862)	(16808)	(10286)	(13133)	(932)		(40.217)	(48.710)	(29.866)	(38.345)	(2.672)	
[PMMIm]+	5855	-3815	-36573	-59672	7177	-3780	0.000^a	-3.005	-68.292	-119.003	29.547	-0.609	303.15 K - 363.15 K
N=236	(421)	(8903)	(8965)	(18313)	(11619)	(804)		(26.936)	(26.999)	(38.941)	(35.124)	(2.413)	
[EMMIm]+	-547	-15910	-6757	-12165	-15609	-7119	-14.729	-44.689	21.263	-2.908	-32.292	-11.065	295 K - 364.4 K
N=153	(6855)	(15680)	(17478)	(20664)	(17394)	(2110)	(21.371)	(47.718)	(53.383)	(62.797)	(53.007)	(6.527)	
[(Meo)₂Im]+	4098	7744	-17284	-31535	-13281	-8061	0.000^a	25.108	-8.405	-60.528	-22.880	-16.063	298.15 K - 332.70 K
N=196	(329)	(10393)	(8979)	(12639)	(9857)	(735)		(32.908)	(28.426)	(40.012)	(31.208)	(2.317)	
[CNPrMIm]+	0^b	-2142	-3626	-30456	-8839	-8604	-16.858	-5.762	37.170	-53.892	-14.489	-16.207	298.15 K - 332.55 K
N=188		(13102)	(11754)	(15881)	(14174)	(1054)	(1.454)	(41.034)	(36.886)	(49.684)	(44.448)	(3.327)	
[EtOHMIm]+	7474	-27527	-18599	-17600	20877	4855	0.000^a	-78.270	6.574	2.932	85.406	23.238	302.55 K - 332.65 K
N=93	(676)	(20877)	(13253)	(18313)	(18660)	(3518)		(66.399)	(42.267)	(57.971)	(59.193)	(11.219)	
[4-MBPy]+	-6718	1297	-16363	-21076	774	-7550	-35.438	6.901	-6.354	-23.175	9.934	-10.605	295 K - 368.15 K
N=704	(3040)	(5931)	(7488)	(5673)	(6342)	(905)	(9.283)	(18.059)	(22.808)	(16.537)	(19.229)	(2.763)	
[EPy]+	4026	6781	-20727	-27734	-3649	-9788	0.000^a	24.963	-22.009	-41.510	4.908	-18.962	303.15 K - 333.15 K
N=122	(551)	(21662)	(20920)	(18159)	(17200)	(1787)		(68.304)	(65.930)	(57.634)	(54.257)	(5.606)	
[PrOHPy]+	106	215	-15172	-30246	-10233	-7189	-12.631	9.695	-5.962	-45.987	-10.917	-12.841	308.15 K - 378.15 K
N=314	(5638)	(8428)	(10274)	(7990)	(8807)	(1630)	(16.784)	(24.620)	(29.961)	(23.325)	(25.921)	(4.838)	
[M₃BAm]+	-8486	-14060	286	-28988	-5159		(7.408)	-40.016	38.054	59.628	-75.666	-4.948	282.93 K - 396.15 K
N=284	(2340)	(7872)	(8896)	(12121)	(12644)	(618)		(23.416)	(27.232)	(36.778)	(38.669)	(1.893)	
[MO₃Am]+	369	9055	-21027	-28865	-5345	-9448	0.000^a	30.881	-51.658	-64.927	0.000^a	-15.516	303.15 K - 323.15 K
N=84	(522)	(31000)	(25150)	(36869)	(2626)	(1753)		(99.054)	(80.174)	(117.765)		(5.588)	
[HM₃Am]+	-7301	-1510	-5558	-9014	-12511	-5833	-32.042	-6.025	21.495	7.329	-30.406	-6.687	298.15 K - 352.65 K
N=204	(5140)	(6649)	(6211)	(6558)	(1225)	(15.707)	(20.319)	(18.980)	(26.999)	(20.042)	(3.744)		
[BMPyrr]+	-1798	758	-11971	-23817	2258	-9468	-18.082	1.708	5.708	-38.104	11.884	-16.792	283.15 K - 368.15 K
N=1181	(2338)	(4616)	(5513)	(5622)	(5536)	(740)	(7.174)	(13.703)	(16.322)	(16.743)	(16.447)	(2.260)	
[MeoeMPyrr]+	0^b	2964	-18714	-5456	-2943	-8137	-11.197	9.433	-12.767	-35.502	-3.967	-13.836	318.15 K - 368.15 K
N=738		(5125)	(5348)	(5970)	(5627)	(484)	(0.716)	(14.993)	(15.658)	(17.499)	(16.478)	(1.431)	
[H₄TdP]+	-385	1052	-6241	-26748	-5495	-9939	0.000^a	-1.589	2.433	-54.322	-15.236	-17.713	298.15 K - 342.45 K
N=207	(374)	(9842)	(8446)	(12280)	(10283)	(734)		(31.208)	(26.801)	(38.924)	(32.643)	(2.310)	
[MeoeMMorp]+	0^b	0^b	-14198	-19776	-11866	-7429	-13.088	0.000^a	5.519	-19.854	-27.605	-12.642	298.15 K - 368.15 K
N=941			(3406)	(4940)	(4233)	(368)	(0.638)		(10.043)	(14.577)	(12.476)	(1.103)	
[MeoeMPip]+	0^b	0^b	-9826	-20537	-8709	-8486	-10.605	0.000^a	13.173	-24.353	-21.817	-14.757	298.15 K - 368.15 K
N=945			(3385)	(5057)	(4234)	(367)	(0.637)		(9.990)	(14.964)	(12.483)	(1.103)	
[HMPip]+	0^b	5531	-16209	-23894	4122	-9276	-67.872	15.504	-8.851	-36.347	-9.121	-15.632	308.15 K - 358.15 K
N=258		(10430)	(12970)	(8350)	(11272)	(648)	(1.027)	(31.432)	(39.085)	(25.177)	(33.970)	(1.972)	
[PeMPip]+	0^b	4367	-17833	-24462	-4616	-8903	-68.635	13.018	-12.039	-37.153	-10.016	-14.787	308.15 K - 358.15 K
N=249		(11181)	(14000)	(8557)	(11451)	(664)	(1.101)	(33.550)	(41.982)	(25.772)	(34.477)	(2.024)	
[BMPip]+	4141	-8976	-33927	-17229	-9273	-22.834	39.642	-61.408	-46.973	-16.169	0.000^a		318.15 K - 358.15 K
N=164	(564)	(9159)		(16051)	(10241)	(1087)	(27.304)	(3.003)	(47.210)	(30.489)	(3.203)		
[MTBDH]+	0^b	-10167	1033	-34118	-6396	-7202	-12.866	-29.175	41.189	-50.915	-6.048	-7.070	308.15 K - 348.15 K
N=267		(12316)	(12389)	(13725)	(13590)	(992)	(1.536)	(37.608)	(37.919)	(41.900)	(41.533)	(3.062)	

Table 4. Anion-Specific Abraham Coefficients

	$c_{anion,H}$	$e_{anion,H}$	$s_{anion,H}$	$a_{anion,H}$	$b_{anion,H}$	$l_{anion,H}$	$c_{anion,S}$	$e_{anion,S}$	$s_{anion,S}$	$a_{anion,S}$	$b_{anion,S}$	$l_{anion,S}$	Temperature Range
[Tf₂N]⁻	0[a]	0[a]	0[a]	0[a]	0[a]	0[a]	0.000[a]	0.000[a]	0.000[a]	0.000[a]	0.000[a]	0.000[a]	273.15 K - 413.30 K
N=4563													
[BF₄]⁻	-2533	3372	315	11863	-11463	1152	-11.134	21.054	0.000[b]	49.504	-34.916	1.180	273.15 K - 396.35 K
N=1498	(1556)	(3644)	(394)	(7427)	(5180)	(592)	(4.952)	(11.205)		(22.825)	(15.764)	(1.861)	
[CF₃SO₃]⁻	11005	14746	-27832	-38345	6864	232	33.673	35.360	-60.559	-89.317	25.721	-0.644	298.15 K - 368.15 K
N=598	(3624)	(6813)	(8441)	(8301)	(8430)	(1111)	(11.080)	(20.627)	(25.569)	(24.878)	(25.419)	(3.388)	
[PF₆]⁻	196	1654	-13710	38181	-45303	-584	0.908	37.592	-71.324	86.551	-111.014	-5.027	283.15 K - 403.15 K
N=313	(1986)	(8010)	(10414)	(22361)	(21709)	(1051)	(6.337)	(25.079)	(32.705)	(69.201)	(67.019)	(3.307)	
[SCN]⁻	1841	8065	-17926	-25069	10135	3610	0.000[b]	34.753	-48.715	-40.157	30.037	-1.315	298.15 K - 368.15 K
N=1084	(217)	(5612)	(7015)	(5326)	(6607)	(391)		(17.017)	(21.219)	(15.907)	(19.948)	(1.180)	
[B(CN)₄]⁻	0[a]	6099	-9130	9891	-1194	1159	1.741	23.562	-25.158	34.102	-3.212	2.703	298.15 K - 378.15 K
N=1166		(5378)	(6055)	(5374)	(5955)	(414)	(0.643)	(16.030)	(18.035)	(16.152)	(17.894)	(1.253)	
[N(CN)₂]⁻	1413	7392	-22844	-4042	2022	16380	0.000[b]	29.678	-66.562	21.946	2.371	3.428	298.15 K - 353.15 K
N=492	(300)	(7323)	(8833)	(7242)	(674)			(22.351)	(18.192)	(26.822)	(22.048)	(2.077)	
[NO₃]⁻	-480	3702	-11226	-7637	2768	1280	0.000[b]	23.499	-33.026	16.123	-0.247	-3.521	303.15 K - 363.15 K
N=319	(491)	(9317)	(8734)	(12495)	(10895)	(890)		(28.124)	(26.241)	(37.709)	(32.852)	(2.633)	
[AcF₃]⁻	1903	20481	-34921	-15221	10780	-295	0.113	69.832	-114.141	-3.567	47.360	-1.123	298.15 K - 368.15 K
N=185	(6335)	(15981)	(22740)	(25197)	(32460)	(1932)	(19.278)	(48.536)	(67.708)	(72.613)	(92.826)	(5.880)	
[OtSO₄]⁻	-2257	249270[b]	-25352	-2112	-81080		0.000[b]	71.951	-8.415	-41.000	-23.497	-25.071	298.15 K - 343.15 K
N=103	(706)	(15507)	(27129)	(24222)	(2724)			(47.113)	(2.605)	(82.827)	(72.860)	(8.242)	
[EtSO₄]⁻	17956	-7295	-16491	-30071	-3835	-1944	46.979	-15.799	-50.144	-34.193	-24.566	-6.035	293.15 K - 396.10 K
N=268	(5469)	(8845)	(11221)	(14654)	(14513)	(1282)	(16.651)	(26.742)	(34.104)	(43.786)	(44.111)	(3.860)	
[MeSO₃]⁻	3664	-12428	29122	925	-32773	-2770	0.000[b]	-31.040	97.597	69.861	-106.495	-2.308	298.15 K - 353.15 K
N=324	(318)	(8226)	(6409)	(11758)	(8052)	(714)		(25.502)	(19.858)	(36.185)	(24.872)	(2.244)	
[E₂PO₄]⁻	-2588	3205	-11930	-2608	7707	13020	0.000[b]	13.396	-42.085	78.327	10.359	2.983	312.55 K - 352.55 K
N=121	(585)	(14378)	(13168)	(18129)	(15638)	(1299)		(43.159)	(39.299)	(54.549)	(46.993)	(3.893)	
[FAP]⁻	0[a]	0[a]	968	8530	-7284	-92	4.275	0.000[a]	1.859	8.834	-19.733	-0.882	298.15 K - 368.15 K
N=1933			(3157)	(4567)	(3919)	(325)	(0.568)		(9.318)	(13.501)	(11.566)	(0.973)	
[BETI]⁻	0[a]	8687	-16131	10880	-3956	-224	3.352	27.215	-49.091	19.491	-17.082	-4.484	298.15 K - 362.65 K
N=459		(7734)	(7588)	(9176)	(8790)	(591)	(1.134)	(23.653)	(23.286)	(27.965)	(26.876)	(1.834)	

$$\Delta S_{solv} = -15.792(1.104) + 8.617(1.518)E - 19.252(1.512)S - 30.453(1.647)A - 15.530(1.678)B - 11.749(0.331)L$$

$$N = 772;\ R^2 = 0.743;\ F = 443;\ SD = 6.651\frac{j}{mol\ K}$$

$$\Delta S_{solv} = -11.304(0.977) + 7.391(1.169)E - 5.293(1.162)S - 25.597(1.317)A - 17.439(1.171)B - 12.062(0.296)L$$

$$N = 369;\ R^2 = 0.838;\ F = 375;\ SD = 6.651\frac{j}{mol\ K}$$

The entropy correlation for [MeoeMMorp]+[FAP]- is given in Eqn. 6, and the correlation for [MeoeMMorp]+[Tf₂N]- is given in Eqn. 7. Using the entropy coefficients from Tables 2 and 3, predicted entropy of solvation correlations for each ionic liquids yielded SD = 9.662 J/mol K and 3.849 $\frac{J}{mol\ K}$, AAE (absolute average error) = 9.210 and 7.312, and AE (average error) = 3.651 and 7.312 for each ionic liquid, respectively.

The results obtained from the calculation of entropies of solvation of [FAP]- and [Tf₂N]- demonstrate that both calculations have similar signs for every coefficient. The positive sign indicates that solutes have a low molar refraction value that favors the condensed phase. The negative S value shows that the more polar the molecule, the more it will favor the condensed phase. A favors the condensed phase, in Equation 4 is [FAP]- and [Tf₂ N]- in Equation 5. B also favors the condensed phase. L shows that the larger the solute the more it will be attracted to the condensed phase.

Another finding from these entropies of solvation was that the linear regressions were less than 0.9, which demonstrate that

the values are not exactly accurate but more precise. This lead one to think that in order to improve these results accurate, one has to study other ionic liquids to make better correlations for the Abraham coefficients. The benefit that was experienced with the calculation of coefficients was the fact that it is a prediction, which saved both time and money due to the fact that resources didn't have to be used for this study.

Conclusion

This project aimed at studying as most entropies of solvation as possible and one accomplished to calculate them for two ionic liquids. Although it was a small amount of ionic liquids studied, it is of our interest to make more calculations and make correlations between the factors involved in the study of these mixtures in order to learn more about the interactions that might take place. The fact that the Abraham model is temperature independent gives a promising outlook to the expansion of our chemical database.

Acknowledgments

References

Abraham MH, Ibrahim A, Acree WE Jr. Eur J Med Chem 2008;43:478–485.

Abraham MH, Ibrahim A, Acree WE Jr. Chem Res Toxicol 2005;18:904–911.

Sprunger LM, Gibbs J, Acree WE Jr, Abraham MH. QSAR Comb Sci 2008;27:1130–1139.

Acree, WE Jr. Toxicity and Drug Testing; InTech: Croatia, 2012; pp 101-138.

Sprunger LM, Gibbs J, Proctor A, Acree WE Jr., Abraham MH Ind Eng Chem 2009; 48: 4145-4154.

Mintz C, Acree WE Jr., Abraham MH QSAR Comb Sci 2008; 4: 483-491.

Sprunger LM. Ph.D. Thesis, The University of North Texas, Denton, TX, May 2011.

Abraham MH. Chem Soc Rev 1993;22:73–83.

Abraham MH, Ibrahim A, Acree WE Jr. Chem Res Toxicol 2005;18:904–911.

Sprunger LM, Gibbs J, Acree WE Jr, Abraham MH. QSAR Comb Sci 2008;27:1130–1139.

Abraham MH, Acree WE Jr., Cornetto-Muniz JE J Chem 2009; 33: 2034-2043.

A Study of Mobile Virtual Private Networks in Industry

Katherine Marie Salazar

Mentor: Bo Han, PhD
Department of Marketing;
University of the Incarnate Word

Research Question

How are industries implementing mobile technology with mobile virtual private networks and secure sockets layer to securely access an information space internally and externally?

1. Literature Review

The information technology industry is consistently looking for ways to make sure that information is readily available when needed wherever the user is. By utilizing the right technology and making sure that it is up to date with the highest emphasis on security an information space is less likely to be compromised. As businesses continue to grow and become globalized those that work in different locations need a fast, secure and reliable method to connect to their company's information space. This paper will focus on the utilization and comparison of mobile virtual private networks; secure sockets layer technology and mobile technology within businesses. By exploring the streams of mobile virtual private networks and secure sockets layer by explaining what a mobile VPN and SSL are, different VPNs and SSL types, the security requirements of a MVPN and SSL and the utilization and benefits of mobile VPNs, SSL technology and mobile technology within in businesses.

1.1 An Introduction to VPNs

A virtual private network, or VPN, is the extension of a private network across shared or public networks like the Internet. A VPN operates and enables one to pass data over the Internet or corporate intranet through tunnels, which are secure, encrypted virtual connections. The method of configuring and creating a VPN is known as virtual private networking (Microsoft, 2001). Thus this VPN is an encrypted private network that uses a public network that is usually the Internet to connect remote sites or users together.

A mobile VPN is a network configuration in which mobile devices such as cellular phones, tablets and laptops may access a virtual private network to connect remote offices or individual user securely by creating secure tunnels through which access is controlled and data is encrypted. A mobile VPN is has the same concept as a VPN but instead of having a fixed end point the user's endpoint is consistently changing with network configuration from cellular networks to Wi-Fi access points. Due to having a mobile user the cellular network data and Wi-Fi must have the ability and connection to that is transparent to the mobile user.

The analogy that is frequently used is that each information space or private local area network (LAN) is an island, with the Internet being the ocean and the VPN

being the submarine transportation that is able to get one's information securely to its proper destination and proper end user. Even though the ocean is a beautiful place there are multiple dangers that lie within an ocean such as dangerous fish, high tides, and of course, ice burgs. Today the Internet is a wonderful instrument that can be used for educational purposes. Due to the Internet being a public information space an intelligent human would not want to share sensitive information that one cannot chance being public such as one's credit card information, social security number, or private business records. In order to navigate around this dangerous Internet Ocean one must be well equipped to access their information space island securely; one must have secure transportation such as a secure submarine (VPN) that will be able to navigate through the Internet Ocean without intrusion to their personal information space island. One also has to remember that within the submarine the information, or information space will not be seen while passing through the VPN or Internet Ocean. Only when the VPN submarine has reached the destination can the correct user access the information with the use of encryption.
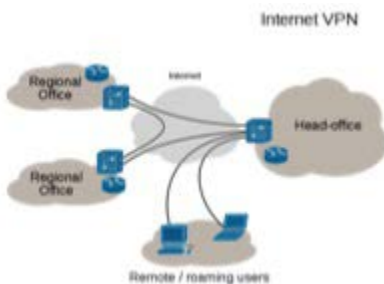
Figure 1: Virtual Private Network

Encryption is the process of encoding data so that only a computer with the right decoder will be able to read and use it

(Tyson & Crawford, 2012). Within a VPN both of the computers at each end of the tunnel encrypt the data entering the tunnel and decrypt it at the other end. However, a VPN requires more than just a pair of keys to in order to apply encryption. In turn to send information from point to point across the Internet the data must be encapsulated, or protected, "with a header that provides routing information allowing it to traverse the shared or public transit internetwork to reach its endpoint" (Microsoft, 2001). Thus this act is basically sending information though private tunnels. The information that can be sent through a shared or private network is called a packet. Packets are basically wrapped information that cannot be accessed without the encryption keys.

1.2 Types of VPNs in the Industry

When businesses are releasing a remote network solution a business needs to facilitate the controlled access to their information space. This solution will include a connection to a local area network, or LAN. A LAN is a computer network that can connect with computers, tablets and phones in a limited area such as a university setting, home, research laboratory or office building using network media (Donahue, 2006). The five basic requirements of a traditional VPN to function correctly are (1): user authentication in order to verify the VPN client's identity and restrict access to authorized users only; (2): address management to assign a VPN client's address on the intranet and ensure that the address is kept private, (3): data encryption to make sure that when the packet is sent off that the information within will be unreadable to unauthorized clients on the network, (4): key management, there must be a solution to generate and refresh encryption keys for the client, and finally (5): server and multiprotocol support to make sure that the solution can handle common protocols that are used in the public network (Microsoft, 2001). Some

ways that a VPN can be utilized are within business are remote access VPN, site-to-site internal connectivity, and business-to-business external connectivity.

A remote access VPN allows individuals users to establish secure connections with the use of a remote computer network (Crawford & Tyson). The users that access the secure resources on a company's network as if they where at their desk at work plugged into the network's servers. A company that would need this type of technology is one that is a large firm with hundreds of sales people out in the world such as consulting that are usually out of the office. Many companies are providing access to a remote VPN due to the privacy and convenience from working at home securely. In geographical areas where inclement weather can affect travel, virtual private networks are a must for companies to be there for their customers. "An end-to-end virtual private network (VPN) session provides complete privacy and data integrity for enterprise users who access the enterprise network from outside the intranet" (Rangaraja & Takkallapalli, 2004). Creating a secure method to remote access ones office's central information on a workday will provide an employee that does not have to risk driving to work in inclement weather and also provide a productive workplace in or out of the office.

There are two components that are required in a remote-access VPN first is a network access server (NAS, which is usually pronounced "nazz" conversationally), and may also be called a media gateway or a remote access server (RAS). A NAS might be a dedicated server, or it could be one of multiple software applications running on a shared server. "A dedicated server is a single computer in a network that is reserved for serving the needs of the network" (Danny, 2013). For example some networks require that one computer be set aside to manage the communications between all the other

computers. Many are familiar with a dedicated server that could be a computer that manages all of the printer resources. The NAS requires that the correct user provide the valid credentials to sign into the VPN. In order to authenticate that user's credentials, the NAS uses either its own standard authentication process or a separate authentication such as RSA or server running on the network. The second required component of remote access VPNs is client software. The employee that wants to use the VPN from their computers must have the required software on the computer in order to connect to the VPN. Today most operating systems have pre-installed software that can connect to remote access VPNs, but some might require users to install a specific application instead (Crawford & Tyson, 2012). The NAS and the software work together to set up the tunneled connection to a NAS in which the user indicated by its Internet address. Many large corporations or businesses with a strong "IT staff typically purchase, deploy, and maintain their own remote access VPNs" Large enterprises to small businesses can also choose to go with a vendor to outsource their remote VPN services though an enterprise service provider (ESP). An ESP sets up a NAS for the business and keeps the NAS up to date and running smooth. A remote access VPN is best utilized for individual employees, but for branch businesses that need to connect to each other a site-to-site VPN is usually the best option.

A site-to-site VPN allows offices in multiple locations to establish secure connections with each other a public network such the Internet. An example of a company that needs a site-to-site VPN is any worldwide corporation that has multiple locations nationwide or world wide such as Tesoro Corporation, Exxon, Starbucks or even universities that have different campus locations that share an information space. With the Tesoro Corporation example

there are multiple refineries that are across the United States including North Dakota, California and Hawaii with corporate headquarters being in San Antonio, Texas. All of these locations across the United States need to have the capability to have communication with each other from site-to-site. Thus a site-to-site VPN would be the best option for all of these multiple locations from the same company to be able to connect.

There are two types of site-to-site VPNs first being Intranet based and extranet based. The site-to-site Intranet based VPN is utilized when a company has one or more remote locations that they wish to join in a single private network, they can create an Intranet VPN to connect each separate local area network (LAN) to a single wide area network (WAN). A wide area network is a, "computer network that spans a relatively large geographical area. Typically a WAN consists of two or more local area networks (LANs) … the largest WAN in existence is the Internet" (Danny, 2013). Thus a VPN establishes tunnels between servers in a site-to-site VPN and between clients and servers in a client-to site VPN. VPNs offer businesses a secure way to provide access to remote users from home, out of the office or even out of the country at with a small price tag due to the extended connectivity. VPNs are less costly than conventional wide area networks, which require lots of instillation costs that can rack up quickly on an expense report.

The second type of site-to-site VPN is extranet-based thus being an external connectivity and being a business-to-business VPN. A business-to-business VPN is utilized when a company has a close relationship with another company. Expanding on the previous example with Tesoro Corporation, suppose they are implementing a new cloud-based software as a service (SaaS) customer relationship management system with vendor SAP a

shared connection is very beneficial within the ramping up process for seamlessness. A SaaS is, "A software delivery method that provides access to software and its functions remotely as a Web-based service. Software as a Service allows organizations to access business functionality at a cost typically less than paying for licensed applications since SaaS pricing is [typically] based on a monthly fee. Also, because the software is hosted remotely users do not need to invest in additional hardware" (Danny, 2013). Many vendors have different conditions within implementing new software. A condition that SAP holds is that it will have access to a company's information space during the ramping up process in order to help the customer, Tesoro Corporation, with any problems that may occur during implementation. Thus it is necessary for business when doing work with other business to have an extranet VPN that allows companies to collaborate together in a secure, shared network environment while preventing access to their separate Intranets. Even though the purpose of a site-to-site VPN is different from that of a remote-access VPN they both use some of the same software and equipment.

The utilization of VPNs within businesses that include remote access VPN, site-to-site VPN and business-to-business VPN are all very beneficial to a growing global business by creating different ways of accessing information throughout the word. There are many other reasons why we have VPNs such as first monetary cost savings leading to being environmentally friendly, second security, and third globalization.

1.3 Mobile VPNs
The evolution of mobile connectivity has evolved from access to network resources via a laptop to using a smartphone or tablet. The need for mobile connectivity stems from users working on the go in larger numbers. Mobile apps like Cisco Mobile VPN as well as various vendors "offers

continuous secure mobility experiences to users on the move" (Cisco). This network configuration technology makes it possible for professionals to extend their network resources and software applications beyond the boundaries of a cubical work environment. According to Cisco's White Paper titled, Cisco Mobile VPN, Enabling Cisco End-Device based IP Mobility:

> The Cisco IOS IP Mobility solution that enables seamless and secure mobility for an end-device, such as a laptop, tablet or personal computer. The solution allows a user to leverage various wireless and wired connections (WiFi, cellular data wireless, Ethernet, etc.) to remote access an organizational intranet anywhere, anytime in a secure and seamless manner. The solution offers its secure and seamless mobility by combining both the Cisco VPN technology and the Cisco IOS IP Mobility technology.

Mobile VPN capability further extends the reach of a corporation having a global presence in the free world markets. No longer does a marketing professional have to wait until they can get to a laptop or a workstation at home before accessing important resources on the company's network. This is now available to them on a smartphone or tablet.

Mobile VPN apps are available on several platforms like Android, IOS and Windows. A typical set-up consists of establishing a connection to a VPN server and providing the necessary credentials such as a Host name, and identifying the VPN type. Authentication settings such as IPSec and user IDs and passwords are also essential to establishing a secure connection and maintaining the integrity of the connection. Riaz, Ahamed & Rajamohan, 2011, discuss the need for mobile VPNs and how mobile professionals who need reliable connections are adopting them. Mobile VPNs allow

users to roam seamlessly according to Ahamed and Rajamohan in their study titled: Comprehensive Performance Analysis and Special Issues of Virtual Private Network Strategies in the Computer Communication: A Novel Study. They describe how a conventional VPN cannot preserve a secure VPN connection while traveling in and out of wireless coverage:

> A conventional VPN cannot survive such events because the network tunnel is disrupted, causing applications to disconnect, time out, or fail, or even cause the computing device itself to crash. Instead of logically tying the end point of the network tunnel to the physical IP address, each tunnel is bound to a permanently associated IP address at the device. The mobile VPN software handles the necessary network authentication and maintains the network sessions in a manner transparent to the application and the user.

VPN technology can leverage wireless and wired connections which offer users a multitude of options to access their resources. Access to intranets can be made readily available with the right configurations.

PCWorld writer, Tony Bradley suggests replacing your laptop for an iPad. He explains, "Next to a laptop, it's smaller and lighter, it has longer battery life, and it offers a more functional interface for staying productive on the go." This can present problems or challenges for certain industries. The Government in particular has extremely stringent rules for what devices can connect to their networks. One of the most important functions of a mobile device is e-mail according to Bradley. The Government requires all e-mails to be encrypted before they're sent out. Users trying to simply forward their office

e-mail will be unsuccessful. Additionally, the restrictions of devices connecting to Government networks will make it impossible to sync iPads with Government computers and its services.

1.4 Benefits of VPNs

There are many benefits to VPNs including the convenience within a growing global business. Due to globalization including worldwide corporate growth, being environmentally friendly, security and mobile capabilities VPNs are a growing trend within employees' options of working. VPNs offer increased security, flexibility, and the proliferation of mobile devices as a whole. In "Digging Secure Tunnels," it suggests that the VPN market will grow tremendously, "double digit" within two years. The Virtual Private Network has become more popular due to the consumers and employees having to be mobile constantly due to globalization.

The first benefit of a VPN is that it can save the business money by eliminating the need for expensive long-distance leased lines. Virtual Private Networks provide an economical yet secure way to connect sites together and to provide network access to remote users. Before the implementation of VPNs there where leased lines to rent such as T1 lines, "to achieve full, secured connectivity between their office locations" (Mitchell, 2012). The T1 standard for data communication was developed by AT&T in the 1960's, a T1 line can carry 24 digitalized voice channels, or it can carry data at a rate of 1.544 megabits per second if utilized for voice. The cost for a T1 line typically costs $1,000 US dollars or more per month (Mitchell, 2011). With a VPN a company can use the public network infrastructure including the Internet to make these connections that go through the virtual network that is much more cost efficient than local leased lines or even just broadband connections to a local

internet service provider. Thus the cost of communications is already within a company's Internet bill with VPNs instead of leasing multiple lines that cost a grand or more per line with leased lines.

The second benefit of a VPN is that it is environmentally friendly. With businesses everywhere going green, Thurman a small business owner, is doing the same with his growing business. Thurman wants to be able to decreases the size of the business's data center to decrease their footprint by 60%. The way that they will decrease the size of their data center are by using Saas or software as a service, a public cloud environment: Amazon Cloud, a hybrid cloud: VPN, and a private cloud with their own environment. Thurman is "uncomfortable with the idea that much of our data center infrastructure will be accessible from anywhere on the Internet" (Thurman, 2012). With the data being available this means that when doing international business the business can thrive globally due to access of information, but this also means that this gives more access to hackers as well. Thurman has thus implemented five security requirements to access the cloud services within the business (Thurman, 2012).

The third benefit of a VPN helps make an information space more secure by implementing the process of encryption by encoding data so that only a computer and user with the right decoder will be able to read and use it.

The fourth benefit of a VPN creates an advantage by creating mobility within a global workplace possible. Virtual Private Networks provide attractive solutions that promote globalization because information can be accessed anywhere in the world with an Internet connection. VPN technology is designed to address the current business trends leaning towards telecommuting and globalization within international companies. International companies need

be able to connect to their central resources in order to be in constant communication.

1.6 Secure Sockets Layer Technology
Secure sockets layer, SSL is a commonly used protocol or managing the security of a message transmission on the Internet (Rouse, 2007). SSL has recently been succeeded by transport layer security, TLS that is based on SSL technology. "SSL uses a program layer that is located between the Internet's Hypertext Transfer Protocol (HTTP) and Transport Control Protocol (TCP) layers (Rouse, 2007). SSL is commonly used during sensitive online data transfers such as social security number entry, credit card number entry or other personal information.

One will be able to tell when they are using SSL within their browser by noticing that the "http" in the address line will be replaced with "https" with a green padlock indicating that the web page is secure (Tyson). When a browser requests the secure page and with "https" within the address bar the browser sends out the certificate checking three aspects according to Tyson:

1) That the certificate is from a trusted party, 2) that the certificate is currently valid, and 3) that the certificate has a relationship with the site from which it is coming. The browser then uses the public key to encrypt a randomly selected symmetric key. Public key encryption takes a large amount of computing, so most systems use a combination of public-key and symmetric key encryption. When two computers initiate a secure session, one computer creates a symmetric key and sends it to the other computer using public-key encryption. The two computers can then communicate using symmetric-key encryption. Once the session is finished, each computer discards the symmetric key used for that session. Any additional sessions require that a new symmetric key be created,

and the process is repeated.

Just as there is mobile VPN technology, there is SSL VPN technology. An SSLVPN is a, "Form of VPN that can be used within a standard web browser" (Rouse, 2009). Also unlike most traditional VPNs, SSL VPN does not require the pre-installation of specialized client software on the user's computer. There are two different main types of SSL VPNs that offers users secure options and is then presented with a Web page that acts as the portal to the other services when browsing the web, the SSL portal VPN and the SSL tunnel VPN. The first option is the SSL portal VPN that is a portal, or single web page. The user may the SSL VPN gateway using any web browser, then identifies themself to the gateway using an authentication method supported by the gateway and is then presented with a web page that serves as the portal to the other services (Rouse, 2009). The second option is the SSL tunnel VPN; this type of VPN alloys a web browser to securely access multiple network services that include applications that are not through the Internet. The SSL tunnel VPN runs through a tunnel that is running under SSL. Popular examples of SSL tunnel VPN include TunnelBear VPN and Cisco system's SSL VPN.

With technology changing everyday businesses must keep up with current trends in order to serve their customer. The VPN introduction, explanation of the types of VPNs and secure sockets layer technology are just some aspects of mobile technology. This research will present the utilization and comparison of mobile VPNs and secure sockets layer technology within businesses in order to gain insight of current and growing trends with mobile technology through capabilities mapping and case study.

2. Methodology
In order to gain an understanding of the technologies of SSL MPN and mobile VPN the researcher will compose a capabilities

mapping of both technologies. This comparison data will be composed from technology white papers as well as articles that discuss these security mobile technologies.

Assessments and capability mapping can be done and researched so much until a decision must be made for implementation. After gaining insight on two popular mobile security solutions, a case study was conducted to thus gain insight on how industry practitioner where using these types of mobile security solutions.

The case study will be conducted on an industry practitioner that is involved within information technology for their company or business. During the interview the practitioner's identity will remain anonymous in order to protect company practices. The practitioner that agrees to the interview will not be obligated to answer all the questions asked during the interview. The interview questions will cover VPN, mobile VPN, SSL, transport layer security; TLS, security practices, mobile strategies, bring your own device programs, future mobile strategy and security architecture. The interview questions are as follows:

1. What virtual private network are you using within your workplace?
2. If your company does use a virtual private network, what are the advantages of this mechanism?
3. What mobile virtual private network are you using within your workplace?
4. If your company does use a mobile virtual private network, what are the advantages of this mechanism?
5. Does your company utilize a secure socket layer?
6. If your company does use secure socket layer, what are the advantages of this mechanism?
7. Does your company transport layer security?
8. If your company does use transport layer security, what are the advantages of this mechanism?
9. What security measures are you using to defend the current systems within your company?
10. What mobile strategies are you using?
11. Do you plan to implement any bring your own device initiative in the future?
12. If you do not plan to implement bring your own device, why is that?
13. What mobile strategies is your company planning for within the future?
14. What is your current security architecture?
15. Do you plan to change your current security architecture to mold with future technology trends within industry?

After an interview has been conducted the researcher will pull the information from the interview and use the case study to provide information that is relevant to secure mobile technology solutions.

Table one: VPN Capabilities Mapping

Advantage = ✔ Disadvantage = ✖	Secure sockets layer VPN	Mobile VPN
Policy support at application level	✔	
Low total cost of ownership	✔	✔
Application session persistency	✔	✔
Designed to handle wireless challenges		✔
Support network layer policies	✔	✔
Wireless friendly	✔	✔
Windows support	✔	✔
Linux support	✔	✔
Mac OS	✔	✔
iOS	✔	✔
Windows mobile	Browser only	Browser only
Pocket PC	Browser only	Browser only
Palm OS	Browser only	Browser only
Symbian	Browser only	Browser only
Provides access to internal users	✔	✔
Provides access to external users	✔	✔
Supports application access on campus	✔	✔
Support application access outside campus	✔	✔
Application can resume where left off	✔	✔
Network audit control	✔	✔
May drop connection while switching networks	✖	✖
Have to log in after application suspension	✖	N/A
Slow protocols, slow user experience	✖ (TCP)	N/A
Efficient use of protocols	✔	✔ (UDP)
Performance decline with increase in users	✖	N/A
Performance improves with increase in users		✔
Clientless versions cannot support full compatibility	✖	✖
Requires additional configuration to support more applications	✖	✖
Software must be installed on each device	N/A	✖
Separate connectivity	✖	✖

The primary vendor within this case study was Cisco providing the Cisco SSL VPN for the company's virtual private network use. The advantages of the SSL VPN provided collaboration within this large community based company. SSL VPN allowed employees that were on the road, sick or not in office to remote in from their location to be virtually present at meetings, which was a huge advantage for the banking company.

The security measures within this company are based on a large amount of firewalls. The serves have many firewalls at the front lines due to the sensitive information within the servers. The disaster recovery plan within the company is having multiple geographic sites where sensitive information is held in order to have the company running and their business running as usual in a timely manner.

Mobile VPN technology was also in place at this company. Many users utilize the on-site company Wi-Fi, and when away from hot spots in the building may seamlessly switch over to their mobile device's LTE, 3G or other mobile network. This mobile VPN technology was implemented from the employees' own personal device, or bring your own device, BYOD.

The BYOD program was introduced in 2012 for this company and went though surveys from employees before the program was implemented. In 2013 the BYOD program was implemented, the application that this company used was a GOOD container, a protected application though secure sockets layer technology held all the documents that the employee needed. The GOOD container consists of work calendar, e-mail and contacts that employees can access with their primary credentials though single sign-on. All of the information within the GOOD container is kept secure by the protected application technology. The protected application technology allows the user to not have to leave the application to conduct business, thus all of the information is held securely within the application. The employee chose if they wanted to bring their own device, or use a company mobile device. If the employee chose to use their personal mobile device they would have the same phone number as they did for their personal contacts as well as work contacts. The practitioner that was interviewed opted out of the BYOD program due to their cellular network not always having service within the building and wanted to remain reliable on phone calls and business related issues. Thus the practitioner interviewed had two mobile devices: one for work and one for personal use and were able to have two separate numbers for work and personal use.

The new mobile strategies that the company is planning for the future consist of new mobile application for customers' tablet and mobile device in order to server them better. This company is constantly looking to new secure technology to better serve their customers through internal and external use of secure mobile technology.

3. Discussions

Both the mobile VPN and SSL VPN have advantages and disadvantages. The main advantages for both are the remote capability function that allows a mobile user to be connected outside of the office and session persistency. The SSL VPN used in the case study increased collaboration throughout the company and allowed employees to be at work even when they where not physically there. The mobile VPN network configuration allowing seamless network connectivity was also in place with the case study to bounce across networks.

Being in the banking industry there is lots of sensitive information that must be shared internally, but cannot be seen by non-intended eyes. Within the case study there was a heavy security implementation for the banking company. The security measures that the company took to defend the current systems were firewalls. Even when disaster stuck this company made sure that their information would be secure and up with an extensive disaster recovery plan that was spread out across different geographical areas to ensure a timely up time.

As mobile technology gets better and the number of user devices that the average consumer owns increases correlates a higher demand for BYOD. BYOD is a fairly new implementation with employees using their own personal devices: personal computer, mobile device or tablet to be used on the company network to conduct business as usual. Having a personal device on a company Intranet can be disruptive if the right measures have not been placed. This case study's company had just implemented BYOD this year, 2013 and did not have many issues with it. The

BYOD implementation also took a year for this banking company with the BYOD that stared last year. By having SSL VPN and mobile VPN this company was able to successfully ramp up their BYOD program securely.

The BYOD program brought forth a new application, the GOOD container. By having an application that was a protected application the employees had another layer of security. The container method is ideal within this case study due to the sensitive information on the networks and that even if the employee had security issues on their personal device the GOOD container would not be effective due to the protected application technology.

3.1 Limitations
The time frame within this study was very limited, thus time was a limitation in that the researcher was only able to interview one company. The research was only focused on mobile security VPN technology; the best technology might not be mobile security VPN technology but this was the limited scope on this research project.

3.2 Future Research
Emerging mobile technologies that where not discussed within this research paper.

With technology being an growing area, new technology is introduced each day from an all-electric car to new ways to simplify one's personal and work life with augmented reality The line between work and personal use can be blurred, due to a user having access to work email and calendar at all times thus, the employee will usually be responsible for work emails sent after hours.

Protected applications: having applications with their on security on top of security network configurations and VPN would be ideal within any company that needs to protect their assets. Looking into protected mobile applications would be an addition onto mobile security capabilities for future research.

Records management: if an employee was terminated or mobile device was lost the methods to make sure that the device was either completely wiped or a containment wipe for security purposes. The documentation of records management involving download, offline, screenshot and sharing capabilities are also apart of records management. With BYOD practices being utilized within the workplace there must be a documentation of the capabilities that the user has and uses.

References

Andrés, S. (2010). How to Stay Safe on Public Wi-Fi. PC World, 28(7), 94-96.

Bradley, T. (2011). Make the iPad Your Only Mobile PC. PC World, 29(5), 30.

Cisco. (2013). Retrieved from web: http://www.cisco.com/en/US/products/ps6744/products_ios_protocol_group_home.html

Cisco. (2013). Retrieved from web: http://www.cisco.com/en/US/prod/collateral/iosswrel/ps6537/ps6551/ps6744/prod_white_paper0900aecd803a837c.html

Crawford, S., & Tyson, J. (2012). *How vpns work*. Retrieved from http://computer.howstuffworks.com/vpn1.htm

Danny, H. (2013.). Retrieved from http://www.webopedia.com/TERM/D/dedicated_server.html

Digging Secure Tunnels – Why SSL Is a Growth Market (2010). *Black Book - The Art of Cyber War - Asymmetric Payoffs Lead to More Spending on Protection*, (43-53) Retrieved from Business Source Complete.

Jamil, D., & Zaki, H. (2011). Cloud Computing Security. *International Journal Of Engineering Science & Technology*, 3(4), 3478-3483. Retrieved from Business Source Complete.

Johnson, T., & Sheth, H. (2006). *Face-off is a mobile vpn a better choice than an ssl vpn?* . Networkworld. Retrieved from http://www.networkworld.com/columnists/2006/112706-mobile-ssl-vpn-yes.html

Ludovic. (Photographer). (2010, April 22). Virtual Private Network site to site and from roaming users [Print Photo]. Retrieved from https://upload.wikimedia.org/wikipedia/commons/0/00/Virtual_Private_Network_overview.svg

Meddeb, A. (2010). Building cost effective lower layer VPNs: The ILEC/CLEC dilemma *International Journal Of Communication Systems*, 23(11), 1405-1430. doi:10.1002/dac.1114.

Microsoft. *Virtual Private Networking: An Overview*. 2001. Retrieved from web.

Rangaraja, S., Takkallapalli, A., & Miller, S. (2004). Adaptive vpn: Tradeoff between security levels and value-added services in virtual private networks. *Bell Labs Technical Journal*, 93-113. Retrieved from Business Source Complete.

Riaz Ahamed, S. S., & Rajamohan, P. P. (2011). Comprehensive Performance Analysis and Special Issues of Virtual Private Network Strategies in the Computer Communication: A Novel Study. *International Journal Of Engineering Science & Technology*, 3(7), 6040-6048. Retrieved from Business Source Complete.

Richard , W., & Bryan , H. (2012). Look, up in the sky! it's a bird…it's a plane…it's a cloud!. *Journal of Financial Service Professionals*, 36-38. Retrieved from Business Source Complete.

RSA, . *RSA Authenication Manager*. (2013) Photograph. http://www.emc.com/security/rsa-securid/rsa-authentication-manager.htmWeb. 9 Apr 2013.

Thurman, M. (2012). A data center in the cloud. *Computerworld*, 46-49. Retrieved from Business Source Complete

The Aging Out Phenomena In Criminology: Is It Still Applicable Today?

Christopher Trevino

Mentor: Armando Abney, PhD
Department of Sociology; St. Mary's University

Abstract

In this study, I will be examining different age groups and how they contribute to the number of Part I offenses, which includes violent and property crimes that are committed each year in the United States. The main focus of this research will focus on long term trends in Part I offenses for age group 50 and above. By analyzing data over the years (1995-2011), we will see if the aging out phenomena still applies to today. The aging out phenomena in crime is a theory that supports as people begin to age, they stop committing crimes due to various reasons. The proportion of Part I arrests and crime rate per 100,000 population will be analyzed to help explain if the aging out phenomena still applies or not. The data will be gathered using the annual publication, Crime in the United States, which is published each year as the FBI Uniform Crime Report published. Based on the present research, as the by number of arrests does decline with each successive age group. However, in recent years, there has been an increase in the number of arrests for the age group 50 and over. Several factors may explain why we are seeing this trend.

Introduction

Crimes are committed every day by a variety of different types of people. Some are minor ones which are not really noticed by the community. Serious crimes are the ones that are seen on television and in the newspaper. These are known as Part I offenses which include violent and property crimes. However, every type of crime is a problem in society which can leave a major negative impact on many people's lives. There are many different types of crimes that people are arrested for. These can include murder, forcible rape, robbery, aggravated assault, larceny-theft, arson, motor vehicle theft, forgery, illegal possession of weapons, and driving under the influence. Each crime has a different story to it, and we can learn from it once it has been solved. From the use of data we can see the trends of the different types of people that are being arrested for these crimes each year. When analyzing the different trends in crime, law enforcement may be able to create specific programs to decrease the number of crime committed by people.

The idea in many people's minds is that younger members of society, 18-24 year olds, are committing the majority of the aforementioned crimes in the United States. Usually the data in arrests have showed that there has always been a peak in arrests for people that are in their early twenties. In relation to this data, the number of arrests in the United States rapidly decline as age starts to increase (Chambliss & Hass, 2012). In the present paper, we will analyze data to test the aging out phenomena in crime. The "aging out" phenomena suggest that

as people begin to age, they are less likely to commit crime. This is due to: remorse for their crimes, maturity that comes along with long term aging, increased responsibilities, the risk of getting arresting again, skill at not getting caught by law enforcement, and incarceration (Chambliss & Hass, 2012). Is the aging out phenomena still occurring today? With the large baby boomer population, reaching their 50s and 60s, are more people in this age range could be arrested for crimes which contributes to the aging out phenomena to not apply today? Is this over 50 group being arrested more so than in the past? Which sorts of crimes are being committed by this older population?

Literature Review

In the book Criminology: Connecting Theory, Research & Practice, Chambliss & Hass (2012) gives an overview of neurophysiology and its basis on the cause of crime. Aggression is one of the main casual factors that lead to crime. The roots of aggression can be looked at through the physical appearance of an individual. This is called criminal anthropology which is the relationship between physical features and criminal behavior which was drawn up by Joseph Gall cited in (Chambliss & Hass, 2012). Other criminologists would claim that the mesomorph, who is muscular and athletic, has the most aggression. Males are more likely to commit crimes and this can be explained by high levels of testosterone in them. Another theory on why crimes happen is the brain activity of an individual. The neurotransmitters in the brain are chemical compounds that produce emotions and mood changes in an individual. Past research have looked at the impairment in the regions of the brain which is responsible for self-control and reasoning which can contribute to aggressive behavior that turns into crime (Chambliss & Hass 2012). Can these neurotransmitters change

as a person ages? Is this why older people are unlikely to be involved in a criminal life? It also gives a correlation of how age and crime go hand and hand. It states that as age increases, criminal behavior decreases due to the number of arrests that are reported in the Uniform Crime Reports (UCR). Crimes are usually committed by people who are in their early adulthood which is around the age of 18 through 24. This is supported by the peak in the XY graphs which plots the variables of age and arrests. Regardless of the race, region, gender, economic status, political status, or any other social variables in the pool of community citizens, the spike in arrests have always been in this age group. Research conducted by Robert Agnew, a criminologist, is summarized by Chambliss & Hass (2012). Agnew hypothesized why this trend in crime exists for the younger age group. Some of the factors he mentions are younger people are more involved in committing crimes; the self-urge of the young age group to fit in with their community and lust for peer approval, an emphasis of economic necessities in adolescence, a diminishing of adults watching their every move, the lust for self-independence, and the ability to solve problems through crime (Chambliss & Hass 2012). Studies suggest that with the less crime committed in people age is a part of the natural life cycle. The life cycle explanation suggests that people start to mature as the as they reach a certain age they take on more responsibilities such as work or having a family. With the responsibility that comes along with the aging process, they start to come to terms with prosocial principles which make it harder for them to commit a crime. Also they take a chance in losing their social status. As people are more a part of the normal life cycle such as being hired for a full time job, getting married, and having kids, then it is even harder for them to become involved with the lifestyle of crime. There have been some

exceptions to this theory though, but it is highly unlikely that an individual with a spouse and children will commit a crime (Chambliss & Hass, 2012).

In the book, Introduction to Criminology: Theories, Methods, and Criminal Behavior Hagan (2013) suggests that most people that are convicted of crimes are young. The peak arrest age for property crime is 16, and the peak arrest age for violent crimes is 18. Arrests declines as age increases. The reason why most of the Part I arrests are in the young age group is because they commit the vast majority of property crimes. However, most juveniles who are arrested do not become adult criminals. (Hagan, 2013)

In the landmark book Theoretical Criminology Vold, Bernard, & Snipes (2002), devote a chapter to crime and age. There have been theories that posit the influence of age on criminal behavior. Developmental theory describes crime in the course of a life which ranges from childhood, teenage years, young adulthood, adulthood, and then old age. Some factors explain how criminal behavior in an individual starts in childhood. There have been criminologists who have stated that developmental theories can contribute nothing to the study of criminals. There have always been arguments about the relationship of age and crime. (Vold, Bernard, & Snipes, 2002). Vold, Bernard, & Snipes (2002) provide data that shows the difference between a criminal career and a career criminal. A criminal career suggests a person who participates in crime for a span of time and then ceases his or her criminal activity. A career criminal can be described as an individual who commits crime frequently for a long period of time. Most convicted criminals have a criminal career admitting to a review of over a span of time. There is a peak in crime rates in the early twenties and as they get older, the trend starts decreasing. There

has been much research dedicated to this suggests that the career criminal should be in jail longer so the number of crimes can decrease (Vold, Bernard, & Snipes, 2002). Two criminal researchers, Michael Gottfredson and Travis Hirschi (1987), have explained their point of view on this subject and stated that age matures people so they out of the criminal lifestyle. This means that the decline of arrests of older people is due to the declining frequency of the criminals rather than the number of active criminals. Criminologists study career criminals more that studying the patterns of crimes committed by each criminal over a period of is preferable to studying crime rates. There has also been a debate between criminal propensity and criminal career. Gottfredson and Hirschi support the criminal inclination position cited in (Goode, 2008). They see that some individuals are more likely to commit crime than others. However, all individuals' ability to commit crime is somewhat stable over their life cycle beginning at the age of around eight. The research on the study of criminal propensity and criminal career is inconclusive. Simons (1998) cited in (Vold, Bernard, and Snipes, 2002) tested to see what causes a criminal career. His research was on youths who engage in antisocial behavior in their late childhood. These youths tend to have poor poverty and troublesome friends in schooling. This can potentially lead them into a life of crime. Eric Monkkonmen (1999) cited in (Vold, Bernard, and Snipes, 2002) challenges Gottfredson and Hirschi's view of the balanced relationship between age and crime. He researched age-specific violent crimes in New York between the years of 1972-1974 and 1976 -1995. In the years of 1972-1974, he found that the violent crimes spiked between the ages of 20 to 30, while between the years of 1976-1995 there was a peak of crimes in the early twenties. It concludes that individuals are committing crimes at a much younger age and that the

age distribution today is a new phenomenon. Another study was conducted by Robert O'Brien (1999) cited in (Vold, Bernard, and Snipes, 2002) in which he studied each age with the number of homicides. He did his testing between the years of 1960-1995. He found that in the 1990s youths 14 through 17 were more likely to participate in homicidal crime than youths in the 1960s and 1970s. He also found that individuals 25 years and older in the 1990s were less likely to engage to homicidal crime than the individuals in the same age group in the 1960s and 1970s. He hypothesized that the high number of births at the time and the high percentages of births to single mothers resulted in high rates of violence in youth. This research supports Gottfredson and Hirschi's theory that when criminal behavior begins at an early age, the crime committing behavior continues well into adulthood.

Developmental criminology theory is a new theory in the crime debate. It suggests that crimes should be treated as social events in an individual's lifetime. There are two types of developmental theories. First, there is Thornberry's Interactional Theory (1987) cited in (Vold, Bernard, & Snipes, 2002) which combines both control and social learning theories. He combines them to see how they affect each other over time as he believes that the majority of the causes to criminal behavior in youth will change as an individual grows older. Thornberry organizes his theory in six concepts from the control and social learning theory which can lead youth into crime. These concepts include attachment to parents, commitment to school, belief in conventional values, association with other young people, adoption of youth values, and the involvement of youth behavior. The attachment to parents is a major component in a young childhood. With more attachment to a parent, a youth will less likely be involved in crime. As they grow older and start becoming more active

in society and school, their commitment to school, for instance, is a buffer against crime. Once they get older, the factors of getting married and having children can lead to a person to be less involved in crime. Based on his research, Thornberry found that the attachment had little effect with one's criminal life. The strongest factor was the individual's social life and who they were associating with. (Vold, Bernard, & Snipes, 2002). If they were friends with delinquents, they were more likely to be involved in crime. Once they start maturing and gain responsibilities such as school and work, they begin to turn away from their peers that are involved with crime and start living life crime free. This is supported by the trend in which young adults are more likely to commit crime than any other age group (Piquero, Farrington, and Blumstein, 2007).

Another type of developmental theory is the Sampson and Laub's (2003) Age-Graded theory cited in (Vold, Bernard, & Snipes, 2002) of informal social control. Their study included 500 delinquents and 500 non-delinquents with the same background information. They believed that the family background in an individual was a major cause of them becoming criminals. Some of these factors included low family income, being raised by a single mother, foreign born parents, and parents who are criminals. This will lead juveniles to not doing well in school and push them into hanging out with the wrong crowd of people. During adolescence, it can influence an individual to become a criminal or not. If the individual gets involved with crime, there are many ways that Sampson and Laub explain how they can change their lives and slowly stop their desire of committing crimes (Goode, 2002). As they grow older, they are more likely to be involved in crime. However, marriage can make a criminal change their lifestyle as they began spending more time with their spouse rather than their criminal

friends. What this research was trying to explain was that several theories are needed to explain the relationship between crime and age. There isn't just one theory that can explain the aging out phenomena and why younger people are more involved in crime (Goode, 2008). The future of criminology looks to combine these theories which may lead to a better conclusion on how age and crime work.

The lifestyle model proposes that the start of an individual's crime life begins with their early childhood and their interactions with society. The first phase is called initiation and this may be the only step in some people's crime life. People may get involved with crime because they feel like it gives them a great sense of power and freedom. As they become more familiar with certain types of crimes and how to do it, criminals will go into a second phase which is transition. Individuals may be in their early adulthood in this stage. They start becoming more committed to the criminal lifestyle, but they may stop due to their commitments such as marriage or a job. As criminals start making their way into phase three, maintenance, they start becoming more fully committed to being criminals. Most people will not drop the lifestyle once they've reached this phase. Some may have to due to being arrested for a long period of time or being incarcerated. Criminals in this phase will comment that they feel stuck with the lifestyle because they've become so used to it. It is how they live their lives and they are accustomed to the criminal life. However, the last stage can be described and a burnout and maturity. They burnout is due to the decreased pleasure of committing crime, and the loss of physical strength and stamina. Maturity refers to the criminals looking at their lifestyles and realizing that they should grow out of it. Criminals in this phase will look at their lives and live in fear of being incarcerated. They start fearing death and

would likely not want to die in prison. This phase will most likely happen at the ages of 40 and 50. Almost all will stop committing crime which is supported by the trend of arrests decreasing as age grows. Few will still engage in crime, but it is highly unlikely (Walters, 2012). This life cycle is described as the aging out phenomena; people fade away from crime as they age.

One article by Feldmeyer &Steffensmeier (2007), focuses on the trend in the arrests of the elderly throughout several decades. It includes data from 1980-2004 in which they include Part I and Part II arrsts. Part II includes violent and property crimes which are more serious. Part II includes other crimes such as public intoxication and curfew. The data shows that there isn't much of a change in elderly (55 and older) arrests rates. The only arrests for this group that were increasing were for simple assault and drug violations. There is a drop throughout the years in homicide, larceny theft, drunkenness, DUI, gambling, and disorderly conduct. Involving all types of crime, there has been a drop from 1980 to 2004 in the 55 and older crime rate. Property crimes such as burglary, larceny theft, motor vehicle theft, and arson were reduced by 30% from 1980 to 2004. The biggest reduction in arrests was for larceny theft. However, for violent crimes which include murder, rape, robbery, and aggravated assault arrest trends stayed consisten. Based on the data, we can see that the aging out phenomena was in full effect in 2004 (Feldmeyer & Steffensmeier, 2007).

In conclusion from previous research on the study of aging out and crime, one can see that there are many factors that account for this phenomena for data. Based on past studies, youth and young adults continue to make up a large proportion of those arrested for index crimes. However, as the so called baby boomer generation has aged have the number of arrests for index crimes for those

50 and over remained consistent? Has the proportion of index crimes committed by this population increased, decreased, or stayed the same in recent years.

Hypotheses
The hypotheses for this study are as follows:

Hypothesis 1:
The majority of arrests for violent and property crimes are for individuals who are between the ages of 18-24.

Hypothesis 2:
The age group 50 and over will have fewer Part I arrests than the age group under 30.

Hypothesis 3:
In the last 16 years of data collected from 1995 to 2011 we will see that the age group 50 and over will have increasingly more arrests, which will be determined by their percent distribution for arrests and the crime rate per 100,000, for both violent and property crimes.

Rationale:
The baby boom generation is the major factor which can influence the data and an exception to the aging out phenomena to crime. We predict that different types of crimes are being committed by the 50 and older population and this will help explain why the aging out phenomena may not apply today.

Methodology & Procedure
As far back as 1930, the Federal Bureau Investigation has been collecting data through their Uniform Crime Reporting Program (UCR). The UCR program collects their data from law enforcement agencies which report the number of arrest they have made. The UCR is mainly used by law enforcement agencies and researchers in the fields of criminal justice and criminology. The program has an annual publication, entitled "Crime in the United States,"

and it contains numerous tables which show the race, sex and age distribution of persons arrested for various crimes. In one particular table, it contains arrest data that separates each age and the offense each age committed. The UCR tallies every arrest for each separate instance in which a person is arrested for an offense. The program collects arrest data on 28 different offenses. The UCR does not show the individual number of people that have been arrested, but reflects aggregate data on persons arrested in the United States. Each year the FBI reports on the number of local law enforcement agencies that recorded arrest data. Population estimates for all reporting areas in the United States are also noted. In the arrest table by age, we can examine these to see if there are any specific trends related to the age of persons arrested (U.S. Department of Justice Federal Bureau Investigation, 2011).

One of the trends I will be examining includes the number of arrests by different age groups in each particular year. We will be getting the arrest data for each of the age group which starts at 1995 and ends in 2011. The data will be retrieved from the publication of the *Crime in the United States*. The data will allow an analysis of trends in the arrests for different age groups throughout the years. I will also be looking at the different types of Part I crimes that people have been arrested for and how they correlate with different age groups. The Part I offense category is separated into two categories which each having four offenses. Part I offenses include violent crime which includes murder, aggravated assault, forcible rape, and robbery. Part II offenses include property crime which includes larceny theft, motor vehicle theft, arson, and burglary. I will be extracting data on particular age groups, and their arrests for Part I offenses. The main age group I will be examining the most is the 50 and above age group and see if the number of arrests have

changed over time. This will determine if the aging out phenomena still applies to today. A variable I will be looking at is the percent distribution of all arrests or the proportion of all arrests for the 50 and above age group in each year. I will be comparing the 50 and above age group's percent distribution of all arrests to the 18-24 age group. Even though the percent distribution can inform us of how the arrests are being distributed, the crime rate per 100,000 in each year must be calculated for the 50 and above age group. The formula, number of arrests divided total population times 100,000, will give us a clear understanding on how much the 50 and over age group is being arrested as each year passes. I will calculate the crime rate per 100,000 for total violent crime, total property crime, aggravated assault, and larceny theft. The two different offenses were picked, because aggravated assault is the most frequent for violent crimes and larceny theft is the most frequent for property crime. I will also calculate the crime rate per 100,000 for the age group of 18-24 in the years of 1999, 2003, and 2011. The years are the beginning, middle and end of this study's time span. Each year is not calculated because our main focus is the age group of 50 and over. The crime rate per 100,000 of 18-24 age group will be used to see how it relates to the 50 and over age group. The data in each of the UCR's reports from 1995 to 2011 will be put into excel spread sheet to get a better understanding of the aging out phenomena over time.

Research Questions

Based on the analysis of the data we will attempt to answer the follow research questions: is the aging out phenomena still applicable today as it was 20 years ago? What is the trend of arrests for the older population (50 and older) as the years have passed? Are they decreasing or increasing in arrests? How do they compare to the younger population and has it changed over time? What kinds of crimes are the older age groups committing and how does these compare to the younger age groups? Through an analysis of the UCR data we will be able to reach tentative conclusions if the aging out phenomena is slowly dying out.

Data Analysis & Findings

Based on the data collected we found that the age group of 18-24 committed the most crimes and had the highest crime rate per 100,000 population every year since 1995. All age groups stayed somewhat consistent in their percent distribution of persons arrested throughout the years. More property crimes were committed than violent crimes. In the violent crimes section, aggravated assault was committed more than murder & non negligent manslaughter, forcible rape, and robbery. In the property crimes section, larceny theft was committed more than motor vehicle theft, burglary, and arson.

When looking at this data, it is clear that although the age group 18-24 accounts for most of the total amount of arrests, the number of arrests have slowly been decreasing. Also when people begin to age, the number of arrests in each age category drops. There are many theories as to why this occurs. However, based on the present research in this study, we see a different phenomena occurring in more recent years. The data show that for the age group 50 and above, the number of arrests is increasing. Also, the percent distribution of all arrests for those 50 and over more than doubled from 3.1% in 1995 to 7.6% in 2011. Between 1995 and 2003, the proportion of all arrests for the 50 and over age group was slowly increasing. However from 2004 to 2011 this age group's proportion of all arrests increased at a more rapid rate. For the age group of 50 and above their proportion of all arrests for property and violent crime's percent has been increasing. From the data, we can see, more arrests for Part I offenses

for the age group 50 and over. Moreover, in 1995, the percent distribution for all violent crimes for the age group 50 and above was 3.8 %. In 2003, the proportion of all violent crime arrests for this age group was 4.4 percent. By 2011 this age group's proportion of all violent crime arrests almost doubled (8.6%). This is an important finding.

The proportion of all property crime arrests for those 50 years old and above in 1995 was 3 percent. In 2003, it rose slightly to 4.1 percent. According to 2011 UCR data, it increased to 7.1 percent. The age group of 18-24 must be looked at because it is the age group that commits the most crime in the United States. This group's proportion for all of Part I arrests in 1995 was 24.6 percent. In 2003, the proportion for all arrests increased to 28.7 percent. In 2011 it increased to 30.6 percent for all index crimes. In 1995 the proportion for all violent crime arrests for this age group in 1995 was 23.4 percent. In 2003 it raised to 28.9 percent of all violent crime arrests. However, in 2011 it decreased to 25.3 percent. For property crimes the percent distribution for all arrests for the 18-24 age group, in 1995, was 20.9 percent. In 2003, it rose to 29 percent. In 2011 it decreased to 27.9 percent. As the data shows, for the age group 18-24, their proportion of all property and violent crime arrests decreased in recent years. Our hypotheses, based on the data analysis, are supported.

The first data table includes each age group and Part I arrests between 1995 and 2011; we also calculated the crime rate per 100,000 population. The crime rate per 100,000 population was calculated for the most frequent offenses violent and property crimes; aggravated assault and larceny theft. The crime rate was calculated for every year between 1995 and 2011 for the ages of 50 and above. The crime rate for the age group 50 and above was compared to the age group 18-24 for the years 1995, 2003, and 2011.

Based on the data we see that the violent crime rate for the age group 50 and over declines from 1995 to 1996 from 12 to 11.3, and stays consistent, at 11.3 and 11.4 until 2000. The years from 1999 to 2000 the crime rate declines from 11.4 to 11.1. For the years 2000 and 2001 we see a crime rate of 11.1 and 11. It then increases to 11.4 in 2002, but decreases in 2003 and 2004. Finally the trend starts increasing every year from 2004 to 2011. It jumps from 11 to 15 in this time span. The crime rate for property crimes for the age group 50 years and over has about the same trend as violent crimes from 1995 to 2003 where it decreases and increases. Between the years of 2004 and 2011, the property crime rate increases from 25.7 to 38.3. The crime rate for aggravated assault and larceny theft also reveals similar trends where the crime rates decrease and increase, then increases rapidly. For aggravated assault, the increase starts in 2004 when it increases from 9.79 to 13 in 2011. For larceny theft, the increase starts in 2000, when it increases nonstop from 18.2 to 32.6 in 2011.

For the crime rate per 100,000 population for the 18-24 group, the data reveals that it has a great trend to follow. In 1995, the crime rate per 100,000 for violent crimes was 85.1. It then decreases in 2003 to 59.3 and further decreases to 49.8. The aggravated assault in this age group has the same trend of the violent crimes were in 1995 it starts at 55.8, decreases to 40.6 in 2003, and finally decreases to 32.9 in 2011. The property crime rate per 100,000 in the 18-24 age group has a slightly different trend. In 1995 the crime rate starts of at 195.3, decreases to 159.5, but increases very little to 163.8. For larceny theft in the 18-24 age group, it has the same trend as the property crime in which it begins at 133.7, decreases to 108, but then increases to 123.3.

Crime in the United States - Age Distrubtion by Year Table 1

by Age, 2011

[12,023 agencies; 2011 estimated population 238,952,977]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,681,072	125,193	510,349	224,633	171,160	123,170	114,241	98,624	67,455	33,658	14,964	11,141
Total % Distribution	100	7.4	30.6	13.4	10.2	7.3	6.8	5.9	4	2	0.9	0.7
Violent Crimes	411,534	52,365	119,065	62,972	48,839	34,871	31,043	26,621	18,631	9,352	4,313	3,463
Violent Crimes %	100	12.7	25.3	15.3	11.9	8.5	7.5	6.5	4.5	2.3	1	0.8
Murder/Manslaughter	8,359	651	3,185	1,422	959	567	460	423	307	177	96	82
Forcible rape	14,679	2,071	3,545	2,053	1,620	1,399	1,181	975	678	355	169	196
Robbery	82,557	18,377	30,245	10,714	6,906	4,259	3,688	2,743	1,645	687	227	110
Aggravated Assualt	305,939	31,265	78,697	48,783	39,354	28,646	25,684	22,480	16,001	8,133	3,821	3,075
Property Crimes	1,269,538	72,828	391,284	161,661	122,321	88,299	83,198	72,003	48,824	24,306	10,651	7,678
Property Crimes %	100	20.4	27.9	12.7	9.6	7	6.6	5.7	3.8	1.9	0.8	0.6
Burglary	228,401	47,654	78,938	29,861	21,819	14,723	13,477	11,064	6,524	2,906	930	505
Larceny Theft	981,116	197,159	294,735	123,819	94,268	69,188	65,944	58,136	40,700	20,711	9,445	7,011
Motor vehicle theft	51,027	10,786	14,096	7,163	5,644	3,909	3,338	2,370	1,281	500	195	86
Arson	8,994	3,714	1,688	818	590	479	439	433	319	189	81	76

Crime in the United States - Age Distrubtion by Year: Table 2

by Age, 2010

[12,222 agencies; 2010 estimated population 240,103,394]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,723,387	349,444	530,515	223,679	162,353	125,457	114,318	98,655	63,306	30,741	14,137	10,782
Total Percent Distribution	100	20.3	30.8	13	9.4	7.3	6.6	5.7	3.7	1.8	0.8	0.6
Violent Crimes	430,364	59,093	126,270	65,279	48,229	36,735	32,416	27,905	17,882	8,793	4,314	3,448
Violent Crimes %	100	13.7	25.8	15.2	11.2	8.5	7.5	6.5	4.2	2	1	0.8
Murder/Manslaughter	8,667	2,198	3,328	1,430	938	643	469	418	292	180	95	90
Forcible rape	15,586	2,198	3,981	2,123	1,682	1,514	1,240	1,012	652	340	200	178
Robbery	87,771	21,110	32,394	10,827	6,689	4,553	3,875	2,970	1,546	647	225	99
Aggravated Assault	318,340	7,883	83,265	50,899	38,920	30,025	26,832	23,505	15,392	7,626	3,794	3,081
Property Crimes	1,293,023	290,351	404,245	158,400	114,124	88,722	81,902	70,750	45,424	21,948	9,823	7,334
Property Crimes %	100	22.5	28.4	12.3	8.8	6.9	6.3	5.5	3.5	1.7	0.8	0.6
Burglary	226,325	14,019	79,880	28,587	19,461	14,373	12,881	10,375	5,940	2,252	851	427
Larceny Theft	1,002,446	223,207	305,085	121,393	88,339	69,742	65,086	57,350	37,858	18,986	8,692	6,728
Motor vehicle theft	55,426	12,268	15,741	7,663	5,650	4,150	3,476	2,533	1,322	537	181	114
Arson	8,806	3,578	1,575	757	674	457	459	492	304	173	99	65

Crime in the United States - Age Distrubtion by Year: Table 3

by Age, 2009

[12,371 agencies; 2009 estimated population 239,839,971]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,827,949	402,311	566,935	227,988	158,550	132,636	120,603	102,552	62,385	29,755	13,445	10,789
Total % Distribution	100	22	31	12.5	8.7	7.3	6.6	5.6	3.4	1.6	0.7	0.6
Violent Crimes	458,291	68,074	136,862	68,683	48,327	39,038	34,504	29,117	17,707	8,616	3,963	3,400

	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Violent Crimes %	100	14.9	26.4	15	10.5	8.5	7.5	6.4	3.9	1.9	0.9	0.7
Murder/Manslaughter	9,775	942	3,837	1,649	969	683	534	464	296	164	123	114
Forcible rape	16,442	2,385	4,140	2,248	1,880	1,633	1,352	1,018	628	347	196	145
Robbery	100,702	25,280	37,154	12,284	7,101	5,392	4,491	3,253	1,602	621	206	104
Aggravated Assault	331,372	39,467	88,047	52,502	38,377	31,330	28,127	24,382	15,181	7,484	3,438	3,037
Property Crimes	1,369,658	334,237	430,073	159,305	110,223	93,598	86,099	73,435	44,678	21,139	9,482	7,389
Property Crimes %	100	24.4	28.6	11.6	8	6.8	6.3	5.4	3.3	1.5	0.7	0.5
Burglary	235,226	59,432	82,507	28,472	18,309	14,694	12,950	10,144	5,394	2,140	757	427
Larceny Theft	1,060,754	254,865	325,236	121,573	85,344	73,676	68,801	60,038	37,666	18,305	8,463	6,787
Motor vehicle theft	64,169	15,724	18,461	8,482	6,011	4,750	3,899	2,761	1,319	524	172	97
Arson	9,509	4,216	1,719	778	559	478	449	492	299	170	90	78

Crime in the United States - Age Distrubtion by Year: Table 4

by Age, 2008

[11,713 agencies; 2008 estimated population 230,897,506]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,762,590	413,960	526,452	212,757	147,427	133,574	121,567	100,307	58,042	26,864	11,870	9,770
Total % Distribution	100	23.5	31.9	12.1	8.4	7.6	6.9	5.7	3.3	1.5	0.7	0.6
Violent Crimes	457,455	73,970	135,538	67,020	46,294	39,761	34,957	28,753	16,504	7,884	3,687	3,087
Violent Crimes %	100	16.2	26.2	14.7	10.1	8.7	7.6	6.3	3.6	1.7	0.8	0.7
Murder/Manslaughter	9,888	974	3,960	1,689	918	753	555	416	272	176	85	90
Forcible rape	16,916	2,505	4,294	2,362	1,838	1,638	1,453	1,027	614	336	158	175
Robbery	100,738	27,522	36,075	11,645	6,695	5,511	4,579	3,258	1,561	569	162	92
Aggravated Assualt	329,913	42,969	87,624	51,324	36,843	31,859	28,370	24,052	14,057	6,803	3,282	2,730
Property Crimes	1,305,135	339,990	390,914	145,737	101,133	93,813	86,610	71,554	41,538	18,980	8,183	6,683
Property Crimes %	100	26.1	27.2	11.2	7.7	7.2	6.6	5.5	3.2	1.5	0.6	0.5
Burglary	236,219	64,418	78,286	27,075	17,530	15,705	13,965	10,642	5,461	2,005	705	427
Larceny Theft	982,997	251,483	287,216	107,996	76,180	71,665	67,382	57,205	34,323	16,288	7,197	6,062
Motor vehicle theft	75,135	19,068	20,930	9,843	6,781	5,946	4,748	3,252	1,447	517	195	126
Arson	10,784	5,021	2,022	823	642	497	515	455	307	170	86	68

Crime in the United States - Age Distrubtion by Year: Table 5

by Age, 2007

[11,936 agencies; 2007 estimated population 225,518,634]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,678,016	392,649	471,517	203,219	143,569	137,629	126,406	96,275	53,039	24,319	10,429	8,662
Total % Distribution	100	23.4	28.1	12.1	8.6	8.2	7.5	5.7	3.2	1.5	0.6	0.5
Violent Crimes	451,071	73,427	120,896	66,003	45,976	40,883	36,726	27,861	15,574	7,321	3,380	3,024
Violent Crimes %	100	16	25.6	14.6	10.2	9.1	8.1	6.2	3.5	1.6	0.7	0.7
Murder/Manslaughter	10,082	1,011	4,073	1,758	940	680	558	432	295	175	77	83
Forcible rape	17,132	2,633	4,263	2,311	1,883	1,780	1,463	1,047	585	326	151	153
Robbery	96,720	26,324	33,217	11,175	6,860	5,871	4,865	3,219	1,403	503	178	104
Aggravated Assault	327,137	43,459	85,805	50,759	36,293	32,552	29,840	23,163	13,291	6,317	2,974	2,684
Property Crimes	1,226,945	319,225	350,921	137,216	97,593	96,746	89,680	68,414	37,465	16,998	7,049	5,638
Property Crimes %	100	25.8	26.2	11.2	8	7.9	7.3	5.6	3.1	1.4	0.6	0.5
Burglary	228,846	61,695	72,503	26,124	17,772	16,918	15,073	10,830	5,106	1,855	636	334
Larceny Theft	897,626	229,837	248,323	98,117	71,066	72,005	68,379	53,626	30,598	14,432	6,128	5,115

	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Motor vehicle theft	89,022	22,266	24,941	12,091	8,096	7,217	5,659	3,440	1,471	551	199	124
Arson	11,451	5,427	2,003	884	659	606	569	518	290	160	86	65

Crime in the United States - Age Distrubtion by Year: Table 6

by Age, 2006

[11,250 agencies; 2006 estimated population 216,686,722]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,584,534	372,559	445,294	190,023	139,027	136,136	124,494	89,716	47,887	21,788	9,160	8,450
Total % Distribution	100	23.5	28.1	12	8.8	8.6	7.9	5.7	3	1.4	0.6	0.5
Violent Crimes	447,932	73,991	129,324	64,626	45,778	41,757	37,934	26,962	14,662	6,815	3,117	2,966
Violent Crimes %	100	16.5	25.3	14.4	10.2	9.3	8.5	6	3.3	1.5	0.7	0.7
Murder/Manslaughter	9,815	956	3,910	1,689	986	703	569	423	247	167	72	93
Forcible rape	17,112	2,519	4,500	2,375	1,828	1,807	1,389	1,017	553	291	137	150
Robbery	93,527	26,092	31,338	10,533	6,689	6,060	4,945	2,944	1,306	467	152	87
Aggravated Assualt	327,478	44,424	86,116	50,029	36,275	33,187	31,031	22,578	12,556	5,890	2,756	2,636
Property Crimes	1,136,602	298,568	315,970	125,397	93,249	94,379	86,560	62,754	33,225	14,973	6,043	5,484
Property Crimes %	100	26.3	25.1	11	8.2	8.3	7.6	5.5	2.9	1.3	0.5	0.5
Burglary	222,192	61,155	69,635	25,381	17,258	16,673	15,079	9,934	4,620	1,614	501	342
Larceny Theft	801,633	206,187	212,031	85,902	65,936	68,838	64,570	48,596	26,755	12,593	5,280	4,945
Motor vehicle theft	100,775	25,338	28,696	13,314	9,396	8,226	6,305	3,701	1,540	606	186	145
Arson	12,002	5,888	2,092	800	659	642	606	523	310	160	76	52

Crime in the United States - Age Distrubtion by Year: Table 7

by Age, 2005

[10,974 agencies; 2005 estimated population 217,722,329]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,641,406	381,369	462,186	193,557	151,996	145,606	131,490	89,968	46,524	21,135	9,227	8,348
Total % Distribution	100	23.2	28.2	11.8	9.3	8.9	8	5.5	2.8	1.3	0.6	0.5
Violent Crimes	445,846	70,482	128,075	63,475	48,288	43,645	39,019	26,489	13,812	6,622	3,035	2,904
Violent Crimes %	100	15.8	25.2	14.2	10.8	9.8	8.8	5.9	3.1	1.5	0.7	0.7
Murder/Manslaughter	10,335	929	4,200	1,747	1,003	724	619	511	255	155	73	119
Forcible rape	18,733	2,888	4,803	2,435	2,140	1,889	1,651	1,071	600	287	162	164
Robbery	85,309	21,515	28,516	10,010	6,811	6,058	4,875	2,817	1,197	421	119	86
Aggravated Assualt	331,469	45,150	87,029	49,283	38,334	34,974	31,874	22,090	11,760	5,759	2,681	2,535
Property Crimes	1,195,560	310,887	334,111	130,082	103,708	101,961	92,471	63,479	32,712	14,513	6,192	5,444
Property Crimes %	100	26	25.2	10.9	8.7	8.5	7.7	5.3	2.7	1.2	0.5	0.5
Burglary	220,391	57,506	70,234	25,546	18,413	17,766	15,196	9,436	4,049	1,409	497	339
Larceny Theft	854,856	219,881	226,439	89,471	74,300	74,875	70,217	49,940	26,951	12,451	5,421	4,910
Motor vehicle theft	108,301	27,666	31,614	14,203	10,305	8,649	6,383	3,559	1,411	495	199	117
Arson	12,012	5,834	1,904	862	690	671	675	544	301	158	75	78

Crime in the United States - Age Distrubtion by Year: Table 8

by Age, 2004

[10,830 agencies; 2004 estimated population 209,671,644]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,606,559	391,615	453,084	179,905	151,089	143,087	127,701	82,235	41,563	19,158	8,827	8,295
Total % Distribution	100	24.4	28.2	11.3	9.4	8.9	8	5.1	2.6	1.2	0.6	0.5

	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Violent Crimes	420,169	65,303	120,392	58,782	47,095	42,522	37,920	24,234	12,373	5,899	2,930	2,719
Violent Crimes %	100	15.5	25.3	14	11.2	10.1	9	5.8	2.9	1.4	0.7	0.6
Murder/Manslaughter	9,554	784	3,835	1,608	966	736	600	441	256	137	88	103
Forcible rape	18,542	2,998	4,853	2,326	2,096	1,864	1,617	1,013	551	286	168	156
Robbery	78,494	18,247	26,153	9,327	6,967	6,016	4,866	2,564	1,082	359	131	76
Aggravated Assult	313,579	43,274	82,231	45,521	37,066	33,906	30,837	20,216	10,484	5,117	2,543	2,384
Property Crimes	1,186,390	326,312	332,692	121,123	103,994	100,565	89,781	58,001	29,190	13,259	5,897	5,576
Property Crimes %	100	27.5	25.3	10.2	8.8	8.5	7.6	4.9	2.5	1.1	0.5	0.5
Burglary	210,904	58,423	67,575	22,610	18,203	17,111	13,983	7,872	3,268	1,156	423	280
Larceny Theft	858,821	234,347	227,979	84,510	75,141	74,482	69,314	46,636	24,443	11,555	5,276	5,138
Motor vehicle theft	105,613	27,989	31,684	13,257	10,007	8,362	5,855	3,073	1,198	432	135	97
Arson	11,052	5,553	1,739	746	643	610	629	420	281	116	63	61

Crime in the United States - Age Distrubtion by Year: Table 9
by Age, 2003
[10,843 agencies; 2003 estimated population 204,034,545]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,558,324	393,622	446,346	166,746	152,753	143,935	118,805	71,894	35,866	16,324	7,651	7,917
Total % Distribution	100	25.3	28.7	10.7	9.8	9.2	7.6	4.6	2.3	1.1	0.5	0.5
Violent Crimes	418,964	64,799	120,996	57,123	48,439	44,378	37,654	23,032	11,721	5,516	2,612	2,694
Violnet Crimes %	100	15.5	28.9	13.6	11.6	10.6	9	5.5	2.8	1.3	0.6	0.6
Murder/Manslaughter	9,119	784	3,675	1,590	999	783	591	455	230	144	69	86
Forcible rape	18,446	2,966	4,898	2,287	2,181	1,955	1,538	942	486	295	140	152
Robbery	75,667	17,900	26,383	8,509	6,737	5,841	4,254	2,151	829	281	109	87
Aggravated Assult	315,732	43,150	82,848	48,211	43,290	40,344	33,587	20,285	10,299	5,054	2,434	2,533
Property Crimes	1,139,360	328,823	325,350	109,623	104,314	99,557	81,151	48,862	24,145	10,808	5,039	5,223
Property Crimes %	100	29	29	9.6	8.8	8.4	7.1	4.5	2.2	1	0.4	0.5
Burglary	204,761	59,870	67,427	20,067	17,854	16,388	12,323	6,379	2,479	903	317	302
Larceny Theft	817,048	232,322	220,479	77,250	75,980	74,348	62,966	39,451	20,386	9,403	4,527	4,795
Motor vehicle theft	106,221	30,874	35,325	12,151	10,032	8,010	5,440	2,739	1,038	377	129	106
Arson	11,330	5,757	2,119	692	636	633	610	412	221	131	56	63

Crime in the United States - Age Distrubtion by Year: Table 10
by Age, 2002
[10,372 agencies; 2002 estimated population 205,122,185]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,617,213	415,607	461,159	170,513	158,354	149,021	121,368	72,647	35,983	16,601	7,821	8,139
Total % Distribution	100	25.7	28.5	10.5	9.8	9.2	7.5	4.5	2.2	1	0.5	0.5
Violent Crimes	447,048	66,508	128,815	60,890	54,040	49,464	40,217	23,785	11,838	5,793	2,782	2,916
Violent Crimes %	100	14.9	24.4	13.6	12.1	11.1	9	5.3	2.6	1.3	0.6	0.7
Murder/Manslaughter	10,107	973	4,188	1,590	999	783	591	455	230	144	69	85
Forcible rape	20,162	3,361	5,040	2,465	2,429	2,158	1,622	994	520	304	166	202
Robbery	77,342	17,893	25,380	8,624	7,322	6,179	4,417	2,051	789	291	113	96
Aggravated Assult	339,437	44,281	89,119	48,211	43,290	40,344	33,587	20,285	10,299	5,054	2,434	2,533
Property Crimes	1,170,165	349,099	332,344	109,623	104,314	99,557	81,151	48,862	24,145	10,808	5,039	5,223
Property Crimes %	100	29.8	24.6	9.4	8.9	8.5	6.9	4.2	2.1	0.9	0.4	0.4
Burglary	206,136	61,843	67,281	20,067	17,854	16,388	12,323	6,379	2,479	903	317	302

Larceny Theft	845,009	248,861	227,042	77,250	75,980	74,348	62,966	39,451	20,386	9,403	4,527	4,795
Motor vehicle theft	107,187	32,544	31,055	11,525	9,745	8,067	5,213	2,582	1,048	395	134	84
Arson	11,833	5,851	1,897	781	735	754	649	450	232	107	61	42

Crime in the United States - Age Distrubtion by Year: Table 11

by Age, 2001

[9,511 agencies; 2001 estimated population 192,580,262]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,554,737	407,106	437,757	163,528	155,810	147,637	115,076	65,636	32,954	14,432	7,049	7,752
Total % Distribution	100	26.2	28.2	10.5	10	9.5	7.4	4.2	2.1	0.9	0.5	0.5
Violent Crimes	434,391	67,002	125,173	59,013	53,129	49,493	37,879	21,363	10,956	5,011	2,511	2,861
Violent Crimes %	100	15.4	24.9	13.6	12.2	11.4	8.7	4.9	2.5	1.2	0.6	0.7
Murder/Manslaughter	9,426	957	3,881	1,437	948	747	585	362	236	127	62	84
Forcible rape	18,576	3,119	4,515	2,397	2,206	2,114	1,586	834	462	255	140	149
Robbery	76,667	18,111	23,987	8,703	7,241	6,190	3,938	1,898	730	229	77	92
Aggravated Assualt	329,722	44,815	86,520	46,476	42,734	40,442	31,770	18,269	9,528	4,400	2,232	2,536
Property Crimes	1,120,346	340,104	312,584	104,515	102,681	98,144	77,197	44,273	21,998	9,421	4,538	4,891
Property Crimes %	100	30.4	24.9	9.3	9.2	8.8	6.9	4	2	0.8	0.4	0.4
Burglary	198,883	61,623	62,608	19,015	17,812	16,512	11,902	5,676	2,304	848	323	260
Larceny Theft	806,093	92,317	213,864	74,118	74,887	73,683	59,774	35,997	18,499	8,138	4,048	4,480
Motor vehicle theft	102,607	33,563	26,570	10,562	9,164	7,172	4,768	2,157	942	323	114	107
Arson	12,763	6,313	1,829	820	818	777	753	443	253	112	53	44

Crime in the United States - Age Distrubtion by Year: Table 12

by Age, 2000

[9,017 agencies; 2000 estimated population 182,090,101]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,496,370	411,641	412,237	156,537	149,814	143,631	105,198	58,841	29,639	13,461	6,689	8,682
Total % Distribution	100	27.5	27.6	10.5	10	9.6	7	3.9	2	0.9	0.4	0.6
Violent Crimes	415,573	65,910	118,588	56,498	51,337	48,381	35,101	19,456	10,068	4,824	2,427	2,983
Violent Crimes %	100	15.9	24.2	13.6	12.4	11.6	8.4	4.7	2.4	1.2	0.6	0.7
Murder/Manslaughter	8,709	806	3,658	1,345	826	717	547	334	222	102	56	96
Forcible rape	17,914	2,937	4,450	2,353	2,143	2,029	1,451	799	461	238	133	168
Robbery	72,320	18,288	23,582	8,082	6,935	5,705	3,560	1,517	632	201	93	87
Aggravated Assualt	316,630	43,879	82,508	44,718	41,433	39,930	29,543	16,806	8,753	4,283	2,145	2,632
Property Crimes	1,080,797	345,731	293,649	100,039	98,477	95,250	70,097	39,385	19,571	8,637	4,262	5,699
Property Crimes %	100	32	23.7	9.3	9.1	8.8	6.5	3.6	1.8	0.8	0.4	0.5
Burglary	189,343	62,557	58,306	17,615	16,683	15,488	10,412	4,878	2,000	748	268	388
Larceny Theft	782,082	243,723	201,513	71,774	72,694	72,070	54,932	32,300	16,609	7,506	3,824	5,137
Motor vehicle theft	98,697	33,816	27,778	10,036	8,535	7,061	4,233	1,892	769	287	117	125
Arson	10,673	3,677	1,743	614	565	631	520	315	193	96	53	49

Crime in the United States - Age Distrubtion by Year: Table 13

by Age, 1999

[8,546 agencies; 1999 estimated population 171,831,000]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,512,073	420,543	403,743	166,005	156,103	146,949	103,881	57,378	28,297	13,378	6,773	9,023

	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Total % Distribution	100	27.8	26.7	11	10.3	9.7	6.9	3.8	1.9	0.9	0.4	0.6
Violent Crimes	420,156	67,916	117,810	59,296	53,317	49,559	34,036	18,589	9,667	4,732	2,413	2,821
Violent Crimes %	100	16.2	23.9	14.1	12.7	11.8	8.1	4.4	2.3	1.1	0.6	0.7
Murder/Manslaughter	9,727	919	4,060	1,525	1,015	824	556	329	211	129	53	106
Forcible rape	18,759	3,182	4,354	2,508	2,411	2,195	1,461	813	470	270	153	155
Robbery	73,619	18,735	23,306	8,899	7,274	5,853	3,399	1,487	609	203	102	117
Aggravated Assualt	318,051	45,080	81,668	46,364	42,617	40,687	28,620	15,960	8,377	4,130	2,105	2,443
Property Crimes	1,091,917	352,627	285,933	106,709	102,786	97,390	69,845	38,789	18,630	8,646	4,360	6,202
Property Crimes %	100	32.3	22.9	9.8	9.4	8.9	6.4	3.6	1.7	0.8	0.4	0.6
Burglary	192,570	64,481	57,763	19,133	17,498	15,759	10,134	4,628	1,902	681	294	297
Larceny Theft	794,201	249,100	196,832	77,106	76,339	74,317	55,317	32,052	15,884	7,619	3,910	5,725
Motor vehicle theft	94,335	33,255	25,927	9,854	8,257	6,658	3,857	1,765	656	259	105	118
Arson	10,811	5,791	1,578	616	692	656	537	344	188	87	51	62

Crime in the United States - Age Distrubtion by Year: Table 14

Distribution by Age, 1998

[9,505 agencies; 1998 estimated population 185,964,000]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,774,103	506,636	463,093	199,844	190,351	172,666	117,251	61,291	30,228	14,838	7,790	10,115
Total % Distribution	100	28.6	26.1	11.3	10.7	9.7	6.6	3.5	1.7	0.8	0.4	0.6
Violent Crimes	481,278	79,999	133,202	69,215	63,268	56,907	37,851	19,568	10,252	5,081	2,689	3,246
Violent Crimes %	100	16.6	23.9	14.4	13.1	11.8	7.9	4.1	2.1	1.1	0.6	0.7
Murder/Manslaughter	12,335	1,470	5,158	1,900	1,164	960	716	405	256	135	61	110
Forcible rape	21,922	3,769	5,135	2,936	2,893	2,638	1,684	848	545	252	158	190
Robbery	87,129	23,400	27,202	10,605	8,932	6,724	3,749	1,487	581	216	102	88
Aggravated Assual	359,892	51,360	90,790	53,774	50,279	46,585	31,702	16,828	8,870	4,478	2,368	2,858
Property Crimes	1,292,825	426,637	329,891	130,629	127,083	115,759	79,400	41,723	19,976	9,757	5,101	6,869
Property Crimes %	100	33	22.4	10.1	9.8	9	6.1	3.2	1.5	0.8	0.4	0.5
Burglary	233,435	30,840	67,458	23,398	22,224	18,852	11,357	4,862	1,903	814	322	351
Larceny Theft	940,243	300,033	227,462	95,049	94,467	88,704	63,278	34,711	17,081	8,516	4,603	6,339
Motor vehicle theft	107,003	38,386	28,873	11,441	9,620	7,356	4,137	1,800	779	319	119	113
Arson	12,144	6,324	1,788	741	772	847	628	350	213	108	57	66

Crime in the United States - Age Distrubtion by Year: Table 15

Distribution by Age, 1997

[9,271 agencies; 1997 estimated population 183,240,000]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	1,910,953	576,848	482,889	216,635	208,399	181,097	177,843	63,318	30,009	14,739	8,084	11,122
Total % Distribution	100	30.2	25.3	11.3	10.9	11.6	9.5	3.3	1.6	0.8	0.4	0.6
Violent Crimes	501,353	86,462	136,405	73,162	68,464	58,315	37,378	20,308	9,820	4,973	2,768	3,298
Violent Crimes %	100	17.2	23.5	14.6	13.7	11.6	7.5	4.1	2	1	0.6	0.7
Murder/Manslaughter	12,764	1,731	5,354	1,902	1,198	962	609	434	233	150	75	116
Forcible rape	22,133	3,792	5,005	3,143	3,066	2,659	1,683	847	540	258	133	162
Robbery	94,034	28,069	28,737	11,248	9,171	6,775	3,506	1,530	547	181	62	85
Aggravated Assualt	372,422	53,870	92,341	56,869	55,029	47,919	31,580	17,497	8,500	4,384	2,498	2,935
Property Crimes	1,409,600	490,386	346,484	143,473	139,905	122,782	80,465	43,010	20,189	9,766	5,316	7,824
Property Crimes %	100	34.8	21.6	10.2	9.9	8.7	5.7	3.1	1.4	0.7	0.4	0.6

	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Burglary	245,816	90,445	68,298	25,053	23,905	19,042	10,865	4,994	1,871	749	271	323
Larceny Theft	1,033,901	346,753	241,826	105,489	105,194	95,468	65,094	35,848	17,373	8,658	4,890	7,308
Motor vehicle theft	116,052	46,274	29,992	11,833	9,821	7,290	3,837	1,779	728	255	101	124
Arson	13,831	6,914	2,050	1,098	985	982	669	389	217	104	54	69

Crime in the United States - Age Distrubtion by Year: Table 16

Distribution by Age, 1996

[9,666 agencies; 1996 estimated population 189,927,000]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	2,054,605	632,762	516,241	239,165	229,080	189,826	118,027	63,541	29,655	15,096	8,745	12,467
Total % Distribution	100	30.8	25.1	11.6	11.1	9.2	5.8	3.1	1.5	0.7	0.4	0.6
Violent Crimes	548,146	102,231	150,456	81,031	75,171	60,570	36,950	20,203	9,926	5,091	2,928	3,589
Violent Crimes %	100	18.7	23.5	14.8	13.7	11	6.7	3.7	1.8	0.9	0.5	0.7
Murder/Manslaughter	14,447	2,172	5,941	2,008	1,473	1,092	703	441	250	139	88	140
Forcible rape	24,347	4,128	5,481	3,652	3,521	2,827	1,705	940	469	266	193	183
Robbery	121,781	39,037	34,812	14,994	12,419	8,480	4,217	1,769	630	250	116	102
Aggravated Assoult	387,571	56,894	98,285	60,377	57,758	48,171	30,325	17,053	8,577	4,436	2,531	3,164
Property Crimes	1,506,459	530,531	365,785	158,134	153,909	129,256	81,077	43,338	19,729	10,005	5,817	8,878
Property Crimes %	100	35.2	21.3	10.5	10.2	8.6	5.4	2.9	1.3	0.7	0.4	0.6
Burglary	264,193	97,809	71,913	27,927	26,468	20,410	11,282	5,052	1,882	743	311	396
Larceny Theft	1,096,488	155,287	253,942	115,927	115,457	100,072	65,201	35,994	16,906	8,851	5,279	8,252
Motor vehicle theft	132,023	54,813	33,225	13,392	10,941	7,931	3,984	1,953	730	299	156	166
Arson	13,755	7,302	2,000	888	1,043	843	610	339	211	112	71	64

Crime in the United States - Age Distrubtion by Year: Table 17

Distribution by Age, 1995

[9,498 agencies; 1995 estimated population 196,440,000]

Offenses Charged	All Ages	Under 18	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
TOTAL	2,239,934	677,226	550,842	272,564	268,086	208,411	125,858	65,141	31,297	16,285	9,801	14,423
Total % Distribution	100	30.2	24.6	12.2	12	9.3	5.6	3	1.4	0.7	0.4	0.6
Violent Crimes	619,230	115,592	167,223	93,143	89,476	68,151	40,324	21,573	10,810	5,635	3,260	4,043
Violent Crimes %	100	18.7	23.4	15	14.4	11	6.5	3.5	1.7	0.9	0.5	0.7
Murder/Manslaughter	16,701	2,560	6,869	2,380	1,643	1,209	828	479	273	207	104	149
Forcible rape	26,561	4,190	5,905	4,084	4,021	3,183	1,837	1,059	578	321	202	235
Robbery	137,811	44,508	38,642	17,631	14,723	9,488	4,542	1,790	670	255	124	149
Aggravated Assoult	438,157	64,334	109,572	69,048	69,089	54,271	33,117	18,245	9,289	4,852	2,830	3,510
Property Crimes	1,620,704	561,634	383,619	179,421	178,610	140,260	85,534	43,568	20,487	10,650	6,541	10,380
Property Crimes %	100	34.7	20.9	11.1	11	8.7	5.3	2.7	1.3	0.7	0.4	0.6
Burglary	292,315	102,722	77,073	34,044	33,265	24,001	12,484	5,211	2,015	720	349	431
Larceny Theft	1,164,371	388,533	262,615	128,444	131,177	106,898	68,051	35,945	17,555	9,478	5,953	9,722
Motor vehicle theft	149,053	62,545	36,606	15,877	13,051	8,401	4,317	1,959	708	337	164	143
Arson	14,965	7,834	2,097	1,056	1,117	960	682	453	209	115	75	84

Crime Rate Per 100000 Population: Table 18

2011	18-24	Age 50+
Violent Crimes	49.8	15
Aggravated Assault	32.9	13
Property Crimes	163.8	38.3
Larceny Theft	123.3	32.6

Crime Rate Per 100000 Population: Table 19

2010

Violent Crimes	14.3
Aggravated Assault	12.5
Property Crimes	35.2
Larceny Theft	30.1

Crime Rate Per 100000 Population: Table 20

2009

Violent Crimes	14
Aggravated Assault	12.3
Property Crimes	34.5
Larceny Theft	29.7

Crime Rate Per 100000 Population: Table 21

2008

Violent Crimes	13.5
Aggravated Assault	11.6
Property Crimes	32.7
Larceny Theft	27.7

Crime Rate Per 100000 Population: Table 22

2007

Violent Crimes	13
Aggravated Assault	11.2
Property Crimes	29.8
Larceny Theft	25

Crime Rate Per 100000 Population: Table 23

2006

Violent Crimes	12.7
Aggravated Assault	11
Property Crimes	27.6
Larceny Theft	22.9

Crime Rate Per 100000 Population: Table 24

2005

Violent Crimes	12.1
aggravated Assault	10.4
Property Crimes	27
Larceny Theft	22.8

Crime Rate Per 100000 Population: Table 25

2004

Violent Crimes	11.4
Aggravated Assault	9.8
Property Crimes	25.7

Limitations & Recommendations

There are some limitations to this present research. These limitations mainly center on the data collected.

The first limitation in the aging out phenomena research is the data reports that make up the Uniform Crime Reports and how the arrests are reported to the FBI. Beginning in 1995, we were only able to look the part 16 years of data. However, a span of 16 years is plenty of time to see a trend of the aging out phenomena in crime but it would have been interesting to see in data reported in the 1970s, 1980s, and early 1990s. A longer trend analysis of the data could help us validate the arrest trends for older population.

Another limitation is with the UCR and the agencies that report arrest data every year. The agencies that report total arrests do so voluntary. The number of agencies changes every year. From 1995 to 2011 the number of agencies reporting to the FBI has increased from around 9,000 to 12,000. It can be seen that there has been more agency participation, but this is a blow in the data collection. Another flaw is the potential for certain agencies to tamper with arrest data. They might do this for many reasons; one of these reasons being their communities will appear safer. People may not want to travel or even live there if the crime rate is high. Because agencies may not report crime or tamper with their reports, the exact number of arrests can never be determined.

Another limitation with the Uniform Crime Reports centers on when an individual is arrested for multiple crimes. For example, if an individual is arrested for robbery and larceny theft, only robbery would be reflected in arrest data. By looking at the data, it is very broad, because it gives the number of arrests rather than the number of individuals that are being arrested. Another minor limitation to look at in this area is that not all people that commit crimes

are arrested. There are many criminals out in society that are yet to be caught by law enforcement. It can't be known how this would affect the trend of age and crimes.

The last limitation in this research can affect the way people look at the data and how it is analyzed. Although the data shows all the arrests reported, it doesn't show the lifestyle the criminal has lived, the victim they have affected, or how the criminal goes through the court system. The over 50 criminal can be a person that was convicted and arrested at an early age. They could have been released from out prison and committed their crime. The last item in this limitation section is the victim that has been affected by the crime. Some victims won't report a crime to police if doing so will hurt their social status, psychological state, or if they are just scared to face the police. All the people involved in this limitation can increase or decrease the trend.

Recommendations

There hasn't been much research dedicated to the aging out. There is a lot of research on the aging out process of a criminal and theories on why people don't commit crimes as much when they began to age. By looking at the data that has been collected, the increase on arrests by the older population have been happening The only research study that has been published that looked at the older population was in 2007 (Hagan, 2007). The author found that the arrest data for the older 50 population was consisted from year to year and didn't increase. However, this study looked at arrest data from 1980 to 2004.

For further research in this study, recommendations must be made to avoid these limitations. It would center on the UCR and the data they give. The data on the FBI websites goes back to only 1995. Compact discs can be requested to see the years prior to 1995. This would take a

lot of time for one researcher to analyze. Many criminology researchers can start analyzing the data all the way back to 1930 from the compact discs. It would save a lot of time if more researchers got involved in this particular study. Also in the UCR, master files can be requested from the FBI which gives a description of the crime that is reported. Although it would be very beneficial to see how each crime takes place, it would take one researcher a lot of time to finish. However, many researchers can get involved in this research and break up into regions to see each crime of the 50 and above age group. A recommendation for the agencies that underreport or do not report at all to the UCR is that the FBI should start making the agencies report their data so researchers can see exact trends. Representatives from the UCR should start checking agencies annually to make sure all data is correct. Our recommendation for future research is to start interview persons arrested who are over 50 years old in prison.

Some interview questions would be based on why they committed the crime, if they have served time in prison or jail, when they were first arrested, and what age were they when they first committed their first juvenile or criminal act.

Conclusion

Based on all the data that was collected, the aging out phenomena still applies today, however it may not be as accurate as it once was. It is a recent trend that older people are committing more Part I offenses as each year passes. Even though there is very little research on the older population starting to commit more crimes in recent years, this study can serve as a springboard for future researchers on the aging out phenomena and life course dynamics. In addition, researchers could further explore the controversial issue of the aging out phenomena This research could shed further light on the life course of the older offender.

Bibliography

Chambliss, William J., Hass, Aida Y. (2012) Criminology: Connecting Theory, Research & Practice. New York, New York: McGraw-Hill

Hagan, Frank E. (2013) Introduction to Criminology: Theories, Methods, and Criminal Behavior. Thousand Oaks, California: SAGE Publications

Feldmeyer B, Steffensmeier D. (2007) Research on Aging, Elder Crime: Patterns and Current Trends, 1980-2004. Pennsylvania State University. Retrieved from http://roa.sagepub.com/

Piquero Alex R., Farrington David P., Blumstein Alfred. (2007) Key Issues in Criminal Career Research. Cambridge, New York: Cambridge University Press

Vold, George B., Bernard, Thomas J., Snipes, Jeffery B. (2002) Theoretical Criminology. New York, New York: Oxford University Press.

Walters, Glenn D. (2012) Crime in a Psychological Context. Thousand Oaks, California: SAGE Publications

U.S. Department of Justice. (2011) Crimes in the United States. Retrieved from http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2011/crime-in-the-u.s.-2011/tables/table-38

U.S. Department of Justice. (2010) Crimes in the United States. Retrieved from http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2010/crime-in-the-u.s.-2010/tables/table-38

U.S. Department of Justice. (2009) Crimes in the United States. Retrieved from http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2009/crime-in-the-u.s.-2009/tables/table-38

U.S. Department of Justice. (2008) Crimes in the United States. Retrieved from http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2008/crime-in-the-u.s.-2008/tables/table-38

U.S. Department of Justice. (2007) Crimes in the United States. Retrieved from http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2007/crime-in-the-u.s.-2007/tables/table-38

U.S. Department of Justice. (2006) Crimes in the United States. Retrieved from http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2006/crime-in-the-u.s.-2006/tables/table-38

U.S. Department of Justice. (2005) Crimes in the United States. Retrieved from http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2005/crime-in-the-u.s.-2005/tables/table-38

U.S. Department of Justice. (2004) Crimes in the United States. Retrieved from

http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2004/crime-in-the-u.s.-2005/tables/table-38

U.S. Department of Justice. (2003) Crimes in the United States. Retrieved from

http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2003/03sec4.pdf

U.S. Department of Justice. (2002) Crimes in the United States. Retrieved from

http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2002/02sec4.pdf

U.S. Department of Justice. (2001) Crimes in the United States. Retrieved from

http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2001/01sec4.pdf

U.S. Department of Justice. (2000) Crimes in the United States. Retrieved from

http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2000/00sec4.pdf

U.S. Department of Justice. (1999) Crimes in the United States. Retrieved from

http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/1999/99sec4.pdf

U.S. Department of Justice. (1998) Crimes in the United States. Retrieved from

http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/1998/98sec4.pdf

U.S. Department of Justice. (1997) Crimes in the United States. Retrieved from

http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/1997/97sec4.pdf

U.S. Department of Justice. (1996) Crimes in the United States. Retrieved from

http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/1996/96sec4.pdf

U.S. Department of Justice. (1995) Crimes in the United States. Retrieved from

http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/1995/95sec4.pdf

Guns of our Fathers: Uncovering the Misconceptions of Gun Violence

Juan Valdez

Mentor: Arturo Vega, PhD
Department of Political Science;
St. Mary's University

Abstract

With the Sandy Hook shootings of 2012 and the current gun control debate, several misconceptions about gun control and homicide rates have arisen. The true purpose of the second amendment is explained as many people have questioned the purpose of gun in the 21st century. One of the misconceptions is the belief that imposing stricter gun control laws will significantly reduce the total homicide rate. However, a review of the literature reveals that gun laws are not very effective at explaining a nation's homicide rate. There is also the possibility of a profit paradox if stricter gun control laws are passed. Utilizing a least ordinary squares multiple regression to examine the individual and collective effects of the independent variables on homicide rates shows that strict gun laws do not impact, nor affect homicide rates. The independent variables are GDP, socioeconomic structure, literacy rate, democratic governance, culture, and types of gun laws in each country. Ultimately, an analysis of the regressions shows that other overlooked factors such as GDP, literacy rates, and socioeconomic inequality impact homicide rates more than gun control.

Introduction

On the morning of December 14, 2012, five years after the Virginia Tech Massacre, twenty children and six adults were fatally murdered at Sandy Hook Elementary School by an armed assailant by the name of Adam Lanza. The shootings follow recent mass-killings in a shopping mall in Oregon (2012), a movie theater in Colorado (2012), a Sikh temple in Wisconsin (2012), and a business in Minnesota (Kellerman, 2013). The Sandy Hook massacre joined a growing list of gun-related homicides in such varied places as a high school, a college campus, a congressional constituent meeting, a

day trader's offices, and a military base. Ultimately, these past few gun incidents have made people question the real purpose of guns in twenty-first century America.

This paper analyzes whether or not pursuing gun control measures designed to impose handgun scarcity reduces or affect the total homicide rate. First contextual information is provided for examining this question. Next, a literature review identifies several points of interests to test hypotheses with an international dataset. Ultimately, the question of how gun laws are related to countries homicide rates is examined.

Some Background: The Second Amendment

In the U.S. Constitution, the Second Amendment states, "A well-regulated militia being necessary to the security of a free state, the right of the people to keep and bear arms shall not be infringed" (U.S. Const. Amend. II). It is clear that the Second Amendment does guarantee the right to bear arms; however, recent scholarship has focused on whether the Second Amendment guarantees an *individual* [not collective] right to bear arms and whether that right is incorporated against the states (McGovern, 2012, p. 472). In the landmark case of *District of Columbia v. Heller*, the Supreme Court determined that the Second Amendment guarantees the *individual* right to possess and carry weapons in case of confrontation and the right to bear arms is not premised upon membership in a state-militia (McGovern, 2012). Moreover, the Court declared that any law banning handguns would be considered unconstitutional and would be immediately invalidated (Softness, 2013).

The Supreme Court ruling of *District of Columbia v. Heller* created an adverse reaction among people such as Duke University professor, Philip J. Cook, who stated, "An increase in gun ownership fuels the secondary market by which guns flow to youths and criminals through loans among family and friends, off-the-books sales and theft" (Jost, 2010). However, the Supreme Court assured that the Constitution still left a variety of tools for combating gun violence, such as longstanding prohibitions on the possession of firearms by felons and mentally ill. In addition, the Court also stated that laws forbidding the carrying of firearms in sensitive places such as school zones, parks, and airports were all still constitutional (Softness, 2013). Criminology Professor Gary Kleck, reiterates the Supreme Court's ruling by stating, "No one

is proposing to legalize the possession or acquisition of guns by convicted criminals, which is currently forbidden in every state" (Jost, 2010). Furthermore, the government is a staunch supporter of laws prohibiting the sale of guns to felons and the mentally ill (Softness, 2013).

Why It Matters

Many people feel like they have had enough of this gun violence and these deaths (Mantel, 2013); As a result, it is important to understand why the Founding Fathers decided to create the Second Amendment in the first place. The Second Amendment was designed to protect citizens from oppressive governments. The government banning of individual gun ownership is called disarmament and the argument is that disarmament put people at a disadvantage against its own and/or foreign governments. Disarmament, they have argued, would leave the government able to commit democide or- the murder of a person and/or people by a government. This is precisely the reason why gun-rights advocates are strongly against disarmament. Twentieth Century democide involved civilians disarmed either by long-standing gun bans or ones specially adopted to facilitate the killing (Kates 2003). For instance, the Cambodian genocide in 1975 involved soldiers doing house-to-house searches to confiscate any guns that people could potentially use. As a result, and over time, approximately two million-Cambodians were slaughtered. Hence, the concept of disarming everyone except the government is completely backwards (Kates, 2003). To prevent a government from ever becoming oppressive, people must acknowledge that they need to legitimately possess small arms to resist illegitimate governments, especially democidal governments (Kopel, 2003). As a final point, the Second Amendment was not solely created to protect people from each other, but also to protect people

from something much bigger than them-- something that can ultimately end their freedom.

Literature Review

The current gun-control debate has been met with misconceptions regarding the national homicide rate. As a result, researchers have often overlooked important factors such as gross domestic product (GDP), literacy rates, and socioeconomic inequality that significantly help explain the national homicide rate. The purpose of this research is to examine whether or not pursuing gun control measures designed to impose handgun scarcity reduce or affect the total homicide rate

Pro-gun law advocates believe that banning handguns will lead to a decrease in violence and have a significant decrease in the national homicide rate. For example, Paul Helmke, President of the Brady Campaign to Prevent Gun Violence, states, "Adding more guns to a home, a state or a country leads to more gun violence, not less" (Jost, 2007). Moreover, in1968, Zimring indicated, "the effect of firearm elimination would itself be quite substantial [in decreasing homicide rates]" (1968, p. 737). It is plausible to believe that eliminating firearms would significantly decrease the homicide rate, as stated by Helmke and Zimring, but the elimination of firearms could also produce other unintended consequences, such as creating a profit paradox.

A profit paradox occurs when a government tries to ban a product that is in high demand and, as a consequence, the demand and profitability of the banned product skyrockets in the black market. Thus, the product becomes more available through the black market. For instance, the United States has a strict drug-enforcement strategy, but it is because of this strategy that the profitability and the demand for drugs are so high (Bertram, 1996). Mexico has grown to be the number one supplier of marijuana to the United States and the four

major drug cartels have garnered billions of dollars from drug trafficking (Katel 2008). Currently, gun traffickers operate freely around the globe because little information is available about their activities, and governments have frequently been unwilling to act on the information they have collected (Goldring, 2002). Similarly, cracking down on firearm smugglers is not an easy task since firearm and drug smugglers have not only created a black market, but according to Stohl (2005), they have created an underground economy that consists of a set of interrelated black markets supported by their own systems of information, their own sources of supply, their own distribution networks, and their own modes of financing. This "underground economy" not only allows easy access to cartels, but just about anyone wishing to get their hands on drugs and firearms; hence, banning handguns will not necessarily reduce the availability of them. As a result, simply eliminating firearms may not be the best route to reduce the homicide rate
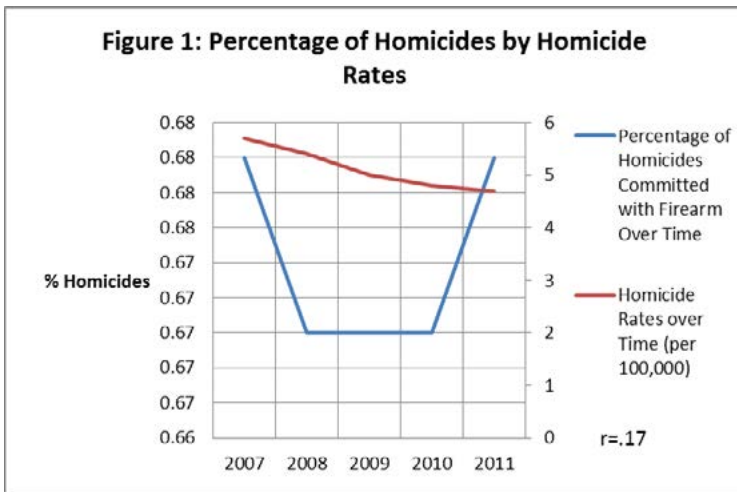
Homicides

While pro-gun law advocates believe that eliminating handguns will decrease the homicide rate, others argue that "pursuing any gun control measure designed to impose handgun scarcity on the general population is both needless and useless" (Stell, 2004, p. 39). In 1968, for example, Zimring found that America's homicide rate depended on the percentage of homicides committed with guns. Stell (2004), however, illustrated that America's homicide rate fluctuated over the course of a century- from a low of 1.1 per 100,000 in 1903 to a high of 10.7 in 1980. Stell (2004) asserted "Unlike the nation's homicide rate, a random sampling indicates that the percentage of homicides committed with firearms has remained comparatively the same [60-70%]" (p. 40) over the time examined.

To affirm Stell's assertion, recent homicide

rates and the percentage of homicides committed with firearms were examined (see Figure 1). The data trend was similar to Stell's finding-- homicide rates fluctuate and declined over time while the percentage of homicides committed with firearms remained relatively constant. For example, the total homicide rate decreased from 5.7 homicides per 100,000 population in 2007 to 4.7 homicides per 100,000 population in 2011. Yet the percentage of homicides committed with firearms remained constant (67%-68%) from 2007-2011. As a result, Stell (2004) demonstrated that America's homicide rate is virtually independent (very weak correlation (r=.17)) of the percentage of homicides committed with guns.

Figure 1

Figure 1: Percentage of Homicides by Homicide Rates

The Misconceptions

Many people assume that the United States has the highest homicide rates because guns are easily obtainable (Kates and Mauser, 2007, p.649). On the contrary, a review of the literature says otherwise. For instance, Kates and Mauser (2007) examined the Russian homicide rate and found that in between the years of 1998-2004, Russian murder rates were about four times higher than the United States and similar rates characterize former Union of Soviet Socialist Republics nations. It is important to note that in the early 1970's the Soviet Union was a generally gun-less country compared to the U.S. Kates and Mauser argue that other weapons are substituted in killings when guns are scarce (p. 649). Another misconception identified in the literature is the relationship between homicide rates and strict gun control. Kates and Mauser (2007), for example, examine this relationship in Europe and found increases in the amount of gun-related crimes. The authors assert that even after handguns were banned in the United Kingdom the use of guns in serious crime increased a hundredfold (p. 655). Moreover, the authors also cite two studies from 2004 by the U.S. National Academy of Sciences,-which reviewed 253 journal articles, 99 books, 43 government publications, and some original empirical research and "failed to identify any gun control that had reduced violent crime, suicide, or gun accidents" (p. 654). Finally, Stell (2004) asserts that banning handguns will not make them scarce, but make them more readily available like other banned substances such as crack, cocaine, and marijuana (p. 45).

Overlooked Data

Several gun-violence analysts have often overlooked and avoided the "socioeconomic predicament and cultural norms of communities with disproportionately high rates of violence" and there cannot be a "satisfactory explanation of lethal violence" without them (Jacobs, 2002, p. 11). Furthermore, in trying to explain the variation between violence rates and gun control laws across different countries, Miron (2001) states that culture, history, and social norms makes attitudes toward both violence and gun control substantially different across countries. Dixon and Lizotte (1987) assert that violent crime rates in southern United States, for example, are not a result from poverty or a violent subculture, but because of "relative deprivations related to ascriptive socioeconomic inequalities in that region" (p. 386). Ultimately, what current gun-violence analysts fail to include in their research are the differences and inequalities in the socioeconomic region they are studying.

Predicting Homicides

A review of the literature reveals that gun laws are not very effective at predicting a nation's homicide rate. Instead, Boix (2008) states, "Violence intensifies in unequal economies in which most wealth is fixed." (p. 392). As a consequence of economic inequality, desperate people in the lower economic classes may resort on other methods to supplement their household income, such as joining gangs, smuggling drugs, and undertaking violent activities. In fact, Collier and Hoeffler (2002) have stated that the supply of rebels increases if the economic opportunity cost of rebellion is low. Sambanis (2004) also linked poverty to violence from the results of a comparative case study project that included twenty-one countries and more than thirty civil wars. The results showed that violence was most prevalent in countries with a low or declining GDP. Unlike gun laws, literacy rates are also effective for predicting a

nation's homicide rate. A low literacy rate in a country blocks people from better employment opportunities; therefore, nations with low literacy rates have higher homicide rates because there is a low opportunity cost in committing violence to achieve a higher social status (Chon 2011). By studying homicides in Latin America, Chon (2011) concluded that economic inequality, poverty, and low literacy rates were significant factors that contributed to Latin America's high homicide rates.

A review of the literature has yielded mixed results. Most literature suggests that banning firearms does not reduce the total homicide rate committed with firearms. On the contrary, banning firearms makes firearms more available through the illicit market; consequently, creating other forms of crime and violence. However, other literature suggests that a country's Gross Domestic Product (GDP) and literacy also serve as good predictors of the total homicide rate. Moreover, homicides can also be traced back to the socioeconomic inequality of a country—an aspect in the literature that is often overlooked and neglected.

Given this literature, this paper examines four hypotheses:

H1: Countries with a low or declining GDP will have higher homicide rates by guns than countries with higher GDP

H2: Countries with low literacy rates will have higher homicides by guns than countries with higher literacy rates.

H3: Countries with high socioeconomic inequality will have higher homicides rates by guns than countries with lower socioeconomic inequality.

H4: The severity or strictness of a country's gun laws will have little to no effect on the homicide rate of a country.

Methodology

The unit of analysis for this research is countries. Two dependent variables are examined—a country's homicide rate and a country's homicide rate by guns. These two dependent variables provide a test of the association of a country's severity of gun laws while controlling for other independent variables. The national homicide rate and gun homicide rates and are measured by the number of intentional homicides per 100,000 people. The homicide rate caused by firearms is measured by the percentage of homicides caused by guns—expressed per 100,000 people.

The principal independent variables are gross domestic product (GDP), socioeconomic structure, literacy rate, and gun law strength in each country (see Table 1). The GDP is measured by the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products, expressed in international dollars using purchasing power parity rates and divided by total population during the same period. The socioeconomic structure is measured by the human development index (HDI) on inequality in distribution of years of schooling based on data from household surveys and the loss in income due to inequality. The loss is the difference between two averages – the arithmetic mean which

Table 1

TABLE 1: List of Independent Variables

Independent Variable	Definition	Source
Gross Domestic Product (GDP)	Sum of gross value added by all resident producers in the economy expressed in international dollars using purchasing power parity rates and divided by total population during the same period.	Human Development Report, published annually by the United Nations Development Program.
Socioeconomic structure Inequality in Education (Inq. Ed.) Income Loss%	Inequality in distribution of years of schooling based on data from household surveys, and the loss in income due to inequality.	Human Development Report, published annually by the United Nations Development Program.
Literacy rate Adult Literacy Rate (ALR)	Percentage of the population ages 15 and older who can, with understanding, both read and write a short simple statement on their everyday life.	Human Development Report, published annually by the United Nations Development Program.
Gun Law Strength	The types of gun laws/policies in each country is a scale measured by the presence or absence of national gun law restrictions (e.g., concealed handgun permitted (0=no restriction, 1=restriction); scale of 0 to 11; 0 being no gun restriction and 11 being the strictest type gun laws.	Retrieved from http://www.gunpolicy.org/

does not account for inequality and the geometric mean which does. The loss, expressed as a percentage, is the relative difference between the two. The literacy rate is measured by the percentage of the population ages 15 and older who can, with understanding, both read and write a short simple statement on their everyday life. The types of gun laws/policies in each country is measured by an additive scale which measured the presence or absence of eleven common national gun restrictions —do citizens have the right to bear arms; does the country require background checks for firearm purchase; are private handguns prohibited; are private semi-automatic firearms prohibited; are automatic assault weapons prohibited; are firearm manufacturers prohibited; does the government require a registration by the gun owner; are private gun sales allowed; are concealed handguns permitted; are non-concealed handguns permitted; and, are gun dealers required to keep a required of gun sales. If the country had the restriction they were given a score of 1 and 0 if the restriction was absent. This scale ranged from 0, no gun law restrictions, to 11, strictest gun laws.

This paper utilizes descriptive and inferential (univariate and multivariate) statistics, principally least ordinary squares multiple regressions to examine the individual and collective effects of the independent variables on homicide rates to test the hypotheses.

Analysis

To examine for issues of multicollinearity, a correlation analysis was conducted with all the variables of interest. A correlation of the independent variables showed that Gross Domestic Product (GDP), Income Loss, Inequality in Education (Inq. Ed), and Adult Literacy Rate (ALR) were statistically significant when correlated with Homicides per 100k (HOM).The same variables, with the exception of adult literacy rate, were also statistically significant when correlated with Gun Homicides. Moreover, the strength of gun law in country failed to be statistically significant with either dependent variables. Finally, to avoid issues associated with multicollinearity, the inequality in education variable was removed from the regression because of its strong association with GDP (r=.760).

By using a multiple regression to examine the individual and collective effects of the independent variables on homicide rates, four regression equations were examined— Model A

Table 2

TABLE 2: CORRELATIONS

	HOM (per 100k)	GDP (PPP$)	Income Loss (%)	GunHomicide	Strength of gun law in country	ALR(%)
HOM (per 100k)	1					
GDP (PPP$)	-.326**	1				
Income Loss(%)	.493**	-.434**	1			
GunHomicide	.909**	-.222*	.540**	1		
Inq. Ed.	-.351**	.760**	-.448**	-.285**		
Strength of gun law in country	.024	.052	-.124	-.027	1	
ALR(%)	-.201*	.468**	-.104	-.058	.051	1

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

with the overall homicide rate; Model B the overall homicide rate without adult literacy rate independent variable; Model C gun homicide; and Model D with Latin America countries only. Table 3 reports the comparative results of the four models (below). Here, for example, Model A shows that strength of gun law is not statistically significant when explaining the homicide rate. The only statistically significant (prob.=.000) variable in this regression was Income Loss with a coefficient (standardized beta) of .44. In all, model A explains 22% of the variance of homicides per 100k (F-test= 7.63).

To increase the R square, ALR was dropped in model B. This variable was the least correlated with HOM per 100k and not statistically significant in the previous regression. By dropping ALR in model B, GDP became statistically significant along with income loss and the R square increased to 29% while the F test increased to 16.54. Here, as GDP decreased, the number of homicides increased. The beta coefficient for income loss was the strongest and

Table 3

TABLE 3: REGRESSION MODELS OF INTERNATIONAL HOMICIDES AND GUN HOMICIDES

	Model A	Model B	Model C	Model D
	Standardized Betas (error)	Standardized Betas (error)	Standardized Betas (error)	Standardized Betas (error)
GDP (PPP$)	-.124 (.000)	-.194* (.000)	.009 (.000)	-.028 (.000)
Income Loss(%)	.436** (.141)	.453** (.123)	.559** (.128)	.100 (.158)
ALR(%)	-.081 (.104)	-	-	-
Strength of gun law in country	.090 (.642)	.088 (.507)	-.008 (.524)	.022 (.460)
Latin American Countries				.605** (3.343)
F	7.63**	16.54**	11.02**	16.60**
Adj R2	.22	.29	.281	.448

** significant at the 0.01 level (2-tailed). * significant at the 0.05 level (2-tailed).

increased from .435 to .453. The relative importance of Income Loss and GDP can be found by squaring their betas of .453 and -.194 respectively, and dividing them which equals to a ratio of 5.40 (.453 squared = .205, -.194 squared = .038, .205/.038 = 5.40). Therefore, Income Loss carries over five times the explanatory power in explaining homicides per 100k population than GDP does.

Strength of gun law also failed to be statistically significant when examining model C for Homicides by Guns (GunHomicide per 100k. Again, Income Loss, with a beta of .559 is the only variable that is statistically significant (prob.=.000). In addition, the R square is .281 while the F test equals 11.02.

Taking a closer look at the frequency distribution of gun homicides reveals that about 70% of the countries in the world have homicides less than or equal to 5 per 100,000 population (mean=5 per 100,000). The countries with the highest homicide rates are those in Latin America, which have homicides way above 10 per 100,000 population. As seen

in the appendix (Table 4), Latin American countries (dichotomized) were highly correlated with gun homicides.

As a result, a fourth and final regression (Model D) was created, which added Latin American countries as a dummy variable along with GDP, Income Loss%, and strength of gun-

-law. The results were astonishing. Here, the Latin American countries variable (33 countries) is the only statistically significant variable while GDP, Income Loss%, and strength of gun law failed to be statistically significant. Model D explained 45% of the variance in gun homicides, and had an F test of 16.6.

Conclusion

The Sandy Hook incident indeed brought a lot of pain to people and fueled the campaign to impose stricter gun laws on the general public. However, this may be a reactionary campaign filled with misconceptions instead of a proactive campaign. The literature suggests that gun laws do not affect homicide rates. In accordance with the literature review, the results of the analysis show that gun law strength does not affect homicides, nor homicides committed with firearms. While GDP was only statistically significant in model B, it illustrates how the economic development of a country can affect its homicide rates. Low economic development is related to

high homicide rates. Interestingly, in models B and C, Income Loss(%) was the strongest and most significant variable out of the three models (A, B, and C), signaling the importance of reducing the income loss percentage in a country

as opposed to imposing stricter gun laws to prevent homicides. Nonetheless, the variable strength of gun law is still not statistically significant; thus, accepting the null hypothesis for strength of gun law and rejecting the null hypothesis for GDP and the socioeconomic structure for model B. The relationship of Income Loss% was negative in models B and C, suggesting again that reducing the income loss% in a country may lead to a greater reduction of homicides and homicides committed with firearms. Because strength of gun law and GDP failed to be statistically significant, the null hypothesis was accepted for both variables, and rejected for Income Loss in model C. Ultimately, GDP, income loss, and gun law strength failed to explain the high homicides committed with firearms in Latin American countries; thus, leaving my research open for continuation.

The limitation of this study is the emphasis of current research. Current research is seemingly over focused on how guns affect a country's homicide rate, instead of focusing on why there is such a high homicide rate in the first place. As seen from the literature review and analysis, guns do not significantly impact homicides rates; therefore, and in the face of popular perception, gun laws are not the simple solution to complex and dynamic social problem. Economic factors, on the other hand, are strongly related to homicides in countries, yet this area of research is often overlooked and neglected. Finally, in all four models (A, B, C, and D), strength of gun law failed to be statistically significant, confirming the hypothesis of the paper that gun laws do not impact homicide rates, nor homicides committed with firearms.

References

Bertram, E. (1996). Drug war politics: The price of denial. Berkeley: *University of California*, p. 15. Retrieved from Google Books.

Boix, C. (2008). Economic roots of civil wars and revolutions in the contemporary world. World Politics 60(3), 390-437. *Cambridge University Press*. Retrieved from Project MUSE.

Chon, D. (2011). Contributing factors for high homicide rate in Latin America: A critical test of Neapolitan's regional subculture of violence thesis. *Journal Of Family Violence*, 26(4), 299-307. doi:10.1007/s10896-011-9365-5

Collier, P., & Hoeffler, A. (2002). Greed and grievance in civil war. *World Bank*, Retrieved from http://economics.ouls.ox.ac.uk/12055/1/2002-.pdf

Dixon, J. & Lizotte, A.J. (1987). Gun ownership and the southern subculture of violence. *American Journal of Sociology* 93.2: 383. Retrieved from JSTOR

FBI. (n.d.). *Federal Bureau of Investigation*. Retrieved from http://www.fbi.gov

Goldring, N. J.(2002). Creating a gobal transparency regime. *SAIS Review* 22(1), 207-211. Retrieved from Project MUSE.

Jacobs, J. B. (2002). Can gun control work? *Oxford: Oxford UP*. 11. Retrieved from Google Books

Jost, K. (2010). Gun rights debates. *CQ Researcher*, 18, 889-912. Retrieved from CQ Researcher

_____. (2007). Gun violence. *CQ Researcher*, 17, 457-480. Retrieved from CQ Researcher

Katel, P. (2008). Mexico's drug war. *CQ Researcher,* 18. Retrieved from http://library.cqpress.com/cqresearcher/

Kates, D. B.(2003). Democide and disarmament. *SAIS Review*. 23(1), 305-309. Retrieved from Project MUSE.

Kates, D. B., & Mauser, G. (2007). Would banning firearms reduce murder and suicide?. *Harvard Journal Of Law & Public Policy*, 30(2), 649-694. Retrieved from Academic Search Complete

Kellermann, A. L., & Rivara, F. P. (2013). Silencing the science on gun research. *JAMA: Journal Of The American Medical Association*, 309(6), 549-550. Retrieved from Academic Search Complete

Kopel, D. B.(2003). The UN small arms conference. *SAIS Review* 23(1), 319-322. Retrieved from Project MUSE

Mantel, B. (2013). Gun control. *CQ Researcher*, 23, 233-256. Retrieved from CQ Researcher

McGovern, O. (2012). The responsible gun ownership ordinance and novel textual questions about the second amendment. *Journal Of Criminal Law & Criminology*, 102(2), 471-496. Retrieved from Academic Search Complete

Miron, J.A.(2001) Violence, guns, and drugs: A cross-country analysis. *The Journal of Law and Economics* 44.S2: 615-33. Retrieved from JSTOR.

Softness, B. S. (2013). Preserving judicial supremacy come Heller high water. *University Of Pennsylvania Law Review*, 161(2), 623-652. Retrieved from Academic Search Complete

Sambanis, N. (2004). Poverty and the organization of political violence. *Brookings Trade Forums*, 165-211. Retrieved from the Project Muse database.

Stell, L. K. (2004). The production of criminal violence in America: Is strict gun control the solution. *Journal Of Law, Medicine & Ethics*, 32(1), 38-46. Retrieved from Academic Search Complete

Stohl, R. (2005). Fighting the illicit trafficking of small arms. *SAIS Review*,25, 59-68. Retrieved from Project Muse.

Zimring, F. (1968). Is gun control likely to reduce violent killings? *The University of Chicago Law Review* 35 (4): 721–737. doi:10.2307/1598883.

The Effects of Swimming on Land Athlete's Sports Performance

Daniel Villarreal

Mentor: Andrew Waldhelm, PhD
Department of Physical Therapy;
University of the Incarnate Word

Description of Research:

This summer my research will be performed with Dr. Waldhelm (Physical Therapist) on the effects of swimming on the sport performance of land athletes such as—soccer, football, baseball, basketball, track, etc. There has been published research that analyzes how land training affects the sport performance of swimmers, but, to our knowledge, the use of swimming as a source of training on the performance of land athletes has not yet been investigated. These 8 weeks of summer research will allow the opportunity to review the literary works needed to actually perform the study. In the fall semester it is our goal to conduct the study we developed over the summer.

Abstract:

Studies have shown that strength has been one of the main factors that has the capability to increase the speed of the swimmer (Morouço, 2012). Common training protocols for elite swimmers to improve speed include both strength and endurance conditioning. Although swimmers use land exercises to improve their sport performance, there is little to no evidence that support the idea of land athletes utilizing swimming as a source of training to enhance their performance. The purpose of this study is to investigate swimming as a mode of training for land athletes. This study will include 28 St. Mary's University soccer athletes (14 male and 14 female) who volunteered and have not suffered an orthopedic injury in the six months prior to testing. The control and experimental group consists of 7 males and 7 females each. Both groups will perform a pretest that will measure their sport performance. The pre-test will include the counter movement vertical jump, shuttle run, and 40 yard sprint (Nesser, 2009). Both groups will continue their regular training regimen for six weeks, but the experimental group will also include swimming, 3 times a week, as part of their training. The swimming participants will do six 25-meter sprints, four 50-meter sprints, and two 75-meter sprints for each training session. Between each sprint, the participants will be given one minute to rest. For the individuals in the experimental group, prior to each swim session the participants will perform a two lap warm up. In addition, a two lap cool down will be performed after their session. After the six week training period, a post-test will be conducted on both groups using the same parameters in the pre-test. Results will be compared between the control and experimental groups using a two-way, repeated-measures analysis of variance tests (pre-post x 2 treatment groups). A significance level of 0.05 will be used for all comparisons. We believe we will observe an increase in sport performance of land athletes with the use of swimming as a training tool.

These results are expected because swimming has been shown to increase strength and endurance due to the total body resistance achieved by swimming. These findings will help improve the field of sport performance by adding swimming as a common exercise to a variety of different land athletics.

Introduction:

Swimming as an Exercise:

According to the Center for Disease Control (2013), in the United States alone, swimming is the fourth most popular mode of exercise. Swimming is an excellent method for an individual to engage in regular aerobic physical activity (C.D.C., 2013). Endurance based exercises, such as swimming and running, can decrease the development of certain health complications like chronic illnesses, and has been proven to improve the health of individuals who suffer from heart disease and diabetes. Not only do swimmers report that water-based exercises are much more enjoyable than exercising on land, but it's also been observed that the morbidity and mortality of swimmers is about half the percentage of inactive individuals (C.D.C., 2013). Furthermore, swimming is an activity undertaken by all ages, from infants to elderly. Although not specifically utilized for the purpose of exercise, infants can use swimming as a source of training to protect themselves if their life is in danger. In today's society, there is a program called the Infant Swimming Resource (ISR) that has a record for the safest and most comprehensive drowning prevention swimming program for children whose ages ranged from six months to six years (Coe, 2013). On the other end of the spectrum, elderly have often used swimming as a source exercise since it has a significantly lower impact on their joints compared to other modes of exercise. In this section we will introduce the physiological benefits of swimming,

forms of training, and the use of swimming to improve performance.

Physiological Benefits of Swimming:

Swimming is a form of aerobic exercise with a number of mental and physical health benefits. Swimming can have a positive effect on an individual's mental health; Berger (1992) found swimming improved moods in both males and females. Thomas-Carus (2008) discovered swimming in warm water can have a significant decrease in anxiety and depression, as well as an improvement in the mood of women who suffer from fibromyalgia. An extremely important physiological benefit of swimming is the improvement in cardiovascular function. For those who don't exercise there is a higher risk of cardiovascular disease. According to Fletcher (1996, pg.1) "aerobic physical activity", such as swimming, "increases exercise capacity and plays a role in both primary and secondary prevention of cardiovascular disease." The improvement of sports performance and cardiovascular endurance may be the result of the body's ability to regulate oxygen to create energy that is used for work (Fletcher, 1996, pg. 2). Also, Fletcher (1996) explains that during aerobic exercise there is an increase in cardiac output and the volume of blood released by the heart, which positively affects the amount of blood that is used by exercising muscles. These muscles then use the oxygen extracted from the blood to increase the body's performance. Therefore, aerobic activities increase cardiac output which directly improves the efficiency of muscle activity (Fletcher, 1996). Swimming is one of the few types of exercise that requires several muscle groups to contract at the same time. Water provides this by providing continued resistance during the exercise (Turner, 2012).

In swimming, there are different stroke forms that one can perform to maximize

the number of muscles or groups of muscles that are worked. A prime example would be the butterfly stroke, which primarily uses back muscles. Another example are the front strokes, such as free-style, or breast stroke, which utilizes chest muscles as well as-- back muscles, gluteus maximus and minimus, hamstrings, and quadriceps (C.D.C., 2013). The more an individual swims the more lean muscle that may be created resulting in the improvement of one's metabolism (Turner, 2012). Another benefit of swimming is that it's a low-impact type of exercise, so it's a great form of exercise for those who are suffering or recovering from an injury (C.D.C., 2013). A low impact exercise is one in which excessive weight bearing on your body's muscles and joints is avoided, it does not include jumping, jogging, or hopping, sparing possibly injury or overload to the joints (Turner, 2012). The water takes pressure of joints, therefore individuals who suffer from arthritis and joint pathologies could benefit from using swimming as an exercise (Turner, 2012). For those individuals who do not suffer from injuries, swimming remains a great preventative exercise because it can prevent future, acute or chronic, injuries from occurring.

Forms of Training:

In competitive swimming, the main goal is to cover a specific distance in the shortest amount of time. According to Morouço (2012), strength has been one of the main factors that may have the capability to increase the speed of a swimmer. A common training protocol for elite swimmers includes both strength and endurance conditioning. Aspenes (2009) reports that the influences of strength and endurance training on sports performance have been investigated in different sports but the findings are inconclusive. There are some studies that have observed the correlations are negative, some found no correlation, and others claim there may be supplemental

benefits from the combination when the training is applied correctly (Aspenes, 2009). One example of a positive correlation was found through the combination of strength and endurance training in both basketball and soccer athletes (Aspenes, 2009). An example of minimal correlation would be the relationship between training volume and improved performances in swimmers. (Aspenes, 2009).

Swimming to Improve Performance:

As mentioned earlier, the main goal of a competitive swimmer is to increase their speed. Swimmers do this, not only by dry land training, but also in the water. According to Evans (2007, pg.1) "swimming is the ultimate all-in-one fitness package, working most muscles in the body in a variety of ways with every stroke" (Evans, 2007, pg. 1). Another benefit of swimming is that there is a larger increase in muscle strengthening because there is more resistance in water then there is in air. (Evans, 2007, pg. 1). Swim training also improves core strength, which is also important for one's overall health. According to Evans (2007, pg.1) the use of swimming as a training tool improves the hip, back, and abdominal muscle strength, which are also vital to the sport performance of swimmers. Also, swimming has a positive impact on the cardiovascular system. When swimming, there is limited breath intake, which can indirectly train the lungs to have a greater lung capacity and a consistent intake of oxygen. Using swimming as a source of training also allows both aerobic and anaerobic benefits to be gained through the same exercise (Evans, 2007, pg.1). Even though swimming has numerous benefits, competitive swimmers still incorporate land exercises to their training regimen in order to ensure an increase in sport performance. According to Richards (n. d., pg. 1-20), land based exercises are used to enhance the muscles by increasing their strength and muscular endurance. These

land based exercises are done in multiple repetitions and usually include exercising the core. Some examples of the abdominal exercises would be abdominal crunches, abdominal pikes, sit-ups, different variations of push-ups, squats, tricep dips, and leg lifts (Richards, n.d., pg. 1-20).

Research Question:

Although there are several studies focused on how land-based training, such as how resistive exercises can improve the performance of competitive swimmers, there are few studies examining how swimming can affect the sport performance of land based athletes. Therefore, the purpose of this study is to determine the effectiveness of swimming as a source of training for land athletes. We believe the performance of land athletes will improve with the utilization of swimming as a source of training.

Methodology:

Study Design:

This study will be conducted with the use of an experimental pre and post-test design.

Participants:

This study will be performed on 28 St. Mary's University soccer players (14 male and 14 female) who volunteer and who have not suffered an orthopedic injury in the last six months. The control and experimental group will both have 7 males and 7 females. All participants must sign an informed consent which was approved by the University Institutional Review Board before they are allowed to participate.

Procedure:

Each participant will first perform a pre-test so that a comparative amount of data can be established for each person in the participant pool. This pre-test includes the counter movement vertical jump, shuttle run, and 40 yard sprint. (Nesser, 2009).

The participants will then be assigned to an experimental or control group. The experimental and control group will continue with their normal exercise regimen and daily practices, with the incorporation of swimming to the experimental group's training. The athletes will participate in the training portion of the experiment for six weeks. The experimental group will be swimming 3 times a week. While in the pool, the participants will do six 25-meter sprints, four 50-meter sprints, and two 75-meter sprints. Between each sprint the participants will be given a one minute rest. Prior to each swimming session, the participants will perform a warm up and a cool down after completing their session. The warm up and cool down will be comprised of 2 free-style laps at their own speed. After the study, a post-test will be conducted using the same parameters as the pre-test.

Statistical Analysis:

In this experiment there is one independent variable which is swimming. Results will be compared between the control and experimental groups using a two-way, repeated-measures analysis of variance tests (pre-post x 2 treatment groups). A significance level of 0.05 will be used for all comparisons

Discussion:

We believe we will not reject our initial hypothesis because swimming has been shown to increase strength and endurance. Should the hypothesis not be rejected the findings would help improve the field of sport performance by incorporating swimming as a common exercise to a variety of different land athletes and their training regimen.

References

Aspenes, S., Kjendlie, P., Hoff, J., & Helgerud, J., (2009). Combined strength and endurance training in competitive swimmers. *Journal of Sports Science and Medicine*. Retrieved from: http://www.jssm.org/vol8/n3/7/v8n3-7text.php.

Berger, B. G., & Owen, D. R., (1992). Mood alteration with yoga and swimming: aerobic exercise may not be necessary. *National Center for Biotechnology Information*. Percept Mot Skills. 75(3 Pt 2):1331-43.

Centers for Disease Control and Prevention. (March 6, 2013). Health benefits of water-based exercise. Retrieved from: http://www.cdc.gov/healthywater/ swimming/health_benefits_water_exercise.html

Coe, R., (2013). Infant Swim Resource. *Orlando Family Magazine*. Retrieved from: http://www.orlandofamilymagazine.com/family-resources/infant-swim-resource/

Evans, J. (2007). Why choose swimming? *Human Kinetics*. Retrieved from: http://www.humankinetics.com/excerpts/excerpts/why-choose-swimming

Fletcher, G. F., Balady, G., Blair, S. N., Blumenthal, J., Caspersen, C., Chaitman, B., Epstein, S., et. all. (1996). Statement on Exercise: Benefits and recommendations for physical activity programs for all americans. *American Heart Association*. 94:857-862. doi: 10.1161/01.cir.94.4.857.

Gowans, S. E., & deHueck, A., (2007). Pool exercise for individuals with fibromyalgia. *Current Option in Rheumatology*. 19(2):168-73.

Morouço, P. G., Marinho, D. A., Amaro, N. M., Peréz-Turpin, A., & Marques, M. C. (2012). Effects of dry-land strength training on swimming performance. *Journal of Human Sport & Exercise*. 7 (2). Retrieved from: http://www.jhseua.es/jhse/article/view/371/546

Nesser, T., & Lee, W. (2009). The relationshiop between core strength and performance in division I female soccer players. *Journal of Exercise Physiology*.

Richards, R. (n. d.). Core body strength exercises for swimmers. *Arena Swim Club*. Retrieved from: http://fanaragon.com/ficheros/articulostecnicos/Core_Strength_Manual.pdf

Tomas-Carus, P., Gusi, N., Hakkinen, A., Hakkinen, K., Leal, A., & Ortega-Alonso, A. (2008). Eight months of physical training in warm water improves physical and mental health in women with fibromyalgia: a randomized controlled trial. *Journal of Rehabilitation Medicine*. 40(4):248-52.

Turner, R. (2012, January 31). Protecting your joints one low-impact swim at a time. *Columbia Daiy Spectator*. Retrieved from: http://www.columbiaspectator.com/2012/01/31/protecting-your-joints-one-low-impact-swim-time