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EDITOR'S INTRODUCTION

Does an infant's immune system respond better to breastfeeding despite the availability of advanced formula? Has investor confidence improved since the passage of the Sarbanes-Oxley Act? How do paper towels absorb liquids even when it means defying gravity? Are sociocultural factors responsible for the superior performance of males on math and science standardized tests or is there a biological basis? Students at Wagner want to know and are conducting research to find answers to these and other questions. Read on and see what they have discovered.

The Wagner Forum for Undergraduate Research is an interdisciplinary journal which provides an arena where students can publish their research. Papers are reviewed with respect to their intellectual merit and scope of contribution to a given field. To enhance readability the journal is typically subdivided into three sections entitled *The Natural Sciences*, *The Social Sciences* and *Critical Essays*. The first of these two sections are limited to papers and abstracts dealing with scientific investigations (experimental and theoretical). The third section is reserved for speculative papers based on the scholarly review and critical examination of previous works.

Gregory Falabella and Richard Brower, Editors

Section I: Eastern Colleges Science Conference[1]

Abstracts

[1] Papers and posters presented at the 60th Eastern Colleges Science Conference held in Philadelphia, PA on April 21-22, 2006.

Section II: The Natural Sciences

Full Length Papers

Section III: The Social Sciences

Full Length Papers

Section IV: Critical Essays

Full Length Papers

Section I: Eastern Colleges Science Conference

Investigating Scaling in Brownian Motion[1]

Brittany Corn (Physics) and Dr. Otto Raths (Physics)

Upon revisiting Jean Perrin's 1909 experiment on Albert Einstein's theory of Brownian motion, we investigated whether it only holds true for Perrin's thirty-second intervals, or for any scale of time. Various applications of this experiment will also be discussed.

Nanotechnology: The Organic Synthesis of Cyclacenes and Introducing Nanotechnology to the Public

Diana D'Onorio DeMeo (Chemistry), Kim Farrell (Chemistry)
and Dr. Wendy deProphetis (Chemistry)

Scientists are always studying ways to invent new materials that will be beneficial to society. One way in particular is through nanotechnology, which involves many areas of research dealing with and manipulating objects that are measured in nanometers. One major material in the field is the carbon nanotube, a long, cylinder shaped structure that is considered one of the allotropes of carbon. The objective of this research was to design and apply a synthesis for a cyclacene, a compound that consists of a single ring of an armchair carbon nanotube, to further the benefits of nanotechnology to humanity. The synthesis requires several reactions, where two reactions were completed. The first reaction synthesized 1,2-phenylenebis(2-ethynylbenzyl alcohol) from a palladium-catalyzed cross coupling reaction of ethynylbenzyl alcohol with o-diiodobenzene in triethylamine. The second reduction reaction synthesized 1,2-phenylenebis(2-Z-ethenylbenzyl alcohol) from the 1,2-phenylenebis(2-ethynylbenzyl alcohol) using Lindlar's catalyst. These reactions were the initial steps toward synthesizing cyclacenes, where their applications will benefit the public. Essentially, this, as well as other research, explores the many applications that nanotechnology has to offer in everyday life. In order to educate the public at an early age, a workbook was developed to introduce nanotechnology to elementary students grades six through eight. Tabletop demonstrations were performed at Liberty Science Center to illustrate how useful and versatile this technology has become. Assessment forms were filled out by participants, which include children able to write as well as adult participants. The feedback received and analyzed was overall positive and therefore, led

[1] Recipient of Outstanding Platform Presentation in Physical, Chemical, Mathematical, Computer, Electrical and Nanotechnical Sciences Award

to a teacher workshop. The workshop allowed educators to learn how to use the workbook in classrooms and to utilize the tabletop demonstrations as their own classroom activities. The comments and continued support and interest from Liberty Science Center and educators from New Jersey schools has allowed further research to be performed in this growing area of science.

The Hormetic Effects of Ethanol: Enhanced Cell Proliferation, Migration and Differentiation as Seen in Surviving Organotypic, Adult Zebrafish Brain Cultures II. An Ultrastructural Analysis[2]

Vincenzo DiMaggio (Biology), Richard Maltese (Biology), Christopher Corbo (Biology), Prof. Linda Raths (Biology) and Dr. Zoltan Fulop (Biology)

Hormesis is a phenomenon that refers to the fact that toxic agents in extremely low concentrations are actually beneficial. In this research we studied the effects of low ethanol concentrations (0.01% and 0.025%) on surviving adult brain tissue. Fifty-four adult zebrafish optic tectum were cut into four pieces each and kept in organotypic culture for 0,2,6,12,24 hours and 2,4,7 and 14 days. Control samples were maintained in minimal essential medium without alcohol. Experimental groups were exposed to either of the alcohol concentrations for 10 minutes in the same medium before cultivation. At the designated time point the tissue samples were fixed and processed using electron microscopic histotechniques. First a set of semithin sections were cut and analyzed. The findings of that study were published as the first part of this series at the TriBeta research conference in 2006. In this part of the study, ultrathin sections were cut on a Reichert OM-1 ultramicrotome with glass knives. Sections, stained with uranyl acetate and lead citrate, were analyzed under a Philips CM 100 transmission electron microscope equipped with a Kodak digital camera for a PC. Several samples were dehydrated and processed for scanning electron microscopy. A Hitachi HHS-2R scanning electron microscope equipped with a large format Polaroid camera was used for analysis. The poster will depict different electron micrographs demonstrating the effects of ethanol. Ethanol, as it was shown earlier, facilitates neovascularization and the formation of new embryoid bodies by enhancing cell proliferation, cell migration and cell differentiation.

[2] Recipient of Outstanding Poster Presentation in Anatomy, Developmental Biology and Physiology Award

Cognitive Dissonance and Intentions to Use Condoms in College Students

Stephanie Nygard (Psychology) and Dr. Amy Eshleman (Psychology)

College students are keenly aware that condom use is the most effective way for sexually active individuals to reduce chances of contracting sexually transmitted disease. Yet college students sometimes engage in unprotected sex. Stone, Aronson, and Crain (1994) demonstrated that inducing cognitive dissonance through asking individuals to remember past risky sexual behaviors causes greater intentions to use condoms in the future. In a replication, feelings of hypocrisy were induced through reminders of past personal risky sexual behaviors followed by asking participants to create a public service announcement for younger students regarding dangers of unprotected sex. Participants in the hypocrisy condition were predicted to elect to take more condoms (offered in the laboratory) than would participants in two comparison conditions. Data are being collected; results will be presented at the conference.

Establishing Conditions for the Detection of GFP Transcription in E. Coli Using RT-PCR

Christi O'Donnell (Chemistry) and Dr. Roy Mosher (Biology)

The recombinant plasmid pGLO contains the green fluorescent protein gene (gfp) from the jellyfish Aequorea victoria, under the control of the PBAD promoter from the arabinose operon of Escherichia coli. The expression of gfp in this system is positively regulated by arabinose and is also subject to catabolite repression by glucose. The expression of gfp can be monitored at the translational level by exposing arabinose-induced cultures to long-wave UV light (which causes a green fluorescence) or at the transcriptional level by using reverse transcriptase-polymerase chain reaction (RT-PCR). The goal of this project is to develop and optimize conditions for the facile detection of gfp transcription in E. coli by RT-PCR. Total RNA has been extracted and purified from Escherichia coli DH5 F'IQ (pGLO) cultures grown under three different conditions: with arabinose, with glucose, or with no added sugars. Samples from each of these extracts will be individually combined with oligonucleotide primers (known to amplify a 247-bp DNA fragment within the GFPuv open reading frame), reverse transcriptase, and DNA polymerase, and then subjected to a one-step RT-PCR reaction. It is expected that amplicons will be detected only when using total RNA from arabinose-supplemented cultures.

Absorption-A Physical Interpretation[3]

Kaitlin Buffington (Physics) and Dr. Otto Raths (Physics)

A look at the properties of water absorption, from a physical view. Absorption seems to violate a simple rudimentary rule of physics - conservation of energy. A look at the apparent violation of gravity and conservation of energy in absorption of water in paper. Energy is being generated from the change in the structure of the paper when wet.

Effects of Seating Arrangements and Assigned Seating on Group Discussion in a Classroom Setting

Meghan Dennis (Psychology) and Dr. Amy Eshleman (Psychology)

Horse-shoe table arrangements and assigned seating are predicted to create an atmosphere more conducive for group discussion than rows of tables and free seating. Eye contact plays an important role on group discussions. Argyle and Dean (1965) found that eye contact is an important tool for feedback which brings on future comments and signaling an open channel of communication. Table arrangements in the shape of a horse-shoe should increase the likelihood for more discussion mainly based on the eye contact findings. Assigned seating should help create a more equal atmosphere for participants interacting in the group discussion by giving an equal opportunity for where they will be sitting. Data is in the process of being collected and will be reported at the conference.

Morphological Description of the Cortex of the Adult Zebrafish Optic Tectum

Nidaa Othman (Biology), Christopher Corbo (Biology), Prof. Linda Raths (Biology) and Dr. Zoltan Fulop (Biology)

The optic tectum of adult zebrafish was studied with different light-microscopic techniques and by electronmicroscopy to reveal the cellular construction of the organ. Images obtained from classical Golgi impregnation were combined with images derived from immunocytochemical reactions, such as glial fibrillary acidic protein (GFAP), glutamine synthetase (GS) for glial cells and Nestin for neurons. Special attention was

[3] Recipient of Outstanding Platform Presentation in Physical, Chemical, Mathematical, Computer, Electrical and Nanotechnical Sciences Award

paid to the neuronal/glial and glial/endothelial co localization, as well as to the Meninges and Ependymal layer. At the ultrastructural level we focused on synaptic arrangements and glial/endothelial relations. To conclude, visualization of the relationship between different structures was enhanced by super imposing the images of various cell types obtained from specifically stained preparations onto an overview picture of the whole cortex stained with tolluidine blue. The authors greatly appreciate the moral and financial support of their anonymous benefactor.

Section II:
The Natural Sciences

Absorption – A Physical Interpretation

Kaitlin Buffington (Physics)[1]

Absorption is a physical or chemical phenomenon, in which atoms, molecules or ions enter some bulk phase, liquid, solid or gas. Usually in physics absorption refers to the phenomenon by which a substance retains the energy of radiation of particular wavelengths; for example, a piece of blue glass absorbs all visible light except the wavelengths in the blue part of the spectrum. In this experiment however, we investigated absorption of water in a simple everyday product, paper towel. This experiment is the physical interpretation of absorption, an investigation of the source of energy in the process of absorption, and the mechanisms behind elasticity.

I. Introduction

This is a preliminary study of the properties of water absorption from a physical view. We looked at the process of absorption of water in paper when dipped vertically, and observed that the process seems to violate the laws of conservation of energy. So our objective is to find the source of energy that draws the water up a piece of paper towel.

Our experiment seems to violate the laws of conservation of energy. The law of conservation of energy states that the amount of energy in a system has to remain constant; the amount of energy that is put into the system must equal the amount of energy we get out. Energy in a system must remain constant. It also states that energy can neither be created nor destroyed in a system. However, energy can be converted from one form of energy to another, for example from potential to kinetic. This is imperative in this experiment.

What is happening in our specific system? *Why* does the paper towel absorb the water? *How* is the water absorbed? Paper towels are made out of fibers of cellulose. Paper is also a polymer, which consists of many small molecules linked together in an enormous chain. The small molecules or "monomers" that make up cellulose are sugar molecules. We can not get any nutritional value from these sugar molecules however it does have one important thing in common with sugar: both chemicals cling tightly to

[1] Research performed under the direction of Dr. Otto Raths (Physics) in partial fulfillment of the Senior Program requirements.

water molecules. The presence of many hydroxyl groups on the sugar molecules allows them to form strong bonds with water molecules. Therefore when you dip the paper towel in water, the water molecules rush into the towel to bind to the cellulose fibers and the towel absorbs water. However this does not tell us the source of the energy.

Everyone knows that paper absorbs water, and other liquids. Yet, most people never question why, when a piece of paper towel is dipped vertically into a cup of water, the water is able to seemingly rise up the paper against gravity. There is no obvious source of energy, we are not heating the water, and we are not putting any energy into the system. Maybe the energy is coming from the displacement of water when the paper enters the water. By simply putting the paper in the water, water is being displaced, could this be the source of energy? Water displacement is not a factor since we are using a large beaker, and a small area of paper, the amount of water displacement is minimal compared to our large beaker. Therefore what is the source of energy that we are looking for?

Before further investigating the source of energy, we look into what would happen if there was no source of energy. If there was no source of energy, we would then be able to use the paper as a wick and bring the water from a lower energy state to a higher energy state without any work. This would result in work out without any work in, an impossibility by physical law, and a clear violation of the laws of conservation of energy. Therefore there has to be a source of energy. After going through all of the possibilities of the source of energy we came to a hypothesis, which states that the source has to have to do with the structure of the paper towel itself. We believe that the energy which is forcing the water up the paper towel is from the change in the structure of the paper, when wet and when dry. Possibly the potential energy of the dry paper is converted to kinetic energy when wet. We believe that maybe the fibers are in a curled haphazard state when dry and uncurl or straighten when wet releasing enough energy to pull the water up the paper.

II. Experimental Procedure and Results

We now research our hypothesis experimentally. Our first step was to cut the paper towel into 3/4 inch strips which we then weigh; this will help us calculate the total amount of water absorbed. Next I created an apparatus to keep the wood standing up straight without holding it. We wanted to ensure that I was not putting any energy into the system. If we minimize human contact with the system we are able to minimize human error. We then fasten the paper to a non-absorbent substance as to not interfere with our absorption. We do not want the substance that we adhere our paper to, to do any

absorbing in itself. Consequently the wood which we attached the strips to was wrapped in tape to hinder absorption within the wood.

Given that we are interested in the energy of the system we would like to calculate the change in energy per unit area. We acquire this by measuring the height which the water rises to after being immersed in the water. However before we do this, we need to decide how long to keep the paper immersed in the water. Therefore we took some preliminary times, observing how high the water rose, and as Figure 1 shows as the time approaches two minutes there is minimal rise in height. There is a large rise in height within the first 15 seconds and as time increases the rise in height decreases. Therefore we chose 2 minutes to be our final time. Now, we repeat our dipping process 10 times measuring each time the height which the water rose to, and the amount of water absorbed. By taking this data and using the following formulas we are able to calculate the amount of energy that the system is using, which we believe can be attributed to the structure of the fibers.

Area = Height * Length

Center of Mass = Height risen / 2

Change in Energy = Weight (H_2O) *Center of Mass

The amount of energy that we attribute to the fibers (Table 1) is 0.06014. This may seem like a negligible amount; however this is the energy which is unaccounted for and unaccounted energy is not negligible.

While dipping the paper into the beaker, I observed that after pinning the paper flat onto the wood, and wetting it, the paper would buckle away from the wood, which leads me to believe that the paper was increasing in length. This would support our hypothesis of the fibers “uncurling” or lengthening to release energy. Therefore I measured a few strips of paper dry, and then completely wet. There was a definite increase in length by at least 0.5 centimeters (Table2).

The next step was to look at the fibers microscopically to see if there are any noticeable differences in the arrangement of the fibers when wet. We hoped to see a difference in the structure, so that we can label this being the source of our unaccounted energy. The dry fibers are very haphazard and very curled (Figure 2.1). This is the state in which the potential energy is stored. In contrast the wet fibers seem to have relaxed and uncurled, straightened (Figure 2.2). In this state the potential energy is released and converted to kinetic energy. Now we can attribute the change in energy that we calculated to the change in structure of the fibers.

We also wanted to investigate the elasticity of the paper. After being wet would the paper go back to its original length and structure after it dries? In order to do this we took strips that we already knew the length of dry, and measured them again after they have been wet and allowed to dry (Table 3). As you can see from this chart we believe there to be some minimal change in the structure of the paper because the re-dried paper in most cases was shorter than its dry state. To further investigate we then looked at the re-dried paper under a microscope to see if there is any observable difference (Figure 2.3). These re-dried fibers seem to have relatively the same structure as the dry fibers (Figure 2.1). We also re-dipped the strips into the water again to see if the water would rise to the same height, therefore release the same amount of energy (Table 4). We see that the water does not rise to the same height in the re-dried strips as it did in the dry. Even though we can not see the change microscopically there is a change in the amount of energy the fibers can release. As a result the paper is not completely elastic.

An additional aspect of this phenomenon that was investigated was the rate of absorption. We were able to calculate the change in radius as a function of time, by videotaping the process of a single drop of water being absorbed into paper. The observation that the drop makes an elliptical shape was unexpected. We would have presumed that the absorption rates in both directions would be equal. However, we observed that the rate at which the water was absorbed through the fibers vertically was greater than the horizontal rate. This leads us to believe that the fibers have a preferred direction of absorption. The fibers more readily release their energy in the vertical direction rather than the horizontal direction. We can deduct that the rate of absorption calculated in Table 5, shows us the rate at which the fibers release their energy. This is an intriguing subject and much more research can be done on this particular occurrence.

Since our experiment is preliminary we were not able to completely investigate many aspects of absorption that we would have liked. We also had some concerns with our experimentation that we would like to resolve further. One of our main concerns while conducting this experiment was our assumption of uniform absorption, when calculating the center of mass. In reality due to gravity there is most likely more water mass at the bottom of the paper towel, relative to the rest. So we would like to perfect those methods of collecting data. Some ways of doing this would be to find a way to cut the paper when wet; this is difficult due to the structure of the wet paper. We also thought of using a radioactive substance and a counting method. We would use a radioactive substance in the water and then let the paper dry and count the amount of the substance in each strip. This would tell us the amount of water that was absorbed in each strip. I would also like to look at different substances, such as oil or alcohol to see if they have the same

absorption properties as water. In addition I would like to look at different temperatures of water to see if there are any differences.

Some applications that we thought applied to this experiment are trees and plants. When you water a plant or it rains, the water is absorbed through the plants roots and it is pushed up to its leaves and buds. Differently plants are alive, unlike our paper, therefore they have different structures, but as I stated in the beginning plants and paper are all made up of cellulose fibers, therefore they all act in a similar manner.

III. Conclusions

There were many aspects of this experiment which were investigated. We discovered that the energy that is pulling the water up the paper towel is from the conversion of potential energy to kinetic energy of the fibers. Therefore the apparent violation of conservation of energy is false. Also we discovered the elasticity of our paper using our re-dry fibers. They looked similar to our dry though there still was some change in the amount of energy released from the fibers the second time around. Therefore the paper is not completely elastic, it does not go back to its original length or release the same amount of energy. We concluded much from this experiment, and there is much more to be concluded.

IV. Works Cited

1. Bloomfield, Louis A. "How Things Work", http://howthingswork.virginia.edu/.

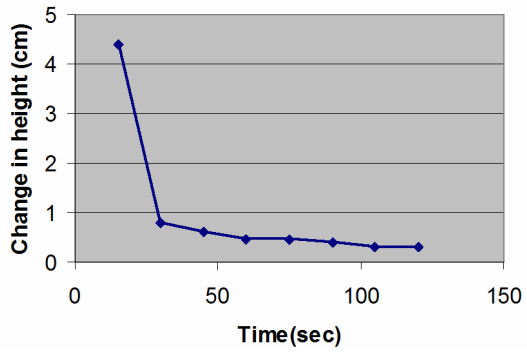

Figure 1: Rise in Height

Table 1: Energy Attributed to the Fibers

Sample #	**Rise in Height (cm)**	**Area (cm2)**	**Weight H2O (gram)**	**Center of Mass (cm)**	**Δ Energy (g*cm)**	**Δ Energy / Area (g/cm)**
1	6.50	12.350	1.903	3.25	6.185	0.5001
2	6.70	12.730	1.942	3.35	6.506	0.5112
3	6.45	13.645	1.923	3.225	6.202	0.4545
4	6.00	12.000	1.893	3.000	5.679	0.4733
5	6.90	13.800	2.041	3.450	7.041	0.5102
6	7.10	15.123	2.354	3.550	8.357	0.5526
7	7.50	15.375	2.560	3.750	9.600	0.6244
8	7.00	13.300	2.364	3.500	8.274	0.6221
9	6.90	12.420	1.844	3.450	6.362	0.5122
10	6.80	11.900	2.129	3.400	7.239	0.6083
Average	*6.805*	*13.254*	*2.097*	*3.3925*	*7.172*	*0.5369*

Table 2: Increase in Paper Length

Height dry (cm)	**Height wet (cm)**
20	20.7
20.1	20.5
20.1	20.5
20.2	20.5
20.2	20.6

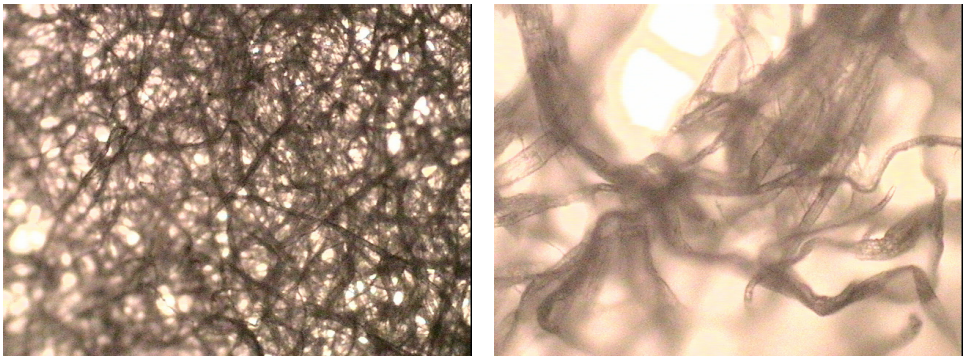

Figure 2.1: Dry Fibers

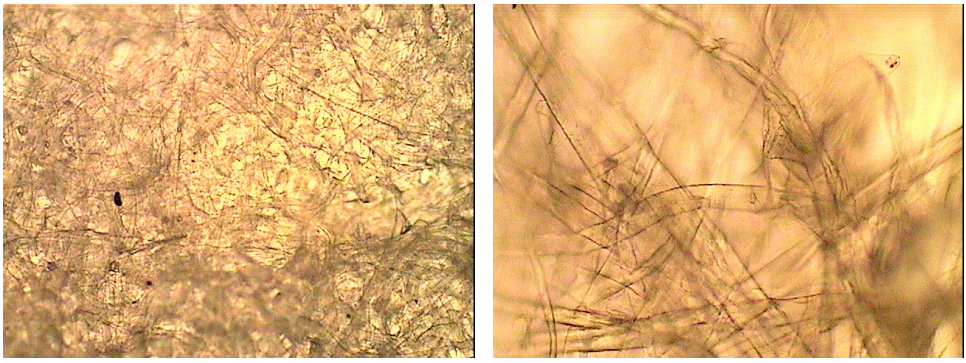

Figure 2.2: Wet Fibers

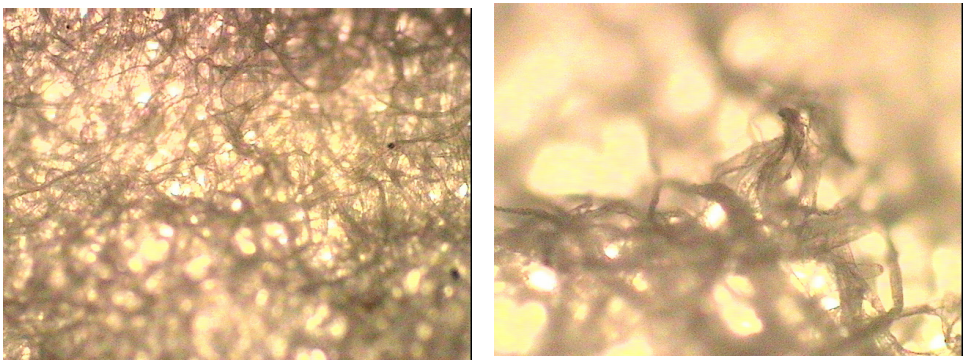

Figure 2.3: Re-dried Fibers

Table 3: Elasticity of the Paper

Height Dry (cm)	Height Re-dry (cm)
20	20
20.1	20
20.1	20
20.2	20
20.2	20.1

Table 4: Elasticity after Multiple Dips and Re-Dries

Height Dry (cm)	Height Re-Dry (cm)
7.4	6.6
7.5	6.6
7.4	6.7
7.5	6.8
7.3	7.0

Table 5: Average Rate of Absorption

Time (seconds)	Vertical Radius	Horizontal Radius
1	0.500	0.500
2	1.015	0.913
3	1.275	1.117
4	1.483	1.308
5	1.533	1.458
6	1.625	1.496
7	1.767	1.533
8	1.875	1.575
9	1.944	1.630
10	1.963	1.646

Section III:
The Social Sciences

Evaluation of Gender Differences in Mathematics and Science in Early Childhood and Adolescence

Courtney Small (Nursing)[1]

The past two decades have seen a large increase in the opportunities, training and encouragement given to girls and women in the areas of mathematical performance. Although some progress has been made, the number of women majoring in math-related disciplines is still only a fraction of what it is for men. Statistics also continue to reveal that women's performance on standardized math tests falls way below their male counterparts, regardless of Grade Point Averages. What, then, is the cause for these continuing differences in male and female involvement in the math and science fields? Some believe it has biological explanations, others believe it has sociocultural implications. Two classes consisting of third and fourth grade students were asked to draw a picture of a scientist. The focus of this research was to determine whether the cause of these differences are purely based on stereotypes and cultural implications, if there are true differences in the male and female brain, or if it is a combination of the two. Results indicated that there is indeed a stereotype, beginning in early childhood, of males being predominant in higher science professions with over 75% of the pictures in both grades drawn as males.

I. Introduction

Gender differences in math ability have been a topic of interest to researchers, educators and doctors for years. Controversies have raged over whether gender differences do exist, and if they do, the causes of these differences. There is proof that females consistently score significantly lower on standardized tests, including the Scholastic Aptitude Test, and the Advanced Placement tests. Males also dominate math and science related professions. The purpose of this research is to identify the reasons for these differences. What is causing our females, the dependent variable, to consistently score lower on any given mathematical task? Many believe that the independent variable in this sequence is the fact that male and female brains are intrinsically different; they develop differently, and more importantly, at very different times. For example, when children are first learning math skills, a girl's brain may not be apt to understand the ways in which

[1] Research performed under the direction of Dr. Lauren O'Hare (Nursing).

teachers are usually presenting the material. This could consequently build a foundation in the young girl's mind, "I'm just not good at math," which could carry throughout her life. We know that self-concept has much to do with performance in an area. Research questions include:

1. Are females in grade school receiving lower grades than their male counterparts?
2. Are females in grade school participating at the same level in math classes as males?
3. Do statistics support the theory that females are scoring lower on standardized tests, such as the SAT and Advanced Placement tests?
4. Do statistics show that male and female brains are intrinsically different?
5. Are stereotypes of math being a male-dominated field present in the classrooms of our youngest generations?

II. Hypothesis

- Due to the differences in structure in the female and male brains, the conventional teaching of math is more beneficial to males, rather than females.
- Due to the differences in structure in female and male brains, females will suffer from low math self-concept earlier than compared to males.

Although statistics reveal that there has been some progress made in the number of women who choose to major in and obtain bachelor degrees in mathematics or the natural and physical sciences, the number of women majoring in other math related disciplines is still only a fraction of that for men. (National Center for Educational Statistics, 2003). Forty-four percent of incoming male freshmen who intended to major in science chose engineering as their initial focus, compared with only twelve percent of females. Fifteen percent of men chose computer science, compared with three percent of women.

Statistics also reveal that female's performance on standardized math tests still lags behind that of their male peers. The Scholastic Aptitude Test (SAT) was developed in the 1920's as an outgrowth of the Army Alpha, the first mass-administered IQ test. The SAT test was first administered in 1943 and became widely used after 1948. The test was thought of as a good way to predict student performance, given the broad disparities among high schools (College Board, 2005). However, from 1972 to present time, females have continued to score significantly lower on the math section of the test. In the year 2000, the male total group mean SAT score was 533, compared to the female total group mean score of 498 (College Board, 2005). Another standardized test, the Advanced

Placement Test, reveals similar results. Average scores on the 2004 Advanced Placement tests show male students outperforming their female counterparts in several math and science exams, in which the maximum score is five. On the biology exam, the male mean score was a 3.23 compared with a female mean of 2.90. The calculus exam produced a male mean score of 3.09 compared with a female score of 2.82 (College Board, 2005). Interestingly, as will be discussed later, females on average scored higher than males in foreign languages and English literature. On the English literature composition exam, males scored an average of 2.96 while their female counterparts scored an average of 2.98.

Another study revealing this gender difference was conducted in 2003 at the University of Massachusetts at Amherst. The study was designed to assess whether gender differences in math-fact retrieval do exist among kindergarten and first grade students. In two experiments, the children were asked to solve a series of simple addition and subtraction problems. Solution strategies were restricted and children were required to use either fact-retrieval or overt counting to solve the problems. Presented on a lap-top, half of the problems required fact-retrieval strategy and half required overt counting. Performance was measured in accuracy and solution time. (Exactly like the SAT, remember.) No female advantages were observed in any of the tasks, however, male advantages for fact-retrieval strategy were revealed in both grades (Garofoli, 2003.)

A study on gender differences in math and verbal self-concept, performance expectations and motivation was conducted in 2004. Nine hundred and seven Norwegian students, grades 6-11 participated, answering a questionnaire about these subjects. The results showed that males had higher self-concept in all samples in mathematics, as well as higher performance expectations. They judged themselves more favorably in mathematics than girls do as early as the end of elementary school. Female students evaluated their abilities in mathematics lower than their abilities in verbal arts. This particular study concluded that these differences could not be explained by differences in the grades the students received, and they are likely to be caused by gender stereotypes and gender role socialization (Skaalvik, 2004.)

Other theories, however, suggest that these gender differences are caused by different brain developments and sequences in male and female brains. Leonard Sax, a physician and psychologist, believes that distinct genetic differences exist in the way male and female brains function. Educators, therefore, that adhere to a gender-blind approach actually end up discouraging young women in such courses as physics, calculus and trigonometry (Sax, 2005.) Scientists at UCLA published one of the most conclusive studies on this theory in 2004. They examined a bird that was a lateral gynandromorphic

hermaphrodite. Every cell on the bird's right side was male, and every cell on the left was female. The bird's blood contained a mix of both hormones, those from the one ovary and those from the one testicle. If the theory popular in the 1970's and 1980's was true, there would not be a big difference in the birds right and left-brain. The researchers stated that hormones were responsible for sexual differentiation of the brain. However, results showed that the right and left side of the bird's brain were dramatically different, regardless of sex hormones. Scientists have concluded from this study that female brain tissue and male brain tissue are "intrinsically different" as a result of females and males having a different complement of sex chromosomes –regardless of the mix of hormones in the blood (Arnold, 2004.)

Caine (1989), a graduate student at Florida State University in the late 1980's, wanted to test a hypothesis that playing soft music in a babies crib may relax them, improving their appetite and help them grow faster. Caine obtained permission from parents of twenty-six premature babies to play soft music in the baby's cribs. She also matched twenty-six other premature babies in the study who did not get to hear music. Her results were dramatic, and brought up an entirely new issue. Girl babies who received music therapy left the hospital nine and a half days earlier on average than girl babies who did not. However, boy babies who received music therapy did not leave the hospital *any earlier* than boys who did not (Caine, 1989). Today there is good evidence that baby girls actually hear better than baby boys. Pediatric audiologists Barbara Cone-Wesson and her colleagues measured the acoustic brain response of more than sixty newborn girls and boys. For a 1,500 Hz tone played to the right ear, the average baby girl had an acoustic brain response about 80 percent greater than the response of the average baby boy (Cassidy, 2001). This gender difference in hearing also later affects children in the classroom. Psychologist Colin Elliot demonstrated that eleven-year-old girls are distracted by noise levels about ten times softer than noise levels that boys find distracting (Sax, 2005). This implies that the tapping on the desk, with pencils, fingers, etc, might not bother the boys at all but is very distracting and bothersome to girls in the class, possibly impairing the learning process.

One of the most important breakthroughs has been discovering that there are differences between male and female developmental timetables. Differences in brain maturation are detectable while the baby is still in the womb (Achiron, 2000). However, they continue to exist in much later years. Researchers at Virginia Tech examined brain activity in 508 normal children, 224 girls and 284 boys. Ages ranged from 2 months to 16 years. (This was the largest study of its type.) Researchers found that areas of the brain involved in language and fine motor skills mature about 6 years earlier in girls than in

boys. (This confirms the study discussed earlier about hearing.) However, the areas of the brain involved in targeting and spatial memory mature about four years earlier in boys than in girls (Anokhin, 2000). Smaller studies have been done supporting this larger one. Researchers in France watched two year olds building bridges out of blocks. At that young age, they found that a boy is 3 times more likely than a girl to be able to build a bridge out of blocks (Labarthe, 1997).

Gron and colleagues at the University of Ulm in Germany created a video game apparatus with virtual reality goggles. It allowed volunteers to play a video game while lying in a MRI brain scanner. In the video game, the volunteer is trying to find a way out of a maze. Their results were very interesting; females and males use completely different areas of the brain for the spatial task. Women used the cerebral cortex, the most advanced area of the brain used for talking, understanding, etc. Men used the hippocampus, a primitive area of the brain that is prewired for navigation (Gron, 2000). They concluded that these differences are genetically programmed, not culturally constructed. Furthermore, the results have major implications for inside the classroom, especially with math and geometry. As stated before, males use the hippocampus for mathematical reasoning - an 'ancient' part of the brain with no connection at all to the cerebral cortex. This may explain why males are more 'comfortable' with math at an earlier age. However, to get girls comfortable and interested, one needs to connect math to the real world. The cerebral cortex, the area females use, is the same division of the brain that mediates language and higher function. Girls and boys are equally capable of learning the same material, but taught the way math usually is, many girls tune out (Sax, 2005).

Many argue then, that coed schools shortchange both girls and boys. This is not because teachers are sexist, but simply because the students learn so differently. Andrew Hunter, a teacher who has taught in both coed and single sex schools, compares teaching in a co ed classroom to teaching two classes at once (Buie, 2000). Rick Melvoin, head of the Belmont Hill School (an all-boys school in Massachusetts) takes the same stand. Melvin explains, for example, in a coed French class the boys almost never attempt to speak in a French accent. However, in an all-boys French class, all the boys compete to see whose accent is best (Wolcott, 2004). Coed schools enforce gender stereotypes where single sex schools can break them down. There is strong evidence that girls are more likely to take courses such as computer science and physics in girls-only schools than in coed schools (James, 2003).

III. Methods

The population tested was third and fourth grade math and science classes in an elementary school. Surveys conducted by the teacher revealed participation ratios in math and science classes. Students were also exposed to a treatment as follows: first, they will be asked to draw a picture of a 'scientist'. The purpose will be to see how many pictures reveal a female scientist as compared to a male scientist. Second, a math lesson will be taught in an unconventional way, a way that seems statistically more beneficial for girls. Students will be split into groups, two male groups and two female groups. One female group will be taught the math lesson in the same manner as the other two male groups. The other female group will be taught in a different manner, a way that complies more with the apparent 'female' way of understanding math. For example, since studies indicate that females use the cerebral cortex for math tasks, the second group of females would be taught in a way that connects the math material to the outside world. These females will be asked to bring in any of the following; a sunflower, pinecones, leaves, etc. Counting or performing math tasks with outside variables will be tested against the conventional, 'male' programmed way based on complete understanding of the material. Did the second group of females understand the material better? Quicker? Or the same as the first group of females, learning in the same manor as the males?

IV. Results

The first part of the study was conducted in an elementary school third grade class. The class consisted of 21 students; 10 males and 11 females. Sixteen students (76%) drew a scientist as a male and 5 students (24%) drew a scientist as a female. The second part of the study was done in an elementary school fourth grade class. This class consisted of 20 students, but was more disproportionate than the third grade class. There were 13 males and only 7 females. Fifteen students (75%) drew a scientist as a male, while only 3 students (15%) drew a scientist as a female. One drawing had both a male and a female scientist together, and the last drawing was questionable whether it was a male or female. Distinguishing male vs. female drawings consisted of common gender stereotypes; for example, length of hair, dress style, etc.

V. Discussion

The math coordinator of the Lynbrook School District was interviewed concerning participation ratios in math classes. The coordinator had taught Advanced Placement (AP) Calculus for many years, and stated that females in the class usually had higher grade point averages. However, they participated extremely less often than the

males in the class. He explained that he tried to encourage the females to participate, but they maintained a timid disposition in math class. Due to time restraints on the amount of time the researcher was allowed to take from the class, the lesson plan could not be completed.

Results indicate that there is indeed a stereotype among school-aged children when considering the gender of the science profession. At least 75% of both third and fourth grade students at Lynbrook Elementary School consider a scientist to be a male. When starting to draw, some students (mostly females) actually asked, "Do we draw a girl or boy?" They were told to draw whatever they thought a scientist looked like, and these females continued in drawing males. It is possible that for this reason, as the children advance to higher academia, females are less likely to participate in mathematics due to the perception that it is a 'male' related field. It is possible, and seems likely, that this stereotype is the cause for female participation ratios to be dramatically lower in advanced math classes. If most females are timid to participate in mathematics at a high school level, it is probable that they will feel even more uncomfortable participating in mathematics at a collegiate level. Therefore, there would be a lower number of females in the mathematical professions. The hypothesis of this research, that females will suffer from low math self-concept earlier than compared to males, proves to be consistent when observing the elementary school population at Lynbrook Elementary School.

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Sarbanes-Oxley and its Effect on Risk Perception

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The Sarbanes-Oxley Act was passed in 2002 due to the surfacing of severe business corruption in major United States companies, such as Enron and WorldCom. This article will focus on the effects of risk perception due to the Act. Using beta as a measure of risk, I will investigate ten companies that in previous years have faced corporate scandals. I will calculate the betas for each of these companies for ten years from 1995-2005 in monthly intervals. After calculating each beta, a statistical evaluation will be performed. From this evaluation, I will determine if the Sarbanes-Oxley Act has affected these companies' betas, and thus investors' perception of risk. Along with the investigation, I will discuss how the new provisions in the Sarbanes-Oxley Act attempt to protect major crises like these from occurring again.

I. Introduction

For the past decade or so, businesses have not been viewed in the most admirable light. Corruption and deceit are two words that would come to many investors' and workers' minds when thinking about businesses. Corporate actions have caused upheaval in many people's lives. As a result, Congress passed the Sarbanes-Oxley Act to help restore investor confidence.

Since it is now three years since the passage of Sarbanes-Oxley, I wanted to test whether in fact there was evidence of renewed investor confidence in publicly traded companies. Since beta is a measure of the systematic risk of a security, I decided to use beta as the variable to be evaluated. My hypothesis for this experiment was that as I analyzed each company's betas prior to the introduction of the Sarbanes-Oxley Act, I would find them to have been higher than the betas calculated after the introduction of the Sarbanes-Oxley Act. It would seem logical that the companies' betas would have fallen, because the Act was passed in order to stop the recent corruption and accounting fraud. If investors believed that Sarbanes-Oxley would be successful in changing corporate behavior, then that renewed confidence should be reflected in lower betas.

Tuesday, October 16, 2001 was a day that made history. On that day, Enron declared that it had a "$618 million net loss for the third quarter and would reduce

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shareholder equity by $1.2 billion" (Brickey, 2003). The world was completely stunned. This giant corporation, which appeared to be financially stable, had been using fraudulent accounting practices for years, without any detection. As it turned out, Enron and all its accounting errors were only the beginning of what was uncovered.

Enron Corporation was a trading and energy company that was founded in 1930, under the name Northern Natural Gas Company (Enron Corporation, 2005). In 1985 after many acquisitions, the company was renamed Enron Corporation by its new CEO Kenneth Lay. This corporation, which grew out of Houston, Texas with rapid speed, became the "world's leading electricity, natural gas, and communications company" (Enron Corporation, 2005). From 1996 to 2000, Enron was named "America's Most Innovative Company" by Fortune magazine and in 2000 was on Fortune's "100 Best Companies to Work for in America." It was also the seventh largest company in the United States. With this background, it was incredible that Enron's stock price fell from $90 in August of 2000 to $.30 in November of 2001 (Enron Corporation, 2005). How could the seventh largest company in the United States be close to bankruptcy when less than a year ago they were at the top of the charts?

After the wave of panic from investors and employees passed, it was found that Enron (with the presumed knowledge of their audit firm Arthur Andersen) was using illegal accounting techniques to inflate Enron's numbers. Even more alarming was the fact that while all of these illegal maneuvers were taking place, CEO Kenneth Lay would continuously "issue a statement or make an appearance to calm investors and assure them that Enron was headed in the right direction" (Enron Corporation, 2005). Meanwhile, as investors continued to believe Mr. Lay, executives at Enron were secretly selling shares. Finally, in December of 2001 the truth was out when Enron declared bankruptcy. Many executives, including Kenneth Lay, have been tried or are awaiting trials for indictments for bank fraud, making false statements to banks and auditors, securities fraud, wire fraud, money laundering, money laundering conspiracy, and insider trading (Enron Corporation, 2005). Kenneth Lay's trial began in January of 2006. If convicted on all accounts Mr. Lay could face up to one hundred and seventy five years in prison. At the time, Enron was the largest bankruptcy case in history. Just six months later, however, WorldCom assumed that honor when it filed for Chapter 11 bankruptcy.

WorldCom was a company that emerged from a series of acquisitions dating all the way back to 1963 with a company called MCI Communications (MCI, 2005). WorldCom, under the control of CEO Bernard Ebbers, grew to be the second largest long distance phone company in the United States next to AT&T. This company was also, "instrumental in pushing legal and regulatory changes that led to the breakup of the

AT&T monopoly that dominated American telephony" (MCI, 2005). The company was in full gear to one day be the leading telephone company here in the United States. That all changed when in June of 2002 an audit of the company was performed, which uncovered billions of dollars of questionable accounting. After filing for bankruptcy in July, it was discovered that there was "$3.3 billion in improper accounting since 1999 and by the end of 2003 it was estimated that the company's assets had been inflated by around $12 billion" (MCI, 2005). Bernard Ebbers was indicted on nine accounts, including fraud, conspiracy, and filing false documents with regulators. On March 15, 2005, Bernard Ebbers was convicted on all nine counts and is facing up to 85 years in prison.

Not only did the collapse of these two major firms cause trouble in the stock market, but it hit the accounting world hard too. At the time of the fall of Enron, there were five dominant accounting firms. One of the Big 5, Arthur Andersen, was the accounting firm that provided the audit team for both Enron and WorldCom, along with audits for numerous other companies. Arthur Andersen was indicted as part of the Enron scandal, accused of tampering and destroying documents related to the Enron case and for obstruction of justice. The company's conviction led to lost clients, and an untrustworthy reputation, and ultimately led to their demise. There are now only four major accounting firms left in the business world.

Sarbanes-Oxley Act

Something needed to be done. The business world could not keep seeing the collapse of major companies and the increasing skepticism of investors. As a result, on July 30, 2002, the Sarbanes-Oxley Act was signed into law. This Act was one of the toughest corporate governance laws in history and was enacted to try to prevent future corruption of the kind that had previously been unveiled. The Act applies to all publicly held companies and the accounting firms that audit them.

Within the Act, there are eleven main titles, each with its own subsequent sections. Title I creates the Public Company Accounting Oversight Board (PCAOB). This is one of the most important provisions. This Board was created to help regulate audits and auditors of all publicly held firms. Before this provision, the accounting firms were free to regulate their own audits. Now, with the Securities and Exchange Commission (SEC) overseeing the Board, all audits performed should be at a higher level of quality and accuracy. The nine sections that follow outline the rules and formation of the PCAOB. They "include establishing auditing, ethics, independence, and quality control

standards for public company audits, and performing inspections of the quality controls at audit firms under its oversight" (Beasley & Elder, 2005).

Title II tries to regulate and control auditor independence. When an individual works closely with a firm for many years, they grow to know and like the people there. Sometimes this causes a problem when bad news needs to be reported. In order to keep such circumstances from occurring, there are multiple sections within Title II that provide rules for how to effectively keep this from happening. Rotation of workers on an audit is one such section. This requires that the main partners on an audit switch audit companies every five years to allow other partners to look for irregularities within the company. Conflicts of Interest, section 206, also helps with an auditor's independence. This section states that the audit firm that is performing a company's audit, for a one-year period before the audit, cannot have employed a main executive of that company, such as the CEO or CFO.

Corporate Responsibility is the third title. This title is important to the Act because it is one of the four titles that give the SEC more control over executives. Section 302 is one section that helps to accomplish this by requiring that all CEOs or CFOs prepare a statement that will be included with the audit. In the statement, the CEO or CFO must attest that the information in the financial statements is correct to the best of their knowledge. Other important sections in Title III are Section 304 Forfeiture of Certain Bonuses and Profits, Section 305 Officer and Director Bars and Penalties, and Section 308 Fair Funds for Investors. These three sections, out of the six sections within the title, are important because they put more pressure on a company to follow generally accepted accounting principles because the penalties of not doing so are harsher than before.

Title IV is Enhanced Financial Disclosures. Out of the nine sections that are found within this title, the most prominent one is Section 404. This section is the one that has most influenced the Big 4 accounting firms. It is now required that all auditors perform an assessment of a company's internal controls. Every firm has a set of internal controls that they are supposed to be using. When the audit teams begin work, the company should provide a list of all their internal controls and how they are performed. It is now the auditor's responsibility to make sure that these controls are being followed properly and in an efficient manner. The auditor then needs to review these controls and determine if the information provided is sufficient and agreeable with the Act. This section allows the SEC to have a clearer view into how the company is run.

Titles V, VI, and VII, provide more enforcement authority to the SEC. Title V, entitled Analyst Conflicts of Interest, require that all registered securities associations

adopt conflict of interest rules for research analysts who recommend equities in research reports (Beasley & Elder, 2005). Title VI deals with commission resources and authority. The two sections that follow are the authorization of appropriations and appearance and practice before the commission. The SEC states its authority to censure all people appearing in front of them. Title VII has five sections and is entitled Studies and Reports. One section deals with consolidation of public accounting firms, the second section applies to credit rating agencies, the third discusses violators and violations, section four is on enforcement actions, and the last section deals with investment banks.

Title VIII is Corporate and Criminal Fraud Accountability. Under this title, the seven sections all deal with penalties and protection for criminal activities. This title is the second title that gives the SEC more power by increasing penalties that a firm can face for fraudulent activities. Section 802 of this title states that no documents can be destroyed or tampered with and must be kept on record for five years after the end of the fiscal year in which the company was audited (Beasley & Elder, 2005). This section was most likely in response to the accusations that Arthur Andersen, during the Enron scandal, destroyed paperwork related to the case. Section 807 helps explain the consequences by stating the criminal penalties for defrauding shareholders of publicly traded companies.

Title IX is the White-Collar Crime Penalty Enhancements and is the third title that helps the SEC. It has six sections within the title, the most important being Section 906. This section deals with the failure of corporate officers to certify financial reports. As noted in Section 302, all financial reports must be certified by the CEO or CFO of a corporation. The consequence for violating Section 302 is now outlined in Section 906. If section 302 is not followed, then the person can be "fined up to $1 million, imprisoned up to 10 years, or both. Furthermore, anyone who does so 'willingly' will be fined $5 million, imprisoned up to 20 years, or both" (Marden & Edwards, 2005). Potentially, this provision will help managers and executives take a deeper look at their financial statements to search for possible erroneous activity.

Corporate Tax Returns are covered in Title X, with one section regarding the signing of corporate tax returns by the CEO. Corporate fraud and accountability is discussed in the last title, Title XI, which has seven sections within. This is the last of the four titles that increases the SEC's power. Section 1102 deals with tampering with a record or otherwise impeding an official proceeding, and increases the penalties that auditors and executives could face. Section 1106 also increases penalties, but penalties that have been in place since the Securities Exchange Act of 1934.

The SEC has been around since 1934. This agency did not always have the full authority to punish companies and their executives when they were accused of crimes. The Sarbanes-Oxley Act grants the SEC more power than ever to help protect investors and punish executives not following the laws. "The sad truth is that unless managers see other managers in handcuffs with some possibility of doing prison time, they are not likely to adjust their behaviors with respect to accounting. Harsh punishment and swift enforcement will make fraudsters think twice before committing their next crime. Indeed, until the ax falls on a few heads it may take some time before American workers and investors start feeling safe again" (Marden & Edwards, 2005). These new provisions in the Sarbanes-Oxley Act give the SEC more enforcement power and the ability to punish violators. Since the passage of the Act, the SEC's Division of Enforcement "filed 543 enforcement actions, 147 of which involved financial fraud or reporting violations. During this time, the SEC sought to bar 144 offending corporate executives and directors from holding such positions with publicly traded companies. Since 2001 this has been about a 24% increase" (Marden & Edwards, 2005).

Hopefully, the Sarbanes-Oxley Act will help investors feel secure when a CEO of a company states that his or her company is doing well. Investors should be able to view the financial statements of a company and believe that this is exactly what is going on at the company. The restoration of investor confidence in the financial reports of businesses should lead to decreased perceptions of risk.

Beta as a Measure of Risk

When investors are trying to choose a company in which to purchase stock, many factors come into play. An investor will inquire if the company is financially sound, how the company's industry is doing, and if it will continue to stay this way for the foreseeable future. An investor can determine all of this information if they view a company's annual report or pay attention to statements made by executives of companies. One other important factor that an investor will look at is a measure called beta (β). "Beta is the measure of volatility, or systematic risk, of a security or portfolio in comparison to the market as a whole (most often the S&P 500 Index)" (Finding Beta, 2004). Basically, beta measures how a stock should react when the market changes. When a beta is one, it means that the security will move directly in line with the market. If a beta is greater than one, then the stock's price will be more volatile than the market. However, when beta is lower than one, the stock is going to be less volatile than the market. For example, if a stock's beta is a 1.53, then the stock should move 1.53% for every 1% change in the market. For investors beta is a number that can be taken in two ways. A high beta,

indicating more volatility than the market, is much riskier, but should lead to a higher return if the market increases. This is conversely true for stocks with betas that are low and less volatile than the market. For these companies, the risk is reduced, but so is the potential return.

Beta is a measure that can be found using different resources or a measure that can be calculated independently with the appropriate tools. When beta is found from outside resources, it is important for an investor to be aware that not every resource that includes beta uses the same indexes, time frames, and calculation methods. For this reason, a beta found on Bloomberg Professional might not be the same number as one that can be found on Value Line. Beta also has limitations. It cannot foresee the future and it does not take into consideration ideas that a company could be in the process of implementing for the future. Beta entirely relies on a company's stock price history relative to the market. It must also be remembered that stocks performing really well relative to the market may have high betas but that this volatility may not be attributed entirely to risk.

Selected Companies

If the passage of the Sarbanes-Oxley Act restores investor confidence, then that confidence should be reflected in the company's beta. I wanted to perform a test to see if the betas of selected companies declined after the passage of the Act. I selected ten companies, all of which have faced major financial difficulties between the years 2000 and 2003. The ten companies are AOL Time Warner, Bristol-Myers, Computer Associates, General Electric, Merck & Co., Qwest Communications, Reliant Energy, Tyco, Waste Management, and Xerox.

Before 2001, AOL and Time Warner were two separate corporations, each successful in their own right. AOL was a huge internet provider while Time Warner was an old-media company. In January of 2001, AOL at the peak of its success acquired Time Warner. Even before the merger took place, there was opposition from other companies, viewing this merger negatively on antitrust grounds. Despite these oppositions, the merger was approved on January 11, 2001. From January of 2001 until July of 2002 the combined company's shares fell 75% (Kirkpatrick, 2002). This was a huge disappointment, considering this was a major merger that was expected to send stock prices soaring. Furthermore, as of July of 2002, the SEC was investigating the AOL division at AOL Time Warner for possible accounting fraud. It has been alleged that AOL erroneously inflated advertisement revenue to keep stock prices high. "AOL might have effectively inflated its revenue, in part by reporting some fees from advertisement to

end contracts without disclosing that the fees would not be recurring. Also, AOL reportedly recognized sales of advertising on behalf of another company, eBay, as part of its own revenue" (Kirkpatrick, 2002). In response to these accusations, AOL Time Warner representatives have said that all of these financial issues have "accounted for less than 2% of America Online's revenue" (Kirkpatrick, 2002).

Bristol-Myers is a pharmaceutical company that was created in 1989. It began facing troubles and stock prices began tumbling in April of 2002. In this month the president of the company's pharmaceutical business, Richard Lane, and the chief financial officer, Frederick Schiff, both left the company. Bristol-Myers was being accused of "overstating revenue last year (2001) by giving wholesalers incentives to buy extraordinary amounts of the company's prescription drugs" (Peterson, 2002). Many other pharmaceutical companies have been accused of similar procedures. "A drug company tells a wholesaler that prices will soon be raised, so distributors buy more of the company's products than they need to meet the demand at pharmacies. This practice allows the drug company to temporarily increase sales" (Peterson, 2002). Since this practice is only temporary, eventually the pharmaceutical company's sales dwindle until the distributors have finished using all of the products that they over-stocked. Bristol-Myers was also facing problems when it came to developing new drugs to take the place of older drugs. This problem along with the above accounting issues had led their stock to be its lowest since 1996. Today, the company has recovered from these allegations and is now on the Forbes 500 list.

Computer Associates is the world's largest management software company and has been around since 1976. This company was under investigation by the SEC in 2002. Computer Associates was said to have increased revenues from 1998 to 2000 by prematurely recognizing money from contracts. Along with these accusations came the indictment of former CEO Sanjay Kumar and the head of worldwide sales Stephen Richards. Both were indicted under the charges of securities fraud and obstruction of justice. They were both accused of tampering with paperwork to make it fit appropriate time-periods, in order to give the appearance of normalcy. In addition to these two men, three other employees are being arraigned on the same charges. The company also faced other accusations, resulting in a restatement of earnings from 2000 through 2004. Under the influence of Charles Wang, Computer Associates new CEO, the company has agreed to a penalty to "settle charges that it violated pre-merger rules after announcing it would acquire Platinum Technology, Inc." (Corporate Scandal List, 2002). Since the beginning of 2002, Computer Associate's stock dropped close to 74%. Today, the stock price is at approximately twenty-nine dollars.

General Electric is a multinational technology and services company that had its beginnings in 1892. This company has always been quite successful. It has been so successful that it is the only company to remain on the Dow Jones Industrial Average since that average was started in 1896. It is also one of the only companies to achieve success with such a large conglomerate business. Most of the praise should go to its long time CEO Jack Welsh, who helped keep the company running from 1981-2001. Analysts have always remained skeptical about General Electric though. Its profits are continuing to increase but analysts worry that this is just a ploy to keep investors happy. "GE Capital was a primary financial backer to WorldCom, providing a financial crutch to the corporation that would go on file as the largest bankruptcy claim in the history of the U.S.; it is the largest corporation to lack an independent board; 77% of GE's 401K's were invested in company stock as of 2001; and GE paid its independent auditor three times as much for non-audit fees in 2000" (Corporate Scandal List, 2002). In 2002, the stock had gone down for the year by 38%, but its profits were still able to increase by 14%. As of today, General Electric is the world's largest corporation in terms of market cap.

Merck & Co. is a pharmaceutical company that has been around since the beginning of 1891. It has always been known as a reliable company. Merck's mission was always "to provide society with superior products and services by developing innovations and solutions that improve the quality of life and satisfy customer needs, and to provide employees with meaningful work and advancement opportunities, and investors with a superior rate of return" (Merck & Co., Inc., 2005). Unfortunately, during 1999 Merck began facing accounting difficulties. The SEC had accused Merck of increasing revenues from their subsidiary Medco. The investigation began in 1999, but no action toward Merck was ever taken. As of 2002, though, the SEC resumed questioning of Merck regarding Medico. Merck stands by its statement saying that the revenues in question "were less than 5 percent of Merck's consolidated sales" (Freudenheim, 2002). Another issue to look at with Merck is that its audit team was from Arthur Andersen, the accounting firm that is no longer in business due to the Enron scandal. When word of this first came out Merck was quick to take action and change auditors, but the problems the company was facing dated back to before the switch. As of today, Merck is one of the top five largest pharmaceutical companies in the world based on both capital and revenue. It has about seventy thousand employees in one hundred and twenty countries and thirty-one factories worldwide.

Qwest Communications is a telecommunications carrier that provides phone services to most of the Western United States. It was first started in 1996 and approximately five years later the company began facing problems. Qwest was accused

of an illegal practice known as "slamming." This practice was used by phone companies to switch their clients who used their local service to the company's long distance service without permission. Qwest paid millions of dollars in fines as a result. Qwest also faced financial issues beginning in 2002. On April 4, 2002, Qwest Communications said that the SEC was investigating them "to determine if it inflated revenue for 2000 and 2001 through capacity swaps and equipment sales" (Corporate Scandal List, 2002). Since the beginning of 2000, Qwest's stock has plummeted approximately 88%, and beginning in 2002, Qwest had lost money in eight consecutive quarters. An analyst from CIBC World Markets said, "There were a lot of gray areas of accounting at the company. And at the same time management sold an awful lot of stock" (Gilpin, 2002). Under investigation from Qwest Communications are four employees, Grant Graham, the Global Business Unit CFO, Thomas Hall, the Global Business Unit Senior Vice President, John Walker, Global Business Unit Vice President, and Bryan Treadway, Assistant Controller along with former CEO Joseph Nacchio. They are all under investigation for conspiracy, false statements to the SEC, securities fraud, and wire fraud (Corporate Scandal List, 2002).

Reliant Energy is an energy company that is based in Texas. This company was under SEC investigation in 2002 for "accounting matters and energy trades relating to restatement of profits." Before 2002, Reliant Energy had inflated revenue by counting artificial 'round trip' energy trades (Corporate Scandal List, 2002). It had also faced publicity for its alleged role in the California electricity crisis of 2000 and 2001. It was speculated that Reliant Energy was "gaming the market by decreasing energy production at its large plants, which caused the spot price for electricity to surge" (Goldberg, 2004). After a while, manipulating the machinery to increase and decrease production in short intervals of time led to massive amounts of machine crashes. In January of 2003, Reliant reached a settlement but still did not admit to any wrongdoing (Reliant Energy, 2005).

Tyco is a conglomerate company that at one time was a multibillion-dollar corporation. Beginning in 1992, Dennis Kozlowski was the CEO of Tyco. While in the head position at Tyco, he adopted aggressive strategies, helping Tyco to acquire more than one thousand companies between the years 1991-2001. Unfortunately, on June 3, 2002 Kozlowski resigned as CEO, and a day later on June 4, 2002 he was indicted on eleven felony counts, one of which was sales tax evasion. He was under investigation for using company money and loans in order to purchase artwork for his home, buy his apartment in New York, and a home he owned in Florida. In addition, Kozlowski is accused of "improperly creating 'cookie jar' reserves that were supposed to cover merger costs but instead were drawn on to boost profits and for improperly 'spring loading' earnings from acquisitions by accelerating their pre-merger outlays" (Corporate Scandal

List, 2002). In addition to Kozlowski, Mark H. Swartz former CFO of Tyco, was on trial for conspiracy, enterprise corruption, securities fraud, grand larceny, filing a false personal tax return and falsifying business records. Mark Belnick, Tyco's general counsel, was also under investigation for falsifying business records and grand larceny, while Frank Walsh, Tyco's outside Director, was under investigation for signing false registration statements. Due to all of the investigations, Tyco's stock has dropped to its lowest level in five years, and the company has had to lay off eleven thousand employees. As of June 17, 2005 after a retrial, both Kozlowski and Swartz were found guilty on all but one charge against them and face up to twenty-five years in prison.

Waste Management is a company in the waste management industry, which serves twenty-one million residential and commercial customers in North America. The company has been around since before 1970 and in its early stages was growing at an enormous rate. Acquiring more than one hundred companies a year, the firm was headed in the right direction. Unfortunately, the company was growing at such an extensive rate that it was beginning to get out of control. Waste Management's problems began in 1997, when Ronald LeMay, the CEO at the time, left and went to another company. Within approximately one week of this, the CFO at the time quit, along with a vice-president, and the newly appointed CFO. The only explanation for these actions was given by LeMay, who inferred that, "Waste Management had 'spooky' accounting practices." (Eichenwald, 2002) By the end of 1997, the company was forced to restate its earnings dating back to 1992. The complaint against Waste Management showed "accounting tricks that had allowed the company to hide about $1.7 billion in expenses from 1992-1997" (Eichenwald, 2002). These accounting tricks are said to have been exaggerating corporate profits by inflating the value of trucks or landfills. For this reason, Waste Management had its worst year ever in 1997. Ironically, Waste Management was another one of Arthur Andersen's audit clients. In 2002, problems arose again when the SEC filed a complaint against six former officers of Waste Management, which also led into the investigation of Arthur Andersen.

Xerox is the world's largest document management company and was founded in 1906. Beginning on April 11, 2002, Xerox had a complaint filed against it from the SEC. Xerox was said to have been faking its numbers from 1997 through 2000. This was said to have been done by "accounting maneuvers, the most significant of which was a change in the way Xerox recorded revenue from copy machine leases- recognizing a 'sale' in the period a lease contract was signed, instead of recognizing revenue rateably over the entire length of the contract" (Norris, 2002). On June 28, 2002, Xerox said, "We will restate five years of results to reclassify more than $6 billion in revenues" (Corporate

Scandal List, 2002). In addition to these reclassifications, Xerox paid millions of dollars in fines but still never confirmed any wrongdoing. Also involved with this Xerox scandal were its auditors, KPMG. When the partner on the audit engagement team began to notice something peculiar, he spoke up about it. Top management at Xerox became angry with KPMG and asked the partner to be removed from the audit. This partner was removed from the audit and replaced by another partner. Then on January 29, 2003, the SEC filed a complaint against the new KPMG auditors, which was later settled by KPMG paying fines.

II. Method

After deciding that the above ten companies would be appropriate to use for my analysis, it was time to determine the betas for each company. I decided that it would be beneficial to figure out each beta on my own with the use of Microsoft Excel, so there would be no inconsistency. By going online at Yahoo.com and going to their financial section, I was able to retrieve historical information on stock prices for the ten companies above. Once I acquired the information I needed, I was able to download each company's financial information onto a spreadsheet in Microsoft Excel. As my control, I used the S&P 500 to represent the market prices. I started first by retrieving the adjusted closing prices for each of the ten companies for eleven years. I began my research in January of 1995 and went through to September of 2005 gathering the adjusted closing prices monthly. For each of the ten companies I first calculated eleven betas, one for each of the eleven years. There were two companies that did not have eleven betas, Qwest Communications and Reliant Energy. This information was not available for these two companies because both companies were formed after 1995. Once all of the adjusting closing prices were downloaded onto Excel, I was able to determine the percentage change by month. I performed this calculation by dividing, for example February's closing price by January's closing price, and then subtracting one. I calculated the percentage change for all ten companies, through the eleven years, and for the S&P 500. Next, to find beta I used the slope function in Excel. By clicking on the slope function, a box appears that asks for Y, the dependent variable and X, the independent variable. For Y, I used the percentage change for the company. For X, I used the percentage change for the S&P 500. To test the validity of the model, I calculated the statistical correlation between the individual stocks and the market. Statistical correlation indicates how much change in the stock's price can be attributed to the market. A low correlation indicates that the individual stock price is affected by other factors.

To eliminate any possible distortion among the individual years leading up to the passage of the Sarbanes-Oxley Act and the years following its passage, I recalculated betas for each of the ten companies using longer time periods. For each company, I calculated one beta for the period prior to 2001, one beta for each of the individual years 2001 and 2002, and one beta for the period 2003-2005.

III. Results

Initial Results

AOL Time Warner

The information I retrieved from 1995 until 2000 was the stock information from Time Warner, since the merger between AOL and Time Warner had not yet occurred. In the first three years, (1995-1997) beta was very volatile compared to the market. In 1995, their beta was close to a negative 2.3 indicating high volatility in movements inverse to the market. In 1996, the beta took a severe reversal and ended the year close to a positive 4.3, meaning that the stock price is more than four times more volatile than the market. Finally, in 1997 the stock settled down at almost a perfect 1.0. The period from 2000-2001 was a turbulent period for the company, during which AOL and Time Warner announced and officially merged. These seven years all make up the period before the Sarbanes-Oxley Act was introduced. Following the Act, it seems that in 2003 beta spiked slightly above 2002's beta, but then settled down and steadily decreased through 2005. Overall, AOL Time Warner's beta decreased following the Sarbanes-Oxley Act.

Bristol Myers

Bristol Myers showed a slight increase in beta post Sarbanes-Oxley compared to the pre-Sarbanes-Oxley amounts. For the seven years prior to the Act, Bristol Myers' betas go from above a one in 1996, all the way down to its lowest beta , -.299 in 2001. Bristol Myers, in 2002, then faced its major financial issues, just as the Sarbanes-Oxley Act was passed. In this year, beta reversed by increasing to a little below one. Following 2002, the next two years saw beta increase slightly to above one, but then in 2005 beta decreased back down to a .417. Although the results show a slight increase following the passage of the Act in 2003 and 2004, when looked at as a collective period from 2003-2005, beta is seen as almost equaling the results of 2002.

Computer Associates

Computer Associates' analysis shows clear support for my theory. Prior to the Sarbanes-Oxley Act, all betas fell between a range of -0.951 in 1995 to a high of 2.662 in 2001. Computer Associates had their major financial difficulties in 2002, which is quite vividly portrayed because beta rises to above three. Following the Act though, in the next three years, there is a steady decrease of beta. In 2003 beta is approximately two while in 2005 beta is below one. Computer Associates is definitely a good indication of what Sarbanes-Oxley was meant to accomplish.

General Electric

General Electric is another company that showed a slight increase in beta after the passage of the Sarbanes-Oxley Act. From 1995 through 2001, General Electric saw its highest beta in 2000 at 1.522 and its lowest beta in 1998 at .827. 2001 was the year in which General Electric faced their major difficulties. During the passage of the Act, in 2002, General Electric's beta reached a low, up to this point, of .705. In the next two years, 2003 and 2004, beta increased to a peak of .945 in 2004. Then in 2005, it dramatically dropped into negative numbers. Although there was an increase in beta following the Act, as seen with Bristol-Myers, when looked at as a collective period following the Act, beta has decreased substantially compared to its result in 2002. So, although at first sight it looks as if my theory is disproved, in actuality beta overall did decrease post Sarbanes-Oxley.

Merck & Co.

Merck & Co. as viewed from my analysis also proves my theory. There was quite a lot of volatility in the pre-Sarbanes-Oxley period, with betas that went from 1.941 in 1995 to -.425 in 2000. In the year of the Act, which is also the year Merck faced its financial issues, beta was at 1.127. In the three years that followed, beta was below the beta of 2002. It is shown that in 2005 beta rose almost equal to the amount in 2002. The reason for this beta increase may be due to problems Merck has been experiencing with one of its drugs known as Vioxx. Beginning in 2004, Merck was made aware of information received from a clinic that said people who took Vioxx had an increased risk of heart attack. On August 19, 2005, Merck was found liable in the death of a man who had a heart attack after taking Vioxx, and had to pay reparations in the amount of $253 million dollars. Merck is also being put on trial for similar occurrences in the state of New Jersey and Louisiana (Merck, 2005). With this problem in 2005, beta has still decreased post Sarbanes-Oxley.

Qwest Communications

Qwest Communications is one of the two companies that were created after 1995. For this reason, I began my research in 1997. Qwest Communications in its first year, 1997, had a significantly low beta with a -3.118 but from 1998-2001 the betas reversed and became positive. In 2002, Qwest reached a peak with the highest beta out of all the companies I analyzed, with a 5.603. It was in 2002 Qwest faced most of its financial difficulties. For Qwest Communications, my theory is again proven, when beta significantly dropped from a 5.603 to a 3.123 in 2003 and continued to decrease through 2005.

Reliant Energy

Reliant Energy is the second company for which I could not retrieve information dating back until 1995. For Reliant, I was only able to find information for a five-year time period, 2001 to 2005. I therefore could only calculate one beta prior to Sarbanes-Oxley, and that beta was 1.594. During 2002, Reliant's beta reached a high of 3.538, which was also the year that Reliant faced its controversy. The period of 2003-2005 reveals betas that were lower than the one in 2002, which supports my hypothesis.

Tyco International Ltd.

Tyco International Ltd. is the third company for which post-Sarbanes-Oxley betas slightly increased. Prior to Sarbanes-Oxley, Tyco's betas were somewhat volatile. There was a low of -0.640 in 1999 and a high of 2.132 in 2001. 2002 was the year in which Tyco faced all their problems with former CEO Bernard Ebbers and their finances. In this year, beta was 2.156. In 2003 beta slightly rose to 2.361 but then quickly decreased in 2004 to 2.003 and in 2005 to .018. Again, it is seen that in 2003 following the Sarbanes-Oxley Act, beta slightly rose, but then it immediately dropped, concluding that for a post-Sarbanes-Oxley time period, beta had decreased.

Waste Management

Waste Management is the last of the companies that had a beta rise after the Sarbanes-Oxley Act. From the years 1995-2001, Waste Management saw severe volatility when it came to beta. In one year beta would be negative, and in the next year, it is positive. Waste Management was one of the only companies to have had difficulties in two non-consecutive years, 1997 and 2002. In 2002, Waste Management's beta was .747. In the two years following, beta increased to .826 and 1.212, respectively. In 2005, beta was reduced to .695. Waste Management is the only company in my analysis that

negates my hypothesis, even after the post Sarbanes-Oxley years are taken collectively. After the calculation, the collective period of post Sarbanes-Oxley comes out to slightly over .747.

Xerox

Xerox is the last company that vividly proves my hypothesis. Prior to Sarbanes-Oxley, beta reached a high in 2001 of 3.418 and a low in 1996 of -.007. Xerox faced its financial crisis in 2002 when beta was 2.885. Following this year, beta significantly decreased, with a high in the next three years of only 1.814.

Revised Results

Table 1 shows the results from the second beta calculations that I made. From these calculations, seven out of the ten companies saw a decrease in beta from 2002 to 2005. Computer Associates, Merck & Co., Qwest Communications, Reliant Energy, and Xerox all had a significant decrease, while Time Warner had a slight decrease and Tyco International Ltd. had a moderate decrease. As for the other three companies, Bristol Myers' beta had a slight increase, General Electric's beta remained relatively unchanged with a slight decrease, and Waste Management's beta had a moderate increase. For the changes that occurred between the year 2001 and 2002, only three out of the ten companies saw a decrease in beta. Time Warner's beta decreased slightly, while General Electric and Xerox both had betas that saw significant decreases. The other seven companies all had significant beta increases. The increases that occurred from 2001 to 2002 are probably due to the fact that all seven companies were under SEC investigation at the time.

IV. Discussion

From the above analysis, it would seem that an investor would feel a lot safer trusting a company now after the passage of the Sarbanes-Oxley Act. For nearly all of the ten companies, beta has been reduced in the years following the Act. The Sarbanes-Oxley Act was put into place to try to protect investors by improving the accuracy and reliability of corporate disclosures. According to some investors though, feelings are mixed. As of this year, The Wall Street Journal and Harris Interactive conducted an online survey which concluded that, "55 percent of U.S. investors believe that financial and accounting regulations governing publicly held companies are too lenient. That figure rises to 77 percent for male investors ages 45 to 54." According to the survey, only one-quarter of investors felt that Sarbanes-Oxley has made the communication of

financial information by companies "much more" or "somewhat more" transparent. (Sarbanes-Oxley Act, 2005)

While my results do suggest that betas have fallen since the Sarbanes-Oxley Act was passed, more analysis will be needed as more time passes. Even if investors' fears have been somewhat alleviated, as the post-Sarbanes-Oxley betas indicate, the question remains as to whether this is a temporary reaction to new legislation or a more permanent restoration of confidence. Less than four years have elapsed since the Act was passed. The WorldCom trial has just ended, and the Enron trial has not yet begun. The country's two largest bankruptcies remain a cloud over American business, both in the U.S. and abroad. It remains to be seen whether the passage of the Sarbanes-Oxley Act will result in improved corporate behavior, sufficiently long-lasting to restore the confidence of investors in U.S. publicly held companies.

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Table 1: Results from the Second Beta Calculation

	Pre 2001		2001		2002		Post 2002
AOL Time Warner	2.520	↓	2.457	↓	2.101	↓	1.984
Bristol Myers	0.588	↓	-0.299	↑	1.005	↑	1.195
Computer Associates	1.615	↑	2.662	↑	3.487	↓	1.914
General Electric	1.239	↓	0.859	↓	0.705	↑	0.755
Merck & Co.	0.634	↓	0.077	↑	1.127	↓	0.536
Qwest	1.448	↓	1.238	↑	5.603	↓	2.367

The Benefits of Breastfeeding and Formula in Regard to Illness Rates

Lauren Grispo (Nursing)[1]

The decision to breast-feed or bottle-feed a newborn is a common occurrence among new mothers. Prior research has exposed conflicting issues regarding whether the breast is really the best. The purpose of this study is to determine the benefit breastfeeding has on protection from illness when compared to formula feeding. This non-experimental study will compare the rate of upper respiratory tract and lower respiratory tract infections during the first six months of life. A convenience sample of ten full-term newborns was selected from a single pediatrician's office in Staten Island, New York. The sample included a mixture of males and females born during the month of August, 2005. Through the data analysis of the subject's medical records, the number of office visits, and the types of illnesses diagnosed at each visit were recorded and analyzed within a six month time frame. Future data analysis will provide information regarding differences in feeding measures and if it is linked with the prevalence of illnesses during infancy.

I. Introduction

The goal of this quantitative study is to identify specific feeding methods and illness rates, in full-term infants for the first six months of life, who were either breast-fed or formula-fed. The relationship being tested is if there is a decreased incidence of illness between breast-fed babies and an increased incidence of illness when formula fed.

II. Research Questions

Through this study, the aim is to seek answers to the following: 1)What are the protective benefits of breastmilk versus formula with regard to (a) rate of illnesses during first six months of life (b) the number of doctor visits during the first six months of life. 2)What effectiveness does breastmilk provide against upper respiratory and lower respiratory tract infections when compared to formula.

The hypotheses are: (A)Fewer illnesses are associated with breast feeding rather than formula feeding during the first 6 months of life. (B)Breast-fed subjects will encounter fewer severe illnesses and fewer doctor visits than subjects who are fed

[1] Research performed under the direction of Dr. Lauren O'Hare (Nursing).

formula. (C) Subjects receiving strictly breastmilk will experience a decreased number of upper respiratory and lower respiratory tract infections.

Also, this study should demonstrate that formula-fed infants will have a higher severity and incidence of illness. The goal is to reveal the benefits breastmilk has over formula, because it offers a higher immunity level, especially in the first six months of infancy.

III. Literature Review

An important decision that a mother will make when her child is born is how to feed her baby. The determination whether to breast-feed or bottle-feed is not an easy choice. There has been much debate over the years on whether breastmilk has greater benefits and whether formula shares these same advantages. It is hard to ignore the fact that breastmilk provides the infant with direct immunity, which formula does not, therefore breastmilk poses as the stronger challenger. With current and future research, we are gaining more information on whether or not the breast is the best choice. The ideal for the infant is breastmilk since it contains numerous benefits. Some benefits of breast milk include the biological specificity of human milk which changes and evolves as the infant grows, the immunological benefits of breastmilk, decreased risk of allergies, decreased risk of sudden infant death syndrome, and decreased severity of illness during infancy (Tyler & Hellings, 2005). Research shows that breastfeeding has been associated with a decreased incidence of illnesses primarily present in infancy. Lower rates of pneumonia, gastroenteritis, otitis media, & upper and lower respiratory tract infections have been seen in infants who received breastmilk (Wright, Baver, Naylor, Sutcliffe, & Clark, 1998). "The surgeon general of the United States and the American Academy of Pediatrics recommend exclusive breast-feeding of infants for at least the first six months of life." Fewer hospitalizations and less severe forms of respiratory illnesses have been associated with breastmilk. Breastfeeding for four or more months during infancy resulted in a decreased risk for hospitalization for severe respiratory illnesses by 1/3 (Bachrach, 2003, p.18). In 1998, a researcher investigated the effect of breastfeeding on incidence and duration of respiratory illnesses during the first six months of life. A cohort of 1,202 healthy infants from New Mexico were monitored. The results concluded that the overall incidences of respiratory illnesses were not affected by breastfeeding. However, rates of lower respiratory infections declined, were less severe, and shorter in duration during the first four months of exclusive breastfeeding (Cushing, Samet, Lambert, Skipper, Hunt & Young, 1998). Therefore, this study indicated that there is not much more protection that breastmilk offers over formula. Yet, breastmilk is still

associated with lower rates of illnesses, especially lower respiratory tract infections. One benefit of breastmilk that has been studied over time is its benefit in asthma reduction. Researchers have concluded that breastfeeding appears to reduce the risk of asthma during the first four years of life by 56%. This study focused on these benefits by following a cohort of 4,089 infants born from 1994-1996 for a 4-year period. Parents filled out questionnaires at birth and then reported symptoms of illness at 1, 2, and 4 years. The results showed a decreased risk of asthma associated with a longer period of breastfeeding (Sullivan, 2004).

Kramer, Guo, Platt, Sevkovskaya, Dzikovick & Collett (2003) conducted a study with the objective to examine the effects of infant growth and health of 3 compared with 6 months of exclusive breastfeeding. Results indicated that there was a significant reduction in the incidence of gastrointestinal infections in the 6 month group. Introduction of a breastfeeding promotion program to increase the rates of breastfeeding was the focus of another research study. By implementing this intervention, the breastfeeding rates by woman increased, which in turn reduced illness rates. The researcher investigated these changes by comparing medical records of infants born before the promotion program and of infants born during the intervention. Results indicated that the rates of breastfeeding increased from 16.4% to 54.6% after the intervention. Also pneumonia and gastroenteritis among breast-fed babies declined as well. Incidences of pneumonia declined from 32%-72% and gastroenteritis declined by 15% (Wright, et al., 1998).

These following studies have demonstrated the benefits of breastfeeding in reducing common illnesses especially asthma, pneumonia, gastrointestinal, and lower respiratory infections. Research concluded also shows that there is no maximum protection benefit of breastmilk when compared to formula. According to one study that examined the feeding method and re-hospitalization rates in less than one month of age, there was no greater benefit of breastmilk. The results indicate that many healthy breast-fed babies are being hospitalized for failure to thrive. Out of a sample of 143 newborns, 22 breast-fed newborns and only 16 bottle-fed newborns had FTT. Also a higher rate of jaundice was seen among infants receiving breastmilk (61%) as compared to the formula fed infants who had the lowest rates of jaundice (30%). Other illnesses that required admittance to the hospital were hypernatremia, dehydration, and sepsis, all of which had a higher incidence in breast-fed infants (Tyler & Hellings, 2005). Many more research studies have been conducted to determine breast vs. bottle, and which is the best. Conflicting arguments and results are seen on both sides of the spectrum. Benefits and risks are associated for both formula and human milk. Therefore this topic to research

was chosen to expand on the knowledge base and offer more information regarding this issue. This study is necessary to try and gain support to strengthen the existing research. Also it will provide more information for expecting mothers and hopefully will provide them with insight on what feeding method is the most beneficial.

IV. Methods

The study compared the incidence of illnesses between breast-fed infants and bottle-fed infants. Information was obtained from the medical records of ten full-term newborns from a primary pediatrician's office. Rates of illnesses, office visits, and types of illnesses were compared in both infants receiving breast-milk and infants receiving formula. This study took place in Staten Island, NY.

Subject selection

A convenient sample of ten infants born between August 1st, 2005-August 31st, 2005 were the focus of the study. The subjects were picked randomly from a list of infants born during that specific time frame. There were a total of twenty-five newborns during the month of August 2005 who all sought care from this pediatrician. Among those twenty-five, only ten were selected for the study. Within the ten subjects there were males (n=6)and females (n=4). Also, five subjects were fed by formula and five by breast. Background information on all 25 potential subjects was collected to determine eligibility for participation in the study. Criteria included: infants had to be full term (>36 weeks gestation), therefore premature infants (<36 weeks gestation) were excluded. At the time of birth the infant encountered none of the following problems: (a) hypoxia (b) mechanical breathing (intubation) (c)birth trauma. The chosen infants all received an APGAR score more than eight at one minute and five minutes after birth. All the infants were required to be placed in the newborn nursery and admittance to the NICU eliminated subjects. Lastly, the infants were to be strictly breast-fed or strictly formula fed for the first six months of life. Supplementation with formula to breast-fed babies was not included in this study. Ten infants fit in the eligibility criteria and these ten infants were selected for the study.

Process

The study conducted involved no manipulation of the independent variable and no introduction of interventions. A between-subjects design was used in which two groups of subjects were analyzed, a group of breast-fed infants compared to a group of formula-fed infants. Before the process began, permission was granted from the primary

physician of the office to review the medical records.

Data Collection & Instruments

Evaluation of the impact of feeding methods in regard to illness rates was based on data analysis. Data was collected over a six-month period and was analyzed and compared at the end of the six months. The data sources utilized were the subjects' existing medical records. Each illness visit to the physician's office was recorded in the subjects' chart. Data included the subjects' chief complaint and symptoms, diagnosis made at each visit, and medications prescribed. Diagnoses and symptoms were arranged into three different groups: (a) upper respiratory tract infections (b) lower respiratory tract infections (c) other illnesses. Treatment measures were also divided into two groups: (a) prescription medications (b) over the counter medications and was recorded for each of the ten subjects.

Classification of Feeding Method

The purpose of utilizing the subjects' medical records for this study was to gather the data without manipulation. Each infant was placed into one of the two categories. The first category included infants that were strictly breast-fed from the time of birth to six months of life. There was no supplementation with formula during this period. The introduction of food during these 6-months was not considered in the study. Breastfeeding included breast-milk directly from the breast or through a bottle via a breast pump. The second category included infants that were strictly formula-fed since birth. There was no preference to the type of formula used for this study.

Classification of Illness and Medications

The diagnoses in the subjects' chart were classified into three categories. Diagnoses that were classified as upper respiratory tract illnesses (URI) included: (a) rhinitis and purulent rhinitis (b)sinusitis (c) allergic rhinitis (d) post nasal drip (d) otitis media. Diagnoses in the category of lower respiratory infections (LRI) included (a) asthma and reactive airway disease (b) bronchiolitis (c) croup (d) pneumonia. The last category included a variety of illnesses such as: (a) gastroenteritis (b) rashes (c)viral syndrome. The symptoms for category one included runny nose, watery eyes, congestion, ear pain, sinus tenderness, and fever. The symptoms for category two included cough, wheezing, SOB, chest pain, and fever. Category three included fever, diarrhea, vomiting, abdominal pain, throat pain, weakness, and loss of appetite. Finally, the medications prescribed after the diagnoses was made were divided into two categories. The

prescription medications included antibiotics, multi-formula medications, steroids, and bronchiodilators. Over the counter medications included cough medications and Tylenol and Motrin. All of the above criteria was recorded for each of the ten subjects.

V. Results

Data was collected from ten subjects over a six month time frame. The subjects were divided evenly between two groups, with five subjects in each. The average age at the time of final data analysis was six months. Five subjects in one group were exclusively breast-fed and five subjects in the second group were exclusively bottle-fed from the time of birth to six months of age. Data was separated into types of illnesses and rates of occurrences among both groups. Results revealed a significant difference between bottle-fed and breast-fed babies in regard to illness rates. Illness rates were greatly increased in infants who were bottle-fed (Figure 1/Table 1). Therefore, infants exclusively breast-fed had a lower risk of contracting an illness during the first six months of life. Between the two groups, there was a total of thirty five incidences of illnesses. Twenty five of those incidences (71%) occurred among infants receiving formula and only ten incidences (29%) among infants receiving breast-milk. The illnesses were divided into three groups including: Upper respiratory tract infections, lower respiratory tract infections, and other. Upper respiratory infections included otitis media, purulent and nonpurulent rhinitis. Lower respiratory infections included bronchiolitis and reactive airway disease. The other category included rashes, viral syndromes, and gastroenteritis. The rates of upper respiratory infections were significantly lower in breast-fed (11.4%) versus bottle-fed (31.4%). Lower respiratory illnesses also occurred more frequently in bottle fed infants (14.3%) compared to breast-fed (5.7%). Other illnesses were also more prevalent in bottle-fed infants compared to breast-fed, at rates of 25.7% compared to 11.4%.

VI. Discussion

The main benefit associated with exclusive breastfeeding for six months compared with bottle-feeding was a significant reduction in illnesses. This study found a difference in the rates of illness between babies receiving breastmilk versus formula. The findings suggest that administering breastmilk during the first six months of life decreases the frequency of illnesses. According to this study, babies who were bottle-fed for the first six months encountered a greater degree and frequency of illnesses. The overall incidence of URIs and LRIs was affected by breastfeeding (Figure 2/Table 2). Breast-fed infants did encounter illnesses, but at a lower rate. Therefore, breastmilk could

provide greater protection against illness in infants. The study could have been strengthened by increasing the number of subjects. The results of the study were consistent with previous studies, supporting the theory that breastmilk does offer a significant degree of protection. The results of this study can improve general knowledge on this subject area and be included in future research.

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Table1: Incidences of Illnesses

Types of Illness	Frequency of illness (bottle)	Percent (bottle)	Frequency of illness (breast)	Percent (breast)
Otitis Media	4	11.4%	1	2.9%
Purulent Rhinitis	7	20%	3	8.6%
Bronchiolitis	4	11.4%	1	2.9%
Reactive Airway	1	2.9%	1	2.9%
Rashes	3	8.5%	1	2.9%
Viral Syndrome	3	8.5%	2	5.7%
Gastroenteritis	3	8.5%	1	2.9%
Total	**25**	**71.2%**	**10**	**28.8%**

Total # of incidences = 35 Total Percent = 100%

Table 2: Illness Rates

Classifications of Illnesses	Formula-Fed	Percent	Breast fed	Percent
Upper Respiratory	11	31.4%	4	11.4%
Lower Respiratory	5	14.3%	2	5.7%
Other	9	25.8%	4	11.4%
Total	**25**	**71.5%**	**10**	**28.5%**

Touch and Learning in a Dance Lesson

Jennifer Wiech (Psychology)[1]

I. Introduction

Due to the growing sensitivity and awareness regarding "inappropriate touch," nearly all touch has been banned from polite and professional society in an attempt to eliminate the risk of unwanted sexual or "bad" touch. In response to growing media coverage about sexual harassment in the work place, Nicks (1996) surveyed fifty-six faculty members at a small liberal arts college to see how concerned they were about unwarranted accusations of sexual harassment and if they had changed the way they interact with students in order to guard against such accusations. Sixty-six percent had expressed some concern and 44% had changed the way they interact with students because of this. Throughout the United States, primary, secondary, and higher education facilities have drafted clear and drastic policies that forbid any tactile contact with students and other employees. While sexual harassment is unacceptable, the majority of tactile exchanges between people of varying degrees of intimate relationships are not sexual in nature. Numerous studies have been conducted to evaluate what types of touch are considered intimate and what types of touch are considered casual friendly exchanges (Bernieri, Gills, David, & Grahe, 1996; Burgoon, 1991; Burgoon & Le Poire, 1999; Kenny, 1994; Derlega, Lewis, Harrison, Winstead, and Costanzac, 1989 as cited in Floyd 1999). While results vary depending on sex/gender, duration, and situation, these studies show that there are a variety of touches that are interpreted in many different ways.

Many types of touch can and do produce positive effects and are sometimes necessary for one's personal well-being. Tiffany Field (2002) has published many articles regarding the necessity of frequent positive tactile exchanges to promote a child's development and general welfare, and she has also explored the powerful effects of touch and massage in regards to healing (Dess, 2000). In an interview with *Psychology Today*, Field discusses the importance of touch in everyone's life and encourages all people to engage in massage with a therapist, significant other, or even oneself through the practice of yoga (Dess, 2000).

Many researchers have also found that exchanging a touch with someone will often produce more altruistic behavior or increase the likelihood of one to comply to a request. Gueguen and Fischer-Lokou (2003) found that if the confederate touched another as a sign

[1] Research performed under the direction of Dr. Richard Brower (Psychology).

of gratitude for the information that that person relayed, the stranger would more often assist the confederate in the future without being prompted. Sixty-three percent of participants in the no touch condition helped the confederate, and 90% of participants in the touch condition helped the confederate. No gender differences were found in this study, but Roese, Borenstein, Martin, & Shores (1992) -as cited in Guegen and Fischer-Lokou -found that American men were more resistant if the confederate was a male. Gueguen & Fischer-Lokou (2003) proposed that the lack of gender influence in their experiment was due to the French population they were working with. This explanation coincides with Field's (1999) report that shows that French people are more accustom to touch than Americans. Field's research was based on Kleinke (1977), Brockner, Pressman, Cabitt, & Moran (1982), Hornik (1987), and Nannberg & Hansen (1994), who all found the touch conditions of their experiments to produce similar results.

Tactile learning is considered one of the most efficient means of acquiring knowledge. Gadt-Johnson & Price (2000) administered the Learning Styles Inventory (developed by Price & Dunn, 1997) to 25,104 students in grades five through twelve in order to identify tactile learners. Eighty-six percent of the students were correctly identified, and the researchers suggested that the LSI be administered more frequently to a greater number of students in order for teachers to best adapt their style of instruction to meet the needs of their students. In this study, tactile learning was defined as using one's hands, participating more directly in the learning process, and using one's sense of touch. While the researchers did not suggest that the teacher use tactile exchanges with these students, this may be appropriate in some forms of instructions such as teaching sports, dance, art, or instrumental music.

This study seeks to determine how touch affects the participant's evaluation of how much he or she learned, and the participant's enjoyment of the activity. Participants will be randomly assigned to either the control (no touch) or experimental (touch) condition. Participants will be brought into the study by condition in groups of 3 or 6. These participants will be taught a series of dance moves. In the control condition, the dance instructor will simply tell and show how to execute the movements, and afterwards, the participants will be asked to do the movements. In the experimental condition, the participants will be asked to do the movements with the dance instructor, and he or she will come around to each person and adjust their bodies so that they can better understand how to execute the movement. Before touching the participants, the instructor will ask if he or she can make these adjustments so that the participant does not feel uncomfortably or unexpectedly touched by the instructor. After the class, participants will be asked to complete a survey regarding how much they enjoyed the class, how much they thought they

learned, and how much they enjoyed the instructor, then the self-evaluation will be compared between each group of participants. Since previous research has shown that tactile learning 1) is an effective method of teaching, 2) causes people to be more likely to comply with a request and 3) shows that various types of touch can strengthen a connection between people that is not necessarily romantic or sexual in nature. The researcher proposes that touch will aide in the learning experience, increase the participants' evaluation of the instructor, and increase the enjoyment of the activity.

II. Method

Participants

The 20 participants (7 men, 13 women) were undergraduate students that attend a small, urban, liberal arts college and were recruited from the college's Participant Pool, as well as, the college choir. Their ages ranged from 18 through 23 (M= 19.32, 3D = 1.39), and 80% of the participants were in their freshmen year of college. The group contained 85% Caucasian/white, 10% African American/black, 5% Hispanic, 0% Asian/Pacific Islander, 0% Middle Eastern/lndian/Pakistani, 0% Native American, and 0% of participants from another ethnic background. The students from the college participant pool were given extra credit in their Introduction to Psychology classes for their participation in this study, and all participants were given an assortment of candy in gratitude for their participation.

Materials and Procedures

The participants were asked to wear comfortable athletic apparel to the study so that their movement would not be restricted during the dance lesson. Before beginning the experiment, participants were given a consent form to read and sign (Appendix A), as well as, a demographic survey to complete (Appendix B). They were also assured that they could leave the study at anytime, and reminded that all data collected was confidential. Participants were also asked to leave their e-mail addresses so that they could be debriefed after all of the data was collected. All participants were randomly assigned to either the control or the experimental group and brought into the study six at time. Each group was called into the dance studio by condition, and both conditions were taught the same routine -an excerpt of the dance routine from the Broadway show "Hairspray" choreographed to the song "The Sixties" and performed during the 2004 televised Tony awards. If the participant was unable to move around due to an injury or illness, the participant was still given credit and thanked for showing up to the session before being dismissed.

Each group was brought into the dance studio and told that they would be participating in a 30-minute basic beginner dance class. At the conclusion of the class, they

were asked to fill out a Likert-style survey which required them to rate on a scale of 1 (poor/nothing/strongly disliked) to 10 (excellent/a lot/thoroughly enjoyed): how much they enjoyed the class, how much they think they learned from the class, and how much they enjoyed the instructor.

In the control condition, the instructor presented the dance moves visually and verbally and offered corrections in the same manner. In the experimental condition, the instructor presented the moves visually and verbally, as well, but also physically adjusted the participants' movements and posture when offering corrections. Before touching the participant, the instructor would ask him/her if she could adjust his/her arm, foot, leg, head, or torso position. This was done to ensure that none of the participants felt uncomfortable with the instructor touching them. After the participants concluded their routines, they were asked to fill out the class and instructor evaluations. Once this was completed, they were thanked for their time, told that they would receive a debriefing e-mail within the following two weeks, and reminded that all data was confidential.

III. Results

To test the first component of the hypothesis that tactile instructions would increase the participants' enjoyment of the class more than just verbal and visual instructions, an independent group I-test was performed. Contrary to the prediction, no significant variance in the participants' enjoyment of the instruction was found, $t(18) = 0.148$, $p = 0.884$. The participants in the touch condition ($M=4.58$, $SD=0.515$) did not rate their enjoyment of the class significantly higher than the no touch condition ($M=4.63$, $SD=0.744$), or rather, both conditions rated their enjoyment of the class with a similar average of a high level of enjoyment. An independent group t-test was also used to test components two and three of the hypothesis that suggest that the participants in the touch condition will evaluate the amount that they have learned and their enjoyment of the instructor higher than the participants in the no touch condition.

Touch did not influence the participants evaluation of how much they thought they learned, either, $t(18) = 2.92$, $p = 0.009$. The participants in the touch condition ($M=2.75$, $SD = 1.139$) did not report a significantly higher amount of learning than people in the no touch condition ($M=4.13$, $SD = 0.835$). Participants in the no touch condition ($M = 4.80$, $SD = .422$) showed similar enjoyment of the instructor as those touch condition ($M = 5.00$, $SD = 0.0$), and thus, there was no significant difference between conditions for that variable, either, $t(18) = -1.50$, $p=0.151$. As the experiment was in progress, the research found a variety of confounding variables that may have affected these results. An independent group t-test was conducted to see if those with no experience ($M=4.17$, $SD=0$ .98) reported learning more

from the instructor than those with previous dance experience (M=2.93, SD=1.14), and statistics showed that those who had no experience felt that they learned more than those with experience, $t(18) = 2.308$, $p < 0.05$.

Because these results showed an obvious but strong statistical difference between people with and without experience, a One- Way Analysis of Varainca (ANOVA) was performed to see if people with no experience learned more in the touch condition than those in the no touch condition. The hypothesis was not significantly supported by this test, $F(4,15)=1.50$, $p=0.252$.

In conclusion, the touch condition had no affect on the participants' evaluation of how much they learned, how much they enjoyed the class, and how much they enjoyed the instructor and neither did the amount of experience when factored in with the touch condition.

IV. Discussion

This experiment was an especially useful trial run, because it illuminated the variety of problems and confounding variables that can interrupt and influence the isolated study of the effects of touch on learning. In order to ensure that the participants' awareness of the touch variable would not influence their evaluation of the experience, it was difficult to determine how the touch variable affected the experimental group. There was little variance between the groups in regards to the participants' overall appraisal of the situation. Perhaps if the questionnaire had emphasized an evaluation of the use of touch, verbal, or visual directions, it would have been easier to specifically appraise this aspect of the experiment. Since the dance lesson was generally enjoyable for participants in all conditions, there was no way to determine if touch had a significant influence on the experimental group based on the results of the final survey.

While surveys may be a useful way of gathering some information, it would also be beneficial to have a blind evaluation of each participant’s dance progress by an objective observer, preferably someone familiar with dance. This was attempted in the first half of the experiment; however, this presents a variety of challenges in and of itself. For example, the researcher was unsure whether to rate the participants by their individual progress or how they progressed as compared to the group. This may be easier to determine if the group is mixed between participants that are touched and participants that are not touched. Also, evaluating more than one participant at a time is an overwhelming task for just one researcher, but, if multiple researchers are asked to appraise one subject per researcher, one must find a clear, consistent, measurable way of evaluating a dance move. It is difficult to do this objectively.

There were several other factors that came to surface after the experiment was in progress. Those that were in a group of people that they were familiar with were generally more encouraging of one another and seemed to collectively enjoy their experience more as observed by the discussion, laughter, and energy exhibited during each session. Also, the dance instructor had an especially enthusiastic, helpful, and encouraging attitude that made all the participants feel comfortable. She had a rating of 5-excellent on every questionnaire. Those that had previous dance experience or were involved in athletics grasped the dance instructions more readily than those that were not engaged with so much unordinary movement. While the One-Way ANOVA showed that this did not significantly affect the study, it should be a consideration for future research.

Since these and a variety of other more subtle variables most likely affected these results and since these results were so strongly contrary to previous touch research, it is paramount that more studies regarding the use of touch in learning be conducted. The researcher suggests that further studies on touch and learning be conducted in other situations (such as art, athletics, or music) before continuing research in the dance studio. This is only because of the difficulty in controlling extraneous variables such as group mentality and previous dance/movement experience (some of which may or may not be noted, though still influential to the participant's dance ability). However, other studies should perhaps look at the unique social dynamics that occur in a beginning dance class with participants that have varied levels of experience. It was especially interesting to observe how male athletes with no previous dance experience immersed themselves in this unique, musical theater dance experience. Since none of the participants' questionnaires ranked the class below a 4 out of 5 on the issue of enjoyment, this fun study may be a great opportunity for participants to enjoy a new experience in a relaxed environment, as well.

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Appendix A

Form A **Consent Form -Researcher's Copy** **Date**:

Dear Participant:

In this study, you will be asked to participate in a basic beginner dance class. If you feel that injury or illness will make this especially difficult, please inform the researcher at this time and you will be excused from the study without penalty.

In order to best help you learn the combinations, the instructor may ask if she can physically adjust your body position. If any part of this class is too difficult or uncomfortable, you are welcome to tell the instructor and/or sit out on that section. Before the class is done, you will be asked to fill out a brief evaluation form. Additional research assistants will be on hand to help evaluate the progress of the class and the ability of the dance instructor.

Please note that you are allowed to leave at any time during the study without penalty, all data collected is completely confidential (including and especially your evaluations of the dance instructor), and each participant will receive a debriefing e-mail after the final experimental session. If you have any questions or concerns, feel free to contact the researcher jwiech@wagner.edu or x4327.

Sincerely,

Jenni Wiech
Student Reasercher
under the advisement of Dr. Brower x3316

Appendix B

Form B Demographic Survey:

I. How old are you? _____

II. What year are you in college?

I)Freshman 2) Sophomore 3) Junior 4) Senior 5) Grad Student

III. What type of community are you from?

I)Rural 2)Suburban 3)Urban

IV. What ethnicity are you?

I)White 2)Black 3)Hispanic 4)Asian 5)Middle Eastern
6)Pacific Islander 7)Native American 8)Please clarify or Other:

V. Do you have any previous dance experience and how many years of experience do you have?

I) No -2)Yes-

VI. What sex are you?

I) Male 2) Female 3) other

Appendix C

Form C Participant's Evaluation of Class and Instructor Form Date:

Participant

Please answer each question by rating on a scale from 1 (not at all/nothing) to 5 (excellent/very much/a lot).

Remember all information is confidential, and only the researcher will be handling these forms.

1. How much did you enjoy the dance class?

1	2	3	4	5
Not at all		Okay		Very Much

2. How much did you learn from today's class?

1	2	3	4	5
Nothing		Something		A lot

3. How much did you like the dance instructor?

1	2	3	4	5
Not at all		Okay		Very Much

Section IV: Critical Essays

Progressive or Regressive?
Coping with Alleged Fin-de-Siècle Corruption

Elena Beth Pushaw (English)[1]

"…we may assume that we are merely images and artistic projections for the true author, and that we have our highest dignity in our significance as works of art—for it is only as an aesthetic phenomenon that existence and the world are eternally justified…"
–Friedrich Nietzsche[2]

Early twentieth-century thought was both progressive and regressive in Eastern Europe; progression into a successful future was often formulated by a plan to follow past ethics and manners. Tumultuous times were explained as a result of social and technological developments, and by a certain commutative aspect, meaning that despite what the true problem was—what came first, the technology or the downfall—mankind taking responsibility for its judgmental actions was harder than just blaming technology for the decline. Naturally, the German people were affected by this rapid development. Artists looked for an escape and philosophers looked for a reason. Both Thomas Mann, the writer, and Friedrich Nietzsche, the philosopher, were so tuned in to the troubles of their surrounding culture, and instead of getting weighed down by it, they lifted themselves up with thoughts expressed through language. Nietzsche's explanation of this need for people to escape their troubled circumstances was through a realization of aesthetics—that earlier times, like those of ancient Greece, were more honest and true, therefore citizens of those times were more comfortable with their surroundings. What brought truth to these people's lives, was a discovery of an immediate beauty and how, if one could just tune oneself into it, he or she would lead a better, more fulfilling life. Mann's depth of thought in *Death in Venice* is a result of Nietzsche's influence of aesthetics in his book, *The Birth of Tragedy*.

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[1] Written under the direction of Drs. Urbanc (Languages) and Morowitz (Art) for the team-taught Honors ILC, *Cities and Perversities: Art, Literature and Society in Turn-of-the-Century Europe*

[2] From *The Birth of Tragedy*, section 5, page 52

Mann unquestionably read Nietzsche. He has written essays on his opinions of Nietzsche's critique of modern Germany and life in general. What must be looked at, however, are not Mann's direct analyses of Nietzsche's theories, but rather the products of intellectual thought that took years of learning to produce. As far as aesthetics are concerned, Nietzsche spent a great deal of time assessing its impact on society when he wrote his first book, *The Birth of Tragedy*. It is not famed for being the most clear or precise, but it does its job in explaining a mindset of the early twentieth century. As Mann read Nietzsche, he was very influenced by Nietzsche's thought, and after reading him for many years, he had a deep, true understanding of Nietzsche's theories. Mann had been reading him for many years when he wrote his novella, *Death in Venice*. The novella is tragic, aesthetic, and the perfect depiction of what a life, in tune to the aesthetics of a desperate and changing culture, becomes when hope is lost.

Before looking at the connections between *The Birth of Tragedy* and *Death in Venice*, what must be explored is why readers, during the fin-de-siècle, were so drawn to Nietzsche in the first place. Critic R. A. Nicholls described Nietzsche's appeal perfectly with, "Nietzsche became a measure by which men analyzed their own inadequacy, or he was the hope of escape from the despair of decadence" (37). Individuals were not in denial of their troubling surroundings and did not deny that they needed something desperately to cling to for hope. This need to hold on was the rope by which Nietzsche pulled followers in. His goal was not to change the world, but to help its inhabitants understand that their current circumstances were malleable, and that if they wanted a different way of life for themselves, there is no other person who can deny them this. Essentially, what could be attained should be attained, despite any consequences. Claimed to be a pessimist, Nietzsche was actually very hopeful during desolate times. He did not believe in a person withdrawing into himself because his circumstances were undesirable, for a person has but one life to live, and if it wasted, he has earned nothing—no personal fulfillment—and then what is the purpose for living? Nietzsche was able to focus so much on worldly, personal fulfillment because of his disbelief in God and an afterlife. It was this disbelief that created such a distrust of his theories in years since publication, but on the other hand, it caused the unsteady to reevaluate their positions in life, and gave them hope if they found that they were not comfortable where they stood.

Nietzsche emphasized the right of the individual to essentially transcend hard times. A person cannot change his or her physical or social condition, but the person can overcome any mental blocks that he or she may have. It is all by a will of the mind, or a new accentuation of personal being. Nicholls writes, "…Nietzsche…claimed to find in accepted moral judgments only the preservation of a victory of the weak over the strong

and healthy, the triumph of slaves over their masters. This emphasis on a very controversial aspect of Nietzsche remained the central source of interest in the following years" (26). If people living in the fin-de-siècle felt abused and mistreated by their ever-changing and manipulatively decadent cities, they could fundamentally read Nietzsche as an escape to a better future—individual power over circumstances that seem too far out of reach.

Now really, Nietzsche's writings were not totally intended to be life-changing pieces. He was not looking for fame or recognition, but rather he looked for truth and worldly hope. Much of this hope was found for the future by backtracking to the past, the classical world. Classical times were so appealing because people were more true to themselves and their innate desires, whereas in the fin-de-siècle, the role of the individual was getting lost in the whirlwind of modernization. People were looking for some steadiness through this storm, artists were influenced by thinkers, and stories were written for exemplification. Mann is a great example of an artist searching for inspiration, finding it, and working it into his novellan plot.

Critic Gary Johnson explores the aesthetic value of *Death in Venice*, but takes it a step further than many others. Instead of looking simply at 'what' is done, he takes a deeper approach into 'how' and 'why' something is done; he explores deeply into Mann's text as Nietzsche explored so deeply into fin-de-siècle culture. To repeat an incredibly valid point, life was hard to handle, and because everyday knowledge progressed with such intense vigor, the concept of the 'literal' came into question. Nietzsche explored a need to make sense of one's surroundings by focusing on what that individual needs to pull from his surroundings in order to succeed; this is a translation—an attempt to grasp at—something literal, something concrete. It makes what is literal, something subjective and believable, so in a sense, what is literal is not literal by worldly means, but only by individual perception, and then, not literal at all.

In *Death in Venice*, Gustav von Aschenbach represents every struggling individual in the turn-of-the-century, for he is talented but drained of inspiration because of his surrounding circumstances. He flees to Italy for refreshment, for mental rejuvenation, and finds what he was looking for all of his adult life: a true escape into the pleasant life of another, who represents something completely different and more hopeful than ordinary people can. Essentially, a new reality. Aschenbach is able to transcend his fraudulent world by regressing to classicism, as Nietzsche did in *The Birth of Tragedy*. Aschenbach becomes infatuated with young Tadzio, and on so many different levels it is both satisfying, true, and yet, at the same time, immoral. But then, as far as satisfying individual desire, morals are more or less set aside in order to attain complete fulfillment.

Aschenbach's regress to classicism is a desire to transform the tangible and intangible aesthetics he sees in Tadzio into a work of art, for in the end, he is an artist at heart. He did not just stumble upon Tadzio as it appears Mann to have written the event. Really, Aschenbach was desperate for something to cling to, something to draw inspiration from—as was his creator, Mann—and in this desperate attempt, he finds Tadzio who fits a classical mode. An author can "exercise a definite control," and it is with this control that art is born (Corngold 51). Mann seeks control by writing about Aschenbach, and Aschenbach seeks control by writing about Tadzio. Aschenbach preys on this young boy, sucking everything he can out of him until he dies, old and withered. If he hadn't clung to someone, he would have had no explanation for his feelings of desire and loss, and for an artist, everything must have explanation. Mann's desire for explanation, inspired by fin-de-siècle understanding, is expressed through Aschenbach's desperation. After exploring the relationship between *Death in Venice* and *Hamlet*, Johnson writes, "[T.S.] Eliot's concept, which depends on a kind of aesthetic symmetry, in that a character's emotions must refer to or stem from a reasonable (objective) cause, maintains its interest despite its philosophical shortcomings." Without concrete reasoning behind his feelings, Aschenbach would have felt like a failure of sorts—a failed artist, and more importantly, a failed man.

In *The Birth of Tragedy,* Nietzsche explores Greek aesthetics as the origin of tragic storytelling, and everything he has to say about it in his introductory sections, confirms Tadzio as a key player for Aschenbach's inspiration. Johnson expands Nietzsche's Greek aesthetics to mean something naïvely natural. He connects the classical to something naïve, and the modern to something sentimental. The modern times are considered by him to be sentimental because there was a constant looking back to the past, and yearning for its naïveté—a time before anyone experienced the 'downfall' of a modernized life. It was believed that people of classical societies were more feeling, therefore, Aschenbach's desire for Tadzio, who represents a classical time, is more easily understood and translated into a desire for more genuine emotion.

The ending of *Death in Venice* confirms what many critics see as Nietzsche's pessimistic view on life: work hard, live with your heart, but in the end you are just going to die and everything will be over for you. Mann's novella is undoubtedly inspired by Nietzsche's philosophy of Greek tragedy. From Nietzsche's *The Birth of Tragedy*, an entire part of section 2 could have been placed directly at the end of *Death in Venice*: "…that pain begets joy, that ecstasy may wring sounds of agony from us. At the very climax of joy there sounds a cry of horror or a yearning lamentation for an irretrievable loss" (40). Had Nietzsche written *Death in Venice*, or at least had conversation with

Mann about it, he probably would have ended it much the same way. Aschenbach gave up his life to follow his aspirations; he died of disease in Venice when he very easily could have left and survived. However, his survival would have been simply physical, whereas his artistic and emotional self would have died right at the time of a departure from Italy and from Tadzio.

The more *Death in Venice* is critiqued, the more obvious it becomes that Mann was a reader of Nietzsche. From aesthetic correlatives and escapism, to obsession, fulfillment, and death, the novella would never have been produced in such a multi-layered, complex form, had Mann not had Nietzsche's texts at his fingertips. Many citizens of the fin-de-siècle longed for stability and understanding of their modernizing cities, and Mann was no exception. He, as an artist, needed it even more, for without understanding his circumstances, he could not produce anything of interest or value to readers of his time. The people looked to artists for reassurance of their daily living conditions, and artists looked to philosophers for their insights. Everything was, and still is for that matter, a huge recycling of knowledge. The ancient Greeks probably had a lot of things figured out in *their* 'modern' society, and somewhere along the lines it got lost, only to be picked back up as centuries turned over, by those who examine what it meant to be a Greek and what it means to be a German.

Ultimately, one cannot take a step forward without first taking a step back. We learn from the past, from history, so if that is what it took for people living in the fin-de-siècle to move forward—to examine what it was that could be learned and used from the past—then it must have worked, because both World Wars were overcome, technology has helped living conditions in too many ways to count, and we have survived to this point in history, one hundred years later, satisfied with how things progressed and ready to watch them progress even more. Nietzsche took a look into the past to find out what it was that was important to bring to the future. The ability and desire to do so is profound, and for this, both he and Mann are still being read and analyzed today. Their approaches are unfailing; their insights are timeless. Progression is never to be doubted.

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The Motivation behind Rear Admiral Grace Murray Hopper's Perseverance & Extraordinary Accomplishments

Amy Jensen (Economics)[1]

Rear Admiral Grace Murray Hopper often said in her lectures to aspiring young people, "Dare and do". [1] This motto is an excellent summation of Hopper's personal philosophy displayed through her accomplishments. Grace Hopper broke into two male dominated fields of study, computer science and the military. She not only entered these professions, but also excelled within them, utilizing her revolutionary ideas of how information could be presented, transmitted and computed. Hopper had the confidence to venture into these fields as well as defend her revolutionary ideas because of the positive influences that occurred in her childhood, particularly the influence of her mother, father and grandfather.

Grace Hopper was born in New York City in 1906 to Walter and Mary Murray. [2] In her early childhood, Hopper enjoyed figuring out the mechanics of machinery, which she satisfied by taking apart household items such as clocks to discover how they worked. [2] Hopper was interested in the socially defined "girl-inappropriate activities" since she preferred to build, particularly utilizing motors.[3] However, Hopper also enjoyed "girl-appropriate" hobbies such as "needlepoint, reading and playing the piano." [4] Hopper was also particularly fond of math, which was encouraged by her mother[2]. "[Mary Murray] studied geometry by special arrangement when serious study of math was still thought improper for a woman."[1]

Hopper was able to overcome obstacles she encountered by following her father's example. Walter Murray had both of his legs amputated but remained a successful insurance broker.[1] "Grace admired him for his fortitude and strong will. Because of his positive attitude and his ability to overcome such hardship, she knew she was capable of anything"[2]. Both Mary and Walter Murray served as vital role models in shaping Hopper's view of herself as a woman. "He [Walter Murray] inspired Hopper to avoid being limited to typical feminine roles."[2] This was clearly displayed in her parent's choosing not to limit her interests in mathematics and machinery.[2,3]

Looking at the pipeline model, in relation to typical feminine roles and careers, it is clear that parental influence does play a significant role in the development of a girl

[1] Written under the direction of Dr. Maria Gelabert (Chemistry) for the honors course *Women in the History of Science*

into a woman. "Factors that will lead girls to reject science as a career are thought to be cultivated early-even moments after birth."[5] By allowing Hopper to explore her interests in mathematics and machinery at a young age, as well as the more "feminine" activities of music and needlepoint, Walter and Mary Murray allowed Hopper to foster an interest that would lead her to an undergraduate, masters, and doctorate degree along with a successful career that would change the world.

Education was an important goal in the Murray household for all the children, male and female. Walter Murray was particularly worried about his daughters. Due to his health, he wanted to make sure that his daughters would be taken care of if anything were to happen to him. Therefore, he explained that "it was especially important that his daughters not only graduate from college but work for at least one year after graduation."[3]

Grace Hopper was an excellent student and skipped several grades, which allowed her to graduate high school at the age of only sixteen in 1923.[3] She applied to Vassar College, but due to a failed Latin Exam, Vassar asked her to wait a year and reapply.[3] Despite initially being rejected, Hopper was not discouraged. She enrolled in the Hartridge School, a preparatory school, in New Jersey, for a year and reapplied to Vassar the following year and was accepted.[1]

Hopper entered Vassar in 1924 where she concentrated her studies on math and physics.[2] She took as many courses as possible and was asked to tutor other students "because of her special gift for sharing knowledge and understanding with others."[3] This gift of sharing knowledge would be utilized later on in her life as Hopper gave any one of her over 200 lectures.[2] Grace Hopper graduated in 1928 Phi Beta Kappa (a collegiate honors society) with her bachelor's degree in mathematics and physics.[3] She earned a Vassar College Fellowship, which allowed her to attend Yale where she began her research in mathematics for her master's degree in 1928.[4] Two years later, Grace Murray Hopper graduated with her Master's from Yale and married Vincent Foster Hopper, an English teacher at New York University.[4] Notably, English is more often associated with women while math and physics are associated with men.[6] Once again, Grace Hopper was not content to conform to the social norm. In the case of Grace Hopper and her husband Vincent Hopper, there was a "reversal" in the expected gender roles in academia.

In 1931, Grace Hopper returned to Vassar, this time as an instructor in the Department of Mathematics.[4] This position was paid at a salary of $800 per year.[1] Hopper continued to work at Vassar while working on her doctorate from Yale, which she was awarded in 1934.[1] With this achievement, she became the first woman to receive

a doctorate in mathematics from Yale University.[7] She was promoted to the position of associate professor and remained at Vassar until 1943.[4]

In 1940, due to the United States entering World War II, Hopper decided to join the Navy.[1] Grace Hopper's family had a long history of military service dating back to the Revolutionary War[3]. Her great grandfather achieved the rank of Rear Admiral during the Civil War, a rank that Hopper would also achieve in her lifetime.[3] However, Hopper's appointment also came with the achievement of being one of the first woman Rear Admirals.[3] Hopper once again showed similar interests as her mother and father who served on the Selective Service Board and Ration Board respectively.[3]

Unfortunately, Hopper was not readily accepted into the Navy. She was considered too old at age 34, and underweight to serve.[4] "The government felt she could best serve the country by continuing to teach mathematics."[3] Hopper did not give up on her goal, and managed to receive a waiver for the weight requirement and received a leave of absence from Vassar.[4] In 1943, Hopper entered the U.S. Naval Reserve in the Midshipman's School for Women where she graduated first in her class.[1]

Grace Hopper began her work for the Navy at Harvard University where she began working on the Mark I, which was "used to calculate aiming angles for Naval guns in varying weather conditions."[1] Ridiculed for thinking that she could solve these complex problems when a man could not, Hopper worked diligently and proved her critics wrong (SOURCE). During her time in the Navy during World War II, Hopper worked on the Mark II and the Mark III as well "transcribing and inputting codes."[1]

In 1945, Hopper and her husband divorced.[3] In 1946, Hopper was released from active military service and resigned from her teaching position at Vassar, instead utilizing a three-year fellowship at Harvard University where she continued in her position in the Computation Laboratory where she worked throughout World War II.[3] Until 1949, Hopper worked as a research fellow in the Engineering Sciences and Applied Physics Departments at Harvard University.[1]

After leaving the world of academia in 1949, Grace Hopper began working at the Eckert-Mauchly Computer Corporation in the position of Senior Mathematician.[1] While at Eckert-Mauchly, Hopper had the opportunity to design the first commercial "large-scale electronic computer called the UNIVAC I."[1] At this time, Hopper developed the first compiler called the A-O that "translated mathematical code into machine language."[8] Hopper was also a part of the team that developed the Flow-Matic, "the first English-language data processing compiler."[4] Most programmers ridiculed the idea that a computer could understand an English-language code.[9] However, despite such criticism, Hopper did not waver and worked even harder to simplify programming language.[9] The

Flow-Matic was "designed to translate a language that could be used for business tasks."[8] It would become the basis for COBOL, the universal programming language.[8]

"'If one computer could do it, so could they all,' Hopper reasoned. She began a campaign to persuade her peers to develop a new common business computer language. The result was COBOL "(Common-Business-Oriented Language)."[9] The development of a common business language would lead to the standardization of computer languages, eventually leading to the international standards for programming languages used in present day.[9] Through her presentations and persuasions, the entire Navy began using the COBOL computer language that Hopper developed.[9]

Grace Murray Hopper stayed extremely active throughout her life and stayed in close contact with both the US Navy and the world of academia by working as a visiting lecturer and consultant[2]. As a lecturer, she urged her listeners to be open to new ideas. "Her philosophy states that if technology is to continue to progress, people in the computer world should be willing to accept new ideas."[10] She utilized analogies as well as common visuals to explain difficult concepts like measuring time for computer calculations.[10]

Hopper was called back to active duty in 1967 to help standardize the high-level Naval computer languages.[1] She took a leave of absence from her job at Sperry-Rand, but ultimately did not return.[2] During her active duty, Hopper continued to hold positions in academia as a lecturer at George Washington University in Washington D.C.[2] "In 1983, by special Presidential Appointment she was promoted to the rank of Commodore."[1] In 1985, she became one of the first women in the United States to achieve the rank of Rear Admiral.[1] Hopper retired from the Navy for the last time in 1986.[2] She was eighty years old at the time, which made her the oldest active duty officer in the Unites States.[2]

At eighty years old, Grace Murray Hopper was not ready for a quiet retirement. She was appointed to the position of senior consultant to Digital Equipment Corporation.[4] She held this position for four years until 1990 when she retired.[4] Throughout this period, she continued to attend as well as give lectures. At the Navy Micro/Office Automation Conference in 1987, Hopper was advocating the optical transmission of information due to its security advantages.[10] Hopper also criticized the government for not focusing enough on information assessment to determine which data will be needed years from now.[10] Once again, Hopper was ahead of her time and looking towards the needs of the future.

Grace Murray Hopper died on January 1, 1992 and was buried with full military honors at Arlington National Cemetery. Unlike many women scientists, she was recognized for her accomplishments and her discoveries during her lifetime. As early as

1946, Hopper was recognized for her work with the Naval Ordinance Development Award.[10] She received over sixty-five honors and awards by the end of her life. One of her most notable achievements includes receiving the Defense Distinguished Service Medal in 1985, which is the highest award possible by the Department of Defense. She was also the recipient of some awards that a woman had never achieved before including Distinguished Fellow of the British Computer Society (1973), and the National Medal of Technology (1991). [4]

Grace Murray Hopper broke into the male dominated fields of the military and computer science utilizing her philosophy of "Dare and Do" in everything that she undertook. Clearly, this philosophy began to develop at an early age as she watched her father successfully overcome obstacles. Hopper also had the experience of being allowed to explore her interests in mechanics and mathematics even though society found such interests inappropriate for young girls and women to study. Without these experiences at a young age, Hopper might have lost interest in math and mechanics simply because she could not explore such an interest or was forced into more "womanly" interests. Hopper must have known this herself, as a message that she stressed in her many lectures was "be innovative, open-minded and give people the freedom to try new things.[7]

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Blonde Humor: An Acceptable Form of Prejudice

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In today's society, the topic of prejudice is a hot button issue. Politicians build platforms on it, novelists write books about it and many groups feel its effects. Because prejudice in itself is an overwhelmingly large topic, it has been divided into many areas of focus, including racial prejudice, anti-gay prejudice and sexism. One area of prejudice that has yet to be explored in depth is the subject of blonde prejudice, specifically the area of blonde humor as a socially acceptable form of prejudice.

Crandall, Eshleman and O'Brien (2002) define prejudice as "a negative evaluation of a group or of an individual on the basis of group membership" (p. 359). A common perception of prejudice is that it refers only to its more familiar types, such as racism, sexism and anti-gay prejudice. Crandall, Eshleman and O'Brien (2002) report that research on prejudice has typically focused on groups which tend to be divided into categories by classifications such as race, religion, and sexual orientation. The common factor which ties these groups together is that, over time, they have all in someway been the objects of prejudice.

As reported by Crandall, Eshleman and O'Brien (2002), it is thought that certain forms of prejudice, such as racism, have been on the decline. However, the authors argue that such notions may merely reflect society's willingness to conform to appropriate social behavior. However, leaving behind old acceptable forms of prejudice may, in fact, lead to the development of other more "politically correct" forms of prejudice (Barreto & Ellemers, 2005). In the same way that social appropriateness today demands that racist jokes are intolerable, social norms suggest that certain other types of humor are acceptable. Greenwood and Isbell (2002) suggest that certain seemingly innocuous forms of prejudice, such as blonde humor, are not so harmless at all. The authors propose that "dumb blonde" jokes are overtly offensive to women and are widely known and accepted today as a form of disparaging humor.

Hair color is a factor most people do not consider when contemplating different types of prejudice. However, as Kyle and Mahler (1996) state, hair color is one of the first things that people notice when viewing another person for the first time. The authors state that stereotypes, such as racist or gender stereotypes, are prompted by visual cues.

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Since hair color can be a potentially dominant physical cue, it can also be a powerful predictor of prejudice. Why then do most people not think of hair color as a potentially damaging stereotype? The answer, according to Greenwood and Isbell (2002), is simple: certain forms of stereotyping, such as the stereotyping of blondes, are prevalent in today's society and, as such, many people do not look upon them as harmful forms of prejudice.

In order to understand blonde humor as a prevalent form of prejudice, it is first necessary to examine how blonde stereotyping operates as a form of sexism. As Barreto and Ellemers (2005) indicate, sexism is a form of prejudice that can be found in countries across the world. While it may appear that sexism has declined, it is still prevalent in modern society in many more aversive ways. Barreto and Ellemers term this new aversive type of sexism "modern sexism." According to the authors, "modern sexists" display their sexist tendencies in more disguised ways than "old-fashioned sexists" because they are aware of societal pressures to display more "politically correct" behavior.

In today's society, sexism is a form of prejudice which has become more prevalent against women than men (Angelone, Hirschman, Suniga, Armey, & Armelie, 2005). Angelone et al. found that when a man is exposed to a peer who engages in either sexually oriented joke telling or verbal sexism, he is likelier to engage in the same activity himself than a man exposed to a peer who is not engaging in sexist activities. The tendency to engage in behaviors similar to those of others is one factor which has allowed prejudice to remain prevalent. In today's "politically correct" climate, however, overt forms of prejudice have become increasingly less common than disguised or obscured forms, such as disparaging humor (Angelone et al., 2005).

Disparaging humor is any sort of joke which is disrespectful in nature, such as racist or sexist humor (Ford, 2001). Humor itself has become an increasingly popular form of entertainment. Television has an entire channel devoted to stand up comedians telling jokes. Many of these comedians choose to make jokes about people of the opposite sex, which causes audiences to laugh uproariously. These jokes are a kind of disparaging humor.

Ford (2001) stated that humor in this day and age has become a socially acceptable device for oppressing groups of people. In his discussion of disparaging humor, Ford (2000) hypothesizes that this particular type of humor creates a norm of tolerance of discrimination against members of the disparaged group. The theory of the social acceptability of humor combined with the norm of tolerance that people have with disparaging jokes has led to the notion that humor does not harm and therefore cannot be

considered a dangerous form of prejudice. However, since many jokes which are considered socially acceptable today contain sexist humor, mostly with regard to women, viewing the humor as acceptable leads to harmful stereotypes and presents itself as a valid form of prejudice (Ford, 2000). In fact, as Angelone et al. (2005) note several colleges have gone so far as to recognize sexually oriented joke telling as a form of sexual harassment and take disciplinary actions against those found telling disparaging jokes.

Schafer (2001) presents several common themes with regards to sexist humor against women. The author states that many jokes contain stereotypes depicting women as "whores," which Schafer proposes makes women seem like less of a threat to males in power. For instance, one of the more common themes is a woman selling herself for wealth or physical pleasures. Yet another theme is a woman taking forever to "beautify" herself. Ironically, as Rich and Cash (1993) argue, this phenomenon may only occur because men stress attractiveness in women more than women do in men, therefore women are under more pressure to conform to beauty standards in order to achieve success. One particular aphorism Schafer (2001) explores is, "If a lady says no, she means maybe; if she says maybe, she means yes; and if she says yes, she's no lady." This both takes away a woman's ability to say "no" and makes it impossible for her to say "yes" while keeping her dignity. Many other jokes explore the same themes and Schafer hypothesizes that this sort of humor makes women seem a lesser force in a male empowered society.

Since sexist humor against women is such a veritable form of prejudice, what part does hair color play? As Juni and Roth (1985) indicate, hair color has been established as a significant factor affecting stereotyping simply because it is one of the first things a person can recognize about another. Rich and Cash (1993) explain how, through mythology and literature, different hair colors have taken on their own meanings. For example, the authors describe how innocent princesses are often portrayed with long, golden-blonde hair while witches are shown with dark, often brown or black hair. Juni and Roth (1985) note that blondes are overly represented as angels and goddesses while brunettes are overly represented as witches and seductresses. Over time, hair color has taken on a life of its own.

Given that hair color carries with it the risk of stereotyping, blondes have become the overwhelming victim of most jokes pertaining to hair color. By default, blondes have gained the sullied reputation of being "dumb," but how did such a stereotype evolve? Rich and Cash (1993) explain that many popular images in Western Caucasian society portray beautiful women as having a light complexion, light eye color

and blonde hair. In the 1950s a vibrant platinum blonde woman burst onto the Hollywood scene. Her stage name was Marilyn Monroe. Her appeal, or so it would seem, was her child-like voice in opposition to her adult curves and seductive behavior (Greenwood & Isbell, 2002). Greenwood and Isbell (2002) maintain that Marilyn Monroe and the roles which she chose to play are some of the factors which contributed to the "dumb blonde" reputation.

Since, as Rich and Cash (1993) reported, blondes are viewed as more beautiful and feminine when compared to women of other hair colors, Greenwood and Isbell (2002) argue that the evolution of the "dumb blonde" might be as simple as examining the possible damage that a beautiful woman might inflict on a man in a man's world. The authors consider the possibility that, to a man in power, a beautiful woman may be attractive, but she may also posses the power to be sexually manipulative. The concept of the "dumb blonde," according to Greenwood and Isbell (2002), may merely be an attempt to reduce "an attractive woman who might otherwise pose a powerful sexual or emotional threat to another stereotypic subtype of female: the attractive, if lobotomized, nymphomaniac" (p. 342).

Along with the reputation of the "dumb blonde" came the "dumb blonde" joke. Greenwood and Isbell (2002) define the "dumb blonde" joke as a sexist genre of humor which features a woman who is "easy on the eyes, easy to get into bed, and above all, easy to ridicule" (p. 341). Blonde women in classic literature and fairy tales were a blend of passive sexuality and purity, also interpreted as virginity. Blonde women from the 1950s onward began to represent a shift towards a more open type of sexuality, while still encompassing the appearance of innocence and defenselessness (Juni & Roth, 1985).

Ford (2001) argued that the telling of disparaging jokes has a negative impact on the stereotyping of groups. Since the "dumb blonde" joke can be categorized as a type of disparaging humor, it has been shown to have a negative effect on the stereotyping of the blonde population as a whole. Kyle and Mahler (1996) examined the potential harms that blonde stereotyping can cause. The researchers conducted an experiment in which they showed college students pictures of the same Caucasian woman as either a blonde or a brunette. The woman's hair color was changed on the computer so as to ensure as much similarity as possible. The photos were attached to identical resumes. The students were asked to rate the woman in terms of their perception of her abilities. The researchers reported that the woman was rated significantly less capable as a blonde than as a brunette. Also, blondes were assigned a significantly lower starting salary than were brunettes. The researchers hypothesized that one possible reason for this was that the woman's hair color was a visual cue which may have brought to mind the "dumb blonde"

stereotype. This stereotype may have affected the perceived lack of skills or intellect of the applicant.

The perception of blondes as "dumb" is a stereotype which has proven harmful to blondes as a group since the 1950s. If this trend is not remedied, the implications for blondes over time are staggering. As Rich and Cash (1993) noted, blondes are more prevalent as *Playboy* centerfolds than any other hair color. The authors go on to report that about one-third of Miss America contestants have been blonde, which is hugely disproportionate to the actual number of blondes in society today. These factors help to propagate the idea of the blonde as a vapid sex object. Greenwood and Isbell (2002) state that the "dumb blonde" trend in Hollywood is still increasing. Movies such as the 2001 film *Legally Blonde* and characters on television shows such as Phoebe on *Friends* perpetuate the "dumb blonde" stereotype and ensure that there will always be someone watching who believes in it.

While magazine's like *Playboy* would have people believe that blondes are the dominant hair color in today's society, they are actually a statistical scarcity (Juni & Roth, 1985). Stories of blonde haired princesses, such as Cinderella or Sleeping Beauty, perpetuate the myth of the helpless blonde woman waiting for her Prince Charming to come and rescue her. Movies such as *Gentlemen Prefer Blondes* and *Legally Blonde* show that, even though 50 years have passed, the myth of the "dumb blonde" holds strong.

Blonde humor is one of the most prevalent ways that the "dumb blonde" stereotype is spread in today's society (Ford, 2001). It has been shown that disparaging humor is harmful and that it has the ability to perpetuate stereotypes which have lasting effects on the group which is victimized (Ford, 2000). Since blonde humor has reached a level of social acceptability in the world today, the implications for blondes as a group are tremendous. Blonde humor is harmful whether the joke is perceived to be funny or not. The stereotype of the "dumb blonde" hurts blonde women's chances of succeeding in the workplace and in many other areas of life (Kyle & Mahler, 1996). Blonde humor creates a disparaging if not downright harmful stereotype of the blonde woman, which is why it is clearly a valid and destructive form of prejudice.

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The Greek Element in Thomas Mann's Death in Venice

Timothy Cushing (English)[1]

Death in Venice by Thomas Mann (1875-1955) is the story of a man's downfall that results from a consuming obsession. Mann uses classical themes to define the modern destiny of the story's central character, Gustav von Aschenbach as well as Aschenbach's personal relationship with art and beauty as represented by a boy named Tadzio. These classical themes are not only overtly expressed in direct references to certain Greek gods from mythology but also implied by subtle motifs that are planted within the pages. It is obvious from his writing in Death in Venice that Thomas Mann was profoundly grounded in classical influences. The aspect of Greek mythology in this novella is impossible to overlook. From the reoccurring motifs of the story as well as its overt references there are four major gods of Greek mythology that are evident: Dionysus, Apollo, Hermes and Eros. Mann utilizes these gods in Death in Venice to not only add a classical frame of reference but also to implicate the turn of the century mindset in the area of psychoanalysis and psychology in general. These gods reflect a very modern interpretation in their relation to Sigmund Freud and his work in these fields. This correlation is by no means accidental. Mann was very well-read in the literature of Freud and was an acquaintance and admirer of him. In Death in Venice, Thomas Mann employs a classical component through his allusions to Greek mythology. Not only do these gods serve to shape Aschenbach's apparent destiny of downfall in the story, but they also insinuate a very modern and psychological viewpoint that was inherent to Mann's time and negate the preordained nature of the story.

The gods that Mann relegates to symbolize the transition in Aschenbach's nature are Dionysus and Apollo. Due to the spirit of these two gods they are traditionally paired together as representing opposite spectrums of human nature; Apollo being equated to sober and rational wisdom and Dionysus to the drunk and communally erotic. Mann included this deliberately and in one of his correspondences wrote of Death in Venice: "It is inherent in the difference between the Dionysian spirit of lyricism, whose outpouring is irresponsible and individualistic, and the Apollonian, objectively controlled morally and socially responsible epic" ("Letter to Weber" 102). At the outset of Death in Venice,

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Aschenbach is portrayed as a restrained artist who prides himself on the dignity and command that is reflected in his work. "[Aschenbach] almost loved the enervating battle that was fought daily between a proud tenacious will – so often tested – and this growing weariness which no one was to suspect and which must not betray itself in his productions by any signs of weakness or negligence" (Death in Venice 8). This "enervating battle" that is mentioned is distinctive of the dichotomy of Apollo and Dionysus.

Mann foreshadows the transition that occurs by mentioning the "growing weariness" that is Dionysus and is eroding Aschenbach's Apollonian intentions. Aschenbach increasingly struggles to suppress his Dionysian desires until he surrenders completely to them in the novella's final pages. Furthermore, Aschenbach's "fate" is also hinted at in his vision of a Dionysian orgy at the beginning of the story. This vision later appears again slightly prior to Aschenbach's downfall in which he identifies "the strange god" (Death in Venice 88). There is a distinction made in the latter vision due to Aschenbach's participatory nature. Whereas he was able to suppress and escape the initial Dionysian vision, in the second vision he is unable to stifle its seductive nature. "But the dreamer now was with them, in them, and he belonged to the strange god" (Death in Venice 90). This represents Aschenbach's final decision to object himself to the spirit of Dionysus as he at last gives into its temptation. However, this is by no means a spontaneous realization. The story illustrates a gradual seduction of Aschenbach as he is led to his eventual Dionysian insight by the god Hermes.

Mann utilizes references to Hermes and the implications that his character represents and uses him as a guide for Aschenbach who coaxes him into an acceptance of Dionysus. Hermes, in Greek mythology, is not only a messenger but also a guide for souls who delivers them to the underworld. "Hermes is perhaps best known as the divine messenger, so often delivering the dictates of Zeus himself; as such he wears a traveler's hat and carries a herald's wand which sometimes bears two snakes entwined" (Morford 165). Hermes is also often classically depicted with wings on his helmet or sandals implying a transitory nature. These aspects of Hermes are constantly referenced in Death in Venice by recurring imagery that personifies him in the characters that Aschenbach encounters. The theme of the traveler's hat is something that is noted by Aschenbach on numerous occasions. Its initial appearance is in the graveyard where the story starts.

In the graveyard, Aschenbach encounters a mysterious man who inexplicably appears. He notes that "the white and straight-brimmed hat that covered his head gave his appearance the stamp of a foreigner, of someone who had come from a long distance" (Death in Venice 5). This unexplained man that Aschenbach sees is a reflection of

Hermes. He is a transitory figure who is clad in a traveler's hat. This is also the point at which Aschenbach's first Dionysian vision occurs. After seeing this man, Aschenbach feels "…the desire for travel, nothing more; although to be sure, it had attacked him violently, and was heightened to a passion, even to the point of a hallucination" (Death in Venice 6). The aspects of Hermes that are embodied by the strange man have a profound effect upon Aschenbach. This is the initial correlation that appears between Dionysus and Hermes.

Hermes also appears in the traits of a few other transitory figures of the story. On the boat to Venice, Aschenbach encounters a drunken man who evokes disgust within him. The man has dressed himself to look youthful and Aschenbach is revolted by his young disguise and his adolescent illusion. He notes, "His old head was not able to resist its wine like the young and robust." (Death in Venice 25) The man is also wearing a "brilliantly decorated straw hat." (Death in Venice 23) This is the second reference to Hermes that Mann includes. Similarly to the initial man in the graveyard, this man is also insinuated as being tied to Dionysus but in a more overt way. The drunkenness of the man reflects the Dionysian spirit as he is the god of wine. This man also foreshadows Aschenbach's final outward appearance on the beach at the end of the novella when he attempts to disguise his age in order to evoke approval in Tadzio.

The foreshadowing of fate through allusions to Hermes is also seen in the gondolier who delivers Aschenbach to the Lido. The man's straw hat is yet another reference to the appearance of Hermes. Furthermore the aspects of Charon that the gondolier embodies at the same time further his traits of Hermes. The coffin-like gondola is a clear reference to the River Styx and the ferryman who delivers souls across its waters. At the same time that he is being delivered there is a sense of fate that alludes to an aspect of guiding. He is both being delivered and led to his fate. Aschenbach's failure to pay the gondolier suggests a foreboding fate as it is customary for Charon to receive payment for his services.

Another display of the imagery of Hermes occurs in Aschenbach's encounter with the musician during a performance at the Lido. The man's shabby felt hat is noted by Aschenbach. Furthermore, the coy and cunning that is exhibited by the man is inherent to the nature of Hermes. Hermes, in Greek mythology, is regarded as a trickster and a thief. After the performance it is noted that the man, "stole about the tables" (Death in Venice 79). The use of the word "stole" implies that the man was in some way robbing the unknowing audience and tricking them into giving him money.

In the novella there is a distinct parallel between the Greek gods and Tadzio, Aschenbach's infatuation. Even the pronunciation of his name serves a source of

excitement for Aschenbach. He becomes obsessed with the "u" sound which is constantly heard as people call Tadzio's name. This is the same sound that dominates the second Dionysian vision. The sounds of this vision are describes as, "Clanking, banging and dull thunder with shrill shouts and a definite whine in a long-drawn-out *u*-sound" (Death in Venice 88). In this story music becomes something closely associated with the god Dionysus. His musical symbolism is hinted at in many of the motifs of Hermes that Aschenbach encounters such as the musician with the felt hat.

Tadzio also encompasses dual references but like the travelers is mostly a display of the traits that pertain to Hermes. Aschenbach, in a letter to Carl Maria Weber writes of, "Tadzio as psychopompos" (102). Psychopompos, or guide to the dead, implies Hermes and one of his key roles in Greek mythology. Tadzio is Aschenbach's foremost guide in the story. Although the other characters are supplemental in Aschenbach's fate, Tadzio is the main catalyst that brings Aschenbach to his Dionysian death. It is Tadzio's youthful beauty, another aspect reflective of Hermes, which results in Aschenbach's refusal to leave the Lido and Venice despite his knowledge of the plague. It stirs an emotional aspect of his psyche that he had been suppressing and causes him to leap into the void and deviate from his Apolline creed.

The final god who plays a large role in Death in Venice is Eros. Eros is classically pertinent to the story. "Eros, like Aphrodite, may represent all facets of love and desire, but often he is the god of male homosexuality" (Morford 165). The element of male homosexuality is intrinsic to the story and the obsession that lies at its center. Aschenbach's actual desire is personified in the story as Eros. Whereas Dionysus serves as the temptation, Aschenbach's sublimated feelings that surface are given the label of Eros. Shortly after first seeing Tadzio, the boy is said to have a, "flowering head [that] was poised with an incomparable seductiveness – the head of an Eros" (Death in Venice 38). The initial desire that is evoked in Aschenbach is projected upon Tadzio with the qualities of Eros.

The homosexual love that Eros encompasses clearly excludes the idea of physical reproduction that is included in one aspect of Eros' nature and instead points to another aspect of his character. "It is the love of the eternal beauty (and with it the goodness and wisdom it entails) that inspires the pursuit of philosophy in the philosopher" (Morford 116). Tadzio evokes a passion in Aschenbach through his beauty that causes a need that had previously been left unrealized. Aschenbach pursues love through Tadzio's beauty. On the beach at the Lido while in Tadzio's presence, Aschenbach is suddenly seized with a compulsion to write. This writing possesses a passion that previously has been foreign to Aschenbach. He is able to transcend death in

a more meaningful way than procreation. His immortality is achieved through creativity that is a result of love. This element of love something understood to be part of the complicated and dualistic nature of Eros.

Another similarity that arises in Death in Venice that is congruent to mythological thought of Eros is the duality of his nature. Eros is composed of a twin nature. Deviating from the common conception that Eros is beautiful Plato in his Symposium offers a completely different definition of his Eros:

> "…he's (Eros) far from being delicate and beautiful (as ordinary people think he is); instead, he is tough and shriveled and shoeless and homeless, always lying on the dirt without a bed, sleeping at other people's doorsteps and on roadsides under the sky, having his mother's nature, always living with Need. But on his father's side he is a schemer after the beautiful and the good; he is brave, impetuous, and intense… resourceful in his pursuit of intelligence, a lover of wisdom" (Plato 486 203d)

In this speech that is given by Socrates in Symposium regarding his conversation with Diotima the duality of Eros' nature and therefore the nature of his love is revealed. This concept is extremely pertinent to Aschenbach. His character is strikingly similar to the Platonic definition of Eros. In the story, Aschenbach is constantly in "Need" of some sort of release from his suffering. Also, in respect to Aschenbach's family background, Mann writes, "Gustav Aschenbach, then, was the son of a higher law official... His forebears had been… men who had led severe steady lives serving their king, their state. A deeper strain of spirituality had been manifest in them once, in the person of a preacher; the preceding generation had brought a brisker, more sensuous blood into the family through the author's [Aschenbach's] mother, daughter of a Bohemian bandmaster" (11). Just like Plato's Eros, Aschenbach comes from a wise father and a poor mother who was the epitome of the starving artist. This creates a conflict within him that lies at the heart of the story.

Another striking similarity exists in the appearance of Plato's Eros and Mann's depiction of Aschenbach. He is described as having "thin and wrinkled" (19) cheeks and a large head. His worn face, he admits, is the product of his career of determination and the struggle that it entailed. Aschenbach's duality and appearance are congruent with Platonic thought. Aschenbach struggles with not only the burden of dignity, but also with the dual nature of love. It plagues him and is as real as the cholera that physically kills

him. He also experiences a spiritual death as he is consumed by the Dionysian void created by his violent inner fight to define love.

The foremost Freudian influence in Death in Venice is the play between the ego and the id. These are represented in the story as the gods Dionysus and Apollo. Apollo is representative of Aschenbach's ego. It is his proud and strong-willed perception of himself. Dionysus, on the other hand, plays the part of the id in Aschenbach's psyche. This god is Aschenbach's unconscious and repressed desire for disorder and intoxication that he has forced himself to conceal and bury from a young age. The shift in the story is Aschenbach's slow realization of his unconscious desires and their eventual achievement that result in his death.

Despite its being written in third person, Death in Venice is mainly from the perspective of Gustav von Aschenbach even though it may reflect aspects of Thomas Mann's personal nature and beliefs. This perspective causes a certain amount of deceit in terms of the personal destiny that the book depicts. It is evident from reading Death in Venice that the downfall of Aschenbach is predetermined and that he is simply following a preordained course of action. However, Mann instilled a Freudian spin upon that story that dispels this façade. The Freudian perspective reveals that Aschenbach was in fact interpreting life as myth. In a speech delivered by Mann entitled "Freud and the Future", he says, "In its wisdom it conceives even the great gods among the given condition originating from the soul and one with her, light and reflection of the human soul" (419). According to this viewpoint, Aschenbach is dictating his own destiny and projecting his desires upon the events that transpired. In his speech, Mann says, "… the typical is actually the mythical, and that one may as well say "lived myth" as "lived life" (422). Although the events that Mann is experiencing may be typical, Aschenbach construes them as mythical. Aschenbach is using the lens of Greek mythology in order to interpret events that culminate in his downfall.

Another Freudian element of the story involves Freud's views concerning creativity. Freud interprets any creative writing as wish fulfillment of an individual's youth. In his childhood, Aschenbach, "had been a slave to the intellect" (Death in Venice 16). He forced himself to suppress his hopes for emotional expression of his true desires. Therefore, according to the Freudian school of thought, he merely uses a pretense of mythological fate in order to fulfill a desire of a previous memory. He turns his reality into one of his own novels by morphing it into a myth and in doing so crosses into the realm of unfulfilled wishes. He stifles the motherly "Bohemian" aspect that was inherited as a child and therefore imposes his father's intellect upon himself. Although Freud defines mythology as, "wishful phantasies of a whole nation" (Freud 442),

Aschenbach uses mythology on a much more personal level and interprets events as related to him individually through allusions to myth. Aschenbach's unfulfilled desires are also relevant to Freud's view on instinct and sexual desires.

A similarity that arises in Freud's writing on psychology is his view on sexual desire. Like much of Freud's psychological language, he uses the names and connotations of Greek mythology in order to name the components of his theories. One of Freud's hypotheses involves instinct. Freud proposes that human instinct is divided into two classes: the Eros, or sexual instinct, and the instinct of sadism which is accompanied by an instinct of death. The importance of Freud's use of Eros as the basis for the language of sexual instinct is obvious and its implications in the novella are easily seen. Freud proposes that the combination of these two instincts serves to reconcile the problematic surfacing of life. He hypothesizes that, "The emergence of life would thus be the course of the continuance of life and also at the same time of the striving towards death" (Freud 646). In this hypothesis Freud also states, "This accounts for the likeness of the condition that follows complete sexual satisfaction to dying, and for the fact that death coincides with the act of copulation in some of the lower animals" (Freud 650).

Freud's theory that death is somehow related to sexual release is particularly significant in the final pages of the book during which Aschenbach reaches his final death. It is in these pages that Aschenbach achieves equilibrium of these two instincts and gains freedom from the problem of his life's emergence. The cyclical nature of the story is finally realized as the colorless eyes of the man in the graveyard are imposed upon Tadzio and they, "finally turn at that threshold and meet his [Aschenbach's] own" (Death in Venice 98). Upon eye contact, "The pale and lovely Summoner [Tadzio] out there seemed as though smiling to him, beckoning, as if removing his hand from his hip, he were calling him to cross over, vaguely guiding him toward some prodigious fulfillment" (Death in Venice 99). For the first time in the story Aschenbach achieves a sense of satisfaction. This fulfillment is composed of an intrinsic duality because it is inherent to the nature of Eros and therefore also to the nature of Aschenbach.

In one sense, Aschenbach is achieving a freedom and realization of his destiny. However, at the same time he is achieving a release from his conflict of love and therefore a sexual release at the same moment. He finally is able to connect to Tadzio and in that moment of ecstasy is released from his physicality. The sexual implications of this release and his immediate death pertain to the theory of Freud. He at last realizes contentment and "sexual satisfaction". The element of sadism that Aschenbach turned upon himself through his self-exposure to the plague kills him and is balanced by his realization of the Freudian Eros and sexual contentment. Life and death, love and hate,

are finally defined and he escapes his dual existence. Hermes has finally coaxed Eros away from his Apolline tendencies and shown his soul to its Dionysian death. Aschenbach is able to fuse with Tadzio and his endless ocean of abyss.

In Death in Venice, Thomas Mann uses reference to Greek mythology in order to shape a sense of prodigious fate while also including aspects of Freudian thought. However, Greek myth is not the only allusion to prehistory that is included in the novella. In his description of the characters that represent Hermes, Mann also often makes mention of their "Adam's apple". This reference, coupled with the reoccurring image of strawberries that eventually infect Aschenbach with Asiatic cholera, illustrate aspects of the bible and serve "to remind us of the first man's encounter with desire and mortality" (Heller 123). In eating the strawberries, Aschenbach is embodying Adam's nature in the Garden of Eden and choosing his own destiny of downfall. The story elaborately and effortlessly spans countless sources of inspiration that Mann draws upon and which create a complicated but genius story of a single artist's downfall.

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Elizabeth Blackwell

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The mid-nineteenth century proved to be a pivotal time for women, especially those interested in the field of medicine. Elizabeth Blackwell, the first woman to receive a medical degree, was a leader in the immense movement of women in the mid-1800's who advocated for their right to education, a career, and a place in the male-dominated public sphere. While modern feminists may advocate for equality between the sexes, the feminist movement in the 1800's, dubbed 'domestic feminism,' operated on almost opposite ideas. Instead of challenging the image of woman as mother, nurturer and homemaker, women embraced their status as rulers of the domestic realm and asserted that it was their domestic skills and sentiments that would benefit an industrialized society in which morals were declining. Elizabeth Blackwell was a firm believer in domestic feminism as it applied to medicine and healing; she advocated for holistic healing and the treatment of both mind and body. Men, she asserted, merely treated the physical ailments of patients; women could bring a new dynamic to the world of medicine with their innate compassion and capacity for healing and nurturing. This philosophy contrasts with that of Mary Putnam Jacobi, a female physician and contemporary of Blackwell's who worked as an equal with male physicians and stressed the pursuit of scientific knowledge rather than morals and femininity. Elizabeth Blackwell's approach to science and medicine continues to be relevant to issues subjectivity, objectivity, and women in science today.

Elizabeth Blackwell was born in Bristol, England in 1821, and immigrated with her family to America in 1832. She was lucky enough to have a father who believed in the education of both sexes (at a time when many did not) and from an early age learned everything she could, especially about medicine (1). Elizabeth's father was also active in the anti-slavery movement, both in England and when the family came to America; Elizabeth herself, as a result, was an active advocate for abolition and later for women's rights as well. Her father died when she was 17, leaving his widow, Elizabeth, and her seven siblings in poverty. All of the children worked so their family could scrape by. Elizabeth earned money as a governess in the home of a North Carolina doctor, whose

[1] Written under the direction of Dr. Maria Gelabert (Chemistry) for the honors course *Women in the History of Science*

books she studied in her spare time. In 1847 she moved to Philadelphia to board with Dr. William Elder and began applying to medical schools (2).

While it would seem that, in the male-oriented and dominated world of the nineteenth century, a woman applying to medical school would simply be laughed at and written off as unfit to study medicine, some doctors who interviewed Blackwell admitted to instead feeling "threatened" by a woman entering their field. As one dean told Elizabeth, "You can't expect us to furnish you with a stick to break our heads with."(2) After enduring much rejection, Elizabeth was finally accepted by Geneva Medical College in New York in October of 1847 (2). Her presence was said to have transformed the bawdy, obnoxious, male student body into one of polite gentlemen who no longer carried on and interrupted lectures (1).

Blackwell's strong religious faith was, from the start, an integral part of her study and practice of medicine, as evidenced by an early letter she wrote to her professor (after he tried to prevent her from participating in a lecture on anatomy) proclaiming that anatomy was an entirely serious study that "reflected glory on the Creator."(2) Much later in her career Blackwell still held to the belief that "Ministrations to body and soul cannot be separated by a sharply-defined line. The arbitrary distinction between the physician of the body and the physician of the soul—doctor and priest—tends to disappear as science advances." (3)

Elizabeth Blackwell was granted her medical degree in January 1849, graduating from Geneva Medical College at the top of her class. Despite her academic achievement, some officials hesitated to grant her a degree. But Elizabeth did indeed get her medical certification, in front of a large commencement crowd that showed up in support of the first woman doctor (1).

Blackwell proceeded to pursue postgraduate work in Paris. She then moved back to America, opening the country's first nursing school in 1857 and the New York Infirmary in 1866 (1). The staff and students of the Women's Medical College of Pennsylvania, founded in 1850 by a group of physicians, kept in close touch with those at the New York Infirmary for Women and Children. Together, the two establishments formed a separate woman's sphere in medicine, but both also kept their sights on the ultimate goal: penetrating the male-dominated medical world (4).

While Elizabeth Blackwell did want to make a career for herself in a male-dominated field, she did not strive specifically for equality with men, as many modern-minded feminists might assume. Blackwell was living, in the mid-1800's, in a period of immense social change. With industrialization came the even more rigid separation of the public and domestic spheres and the confinement of women to the home. Rather than

totally limiting women in their mobility, however, this gave the "gentler sex" a new kind of power: they were not prisoners of the domestic sphere but, rather, rulers of it. Society saw increased social discord with the rise of industrialization, and the home became a symbol for everything good, moral and true. Women found themselves responsible for upholding the moral and spiritual values of the home, which became a strong base for the assertion of those values, and women themselves, in the public sphere. This campaign has been labeled "domestic feminism" by historians, and Elizabeth Blackwell became one of the few believers in domestic feminism who, as a pioneer in the medical field, fully entered the public sphere (4).

Thus Blackwell's strong belief in morality (borne of her faith in God) complemented her feminist beliefs quite well. She advised women who entered medicine that "It is not blind imitation of men, nor thoughtless acceptance of whatever may be taught by them that is required…Our duty is loyalty to right and opposition to wrong, in accordance with our own nature." (3) Women, she asserted, would have to take a different approach to medicine than men, and above all promote and uphold *morality*, if they were to make an impact on the profession and the public at large (3). And soon the rallying cry among domestic feminists and the growing pool of women physicians became that women were indeed naturally more suited than men to practice medicine. Francis Galton, a nineteenth-century intellectual, proclaimed that "[men's] minds [are] directed towards facts and abstract theories, and not to persons or human interests," therefore making them more suitable to scientific study than women (5). Of course, common sense would dictate that it is not favorable to have men unmindful of "human interests" attend to patients.

More and more women began to expand their roles in the domestic sphere and advocate for educating women about the practice of medicine and therefore "professionalizing" women's traditional roles in the home. *Godey's Lady's Book*, a popular publication in the nineteenth century, urged its readers to consider that "The property of [woman's] nature which renders her the best of nurses, with proper instruction, equally qualifies her to be the best of physicians." What had begun as a small-scale movement among feminists eventually became pervasive public opinion (6).

While it was agreed that in order to become full-fledged physicians, women would need an education and could not rely on their maternal instincts alone (6), Blackwell warned aspiring women doctors against the danger of materialism, or "the assertion that only the sense is real."(3) Students who only paid attention to the materials in front of them in the lab were bound to be unsuccessful physicians. "The worship of the intellect…as an end in itself, entirely regardless of the character of the means by which

we seek to gain it, is the most dangerous error that science can make," Blackwell preached. Other female physicians such as Sarah Grimke, similarly, were emphatic that women should not pursue the study of medicine and science solely for science's sake. Grimke also believed wholeheartedly in the role of maternal instinct, or what she called a "love spirit" in successful treatment of patients; she even deemed her "deepest fear" to be the number of women "unblest with this gift and whose highest attainment is the scientific knowledge of medicine." (6)

The conflict between scientific knowledge and morality that women faced in entering medicine can be compared to the debate, invented and analyzed time and time again by scholars, of how *subjectivity* and *objectivity* play into scientific study. Specifically, the assertion that completely objective thinking and the blind quest for knowledge is the ideal in science: both allow for totally analytic scientific study unhindered by the scientist's emotion or personal bias. The centuries-old, pervasive thought in our culture has been to equate masculinity and objectivity; therefore science has come to be a 'masculine' field. As stated by the sociologist Georg Simmel: "Supposing that we describe…absolute ideas by the single word 'objective,' we then find that in the history of our race the equation objective = masculine is a valid one." (7)

There are many theories as to how the idea of 'science' being synonymous with 'masculine' and 'objective' became so entrenched in our culture. In any case, there is no simple answer as to how science became so inseparable from masculinity; there is no solid, rational evidence to support the comparison. Somehow, over the years, objectivity become associated with masculinity, and masculinity equated with science. Evelyn Fox Keller, in her book *Reflections on Gender in Science*, attempts to examine the issue. She looks into one possibility, stating that "When we dub the objective sciences 'hard' as opposed to the softer (that is, more subjective) branches of knowledge, we implicitly invoke a sexual metaphor, in which 'hard' is of course masculine and 'soft' feminine…facts are 'hard,' feelings 'soft.'"(7) Femininity has become synonymous with sentimentality, which the scientific establishment saw for many years as having no place in science.

It was therefore entirely unheard of that women should fight, in a thoroughly male field, not only for equal status but, furthermore, for the feminization of that field. In a society where issues of masculine and feminine, objective and subjective, scientific and sentimental had before been regarded as clear-cut and black-and-white, Elizabeth Blackwell was a pioneer in challenging those ideas and encouraging other women to follow. One woman who was a contemporary of Blackwell's, a physician, professor at the New York Infirmary, and staunch advocate for feminist issues, was Mary Putnam

Jacobi. She in particular offers a contrast between all of the concepts at work in feminism (domestic and otherwise) and the entry of women into the field of medicine. Both were recognized as leaders in the fight of women to enter medicine. Jacobi and Blackwell were acquaintances but not close friends, for the two had very different temperaments.(8) Blackwell, as we have seen, entered medicine with an idealistic view of bringing morality and spiritual guidance to those she treated. Jacobi, on the other hand, simply loved science—she found joy in the rigidity and rationalism of solving problems and could indeed cut to the heart of any matter with her sharp intellect. Jacobi criticized Blackwell as being too sentimental; she complained that Blackwell never paid attention to "the sphere of practical life within which, that vision if anywhere must be realized. You left that for others to do…You have always disliked, ignored, and neglected medicine!" (8)

Also in marked contrast to Blackwell, Mary Putnam Jacobi regarded men as intellectual equals. She believed that working only with other women physicians would isolate her from the happenings of the medical world and did not shy away from collaborating with male colleagues. She stressed objectivity to her students, telling them that "you are liable to be so much and so frequently reminded that you are women physicians, that you are almost liable to forget that you are, first of all, physicians."(8) Again the issue of objectivity versus subjectivity arises, and the ensuing debate: which should be stressed in the practice of medicine, a science that must inevitably incorporate elements of both into patient care?

There will never be one correct answer to the eternal objectivity/subjectivity debate; Jacobi and Blackwell both present valid schools of thought concerning the matter. The legacy of each pioneering woman allowed for their contrasting feminist creeds to both remain popular. Well into the 20th century, however, most women believed foremost in domestic feminism and advocated for a special place in medicine. Not until the 1960s women's liberation movement did Jacobi's feminist ideas stressing equality of the sexes become highly popular, both within the general population and the medical establishment (8).

The thought of Elizabeth Blackwell (and also Mary Putnam Jacobi) perhaps bears re-examination, as we enter the 21st century with scientific fields still dominated by men and a masculine, objective method as the intellectual goal (5). While Elizabeth Blackwell's religious-laden ideas seem outdated and impractical to us today, perhaps we should revisit some of what she preached, as doctoral care becomes less personal and patient-oriented. The scientific writer Regina Markell Morantz stresses that "the passage of time has gradually revealed to us the shocking limitations of laboratory science. Once again we must return full circle to deal with factors in disease causation that cannot be

measured…in an experimental setting."(8) As illustrated to modern practitioners by courageous women who fought to become certified doctors over a century ago: maybe objective thought is not the ideal in science. Perhaps, in medicine especially, balancing the objective with subjective, "feminine" thought will allow for the betterment, moral and otherwise, of the human population.

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