It is with great pleasure that we present this sixth edition of the Colgate Academic Review. The papers that follow are the product of hard work and devoted study by an exceptional group of students, arguably representing Colgate’s cream of the crop from Fall, 2009. This semester marked a dramatic change in the method used to select student work for publication. The Student Lecture Forum organized and held Colgate’s first-ever undergraduate academic conference. 18 students submitted abstracts of their work and gave a presentation to a board of faculty and student judges, who then in turn selected the 13 most exceptional submissions, including four winners for each of Colgate’s major academic divisions: Natural Sciences, Humanities, the CORE Curriculum, and the Social Sciences. One of these four was judged “best in conference,” and was awarded the George E. Stevenson prize from the Colgate Speaking Union.

Although the majority of articles published here are from members of the Senior Class, members of the Classes of 2011 and 2012 are also represented, showcasing the depth of Colgate’s academic excellence across all class years. Work from the Class of 2013 is sure to be a staple of subsequent editions. The future is bright; we at the Student Lecture Forum anxiously await the incredible achievements sure to be forthcoming in the semesters that follow.

Thank you for joining us in celebrating these exceptional accomplishments.

-Andrew Pike, Class of 2012
  Editor

-Avi Israel, Class of 2010
  Assistant Editor
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Temperature and Nutrient Change and their Evolutionary Consequences

Adam Pellegrini, Class of 2010

Environmental stress can cause populations to undergo differential evolutionary change. This evolutionary change can be a function of the intensity of the stress, other associated abiotic/biotic interactions, and species specific ontogenic factors. This study investigated the effects that temperature stress (5°C increase) combined with varying nutrient allocation has on two epiphytic bromeliad species, Vriesea cathyi and Tilandsia bulbosa on biomass production and growth rates over 40 days. I hypothesized that plants under high temperature would have a lower growth rate and lower biomass than control plants and that different nutrient levels will cause significant differences in biomass production and growth rate. Plants in the cooler temperature produced more relative biomass, specifically in the Phosphorus treatment in Tilandsia bulbosa, and had higher relative growth rate in both species. There was a significant effect of nutrient treatment (Nitrogen-Phosphorus treatment had the lowest growth) in the 27°C Tilandsia bulbosas and in the 27°C and 32°C Vriesea cathyi. There was not a significant effect of temperature on growth rate in the Tilandsia bulbosa but there was a significant effect of temperature on growth rate in Vriesea cathyi. Differential nutrient availability did not affect either an epiphyte's response to temperature. Within the significant effects of both treatment and nutrients, I found different effects across species. For example, while the relative biomass data patterns were consistent across species, the relative growth rate were not, with new leaves in the V. cathyi growing significantly faster than new leaves in T. bulbosa. This study showed that temperature change affects epiphytes, a particularly vulnerable plant group, more so than nutrient levels changing.

Introduction

The ability of an organism to cope with environmental change depends on its ability to respond to this change. This response can be through either a physiological change (phenotypic) or by moving to a new habitat that is similar to the organism's old environment (dispersal). As the Intergovernmental Panel on Climate Change has projected a minimum of 5°C Celsius increase over the next century and an even greater maximum increase (IPCC 2007), it is necessary to investigate how this temperature increase will affect abiotic and biotic interactions. An indirect effect of temperature increase is the increase in evapotranspiration (ET), which results in there being greater net water loss within a plant. Although net primary productivity is positively correlated to ET (Lieth & Whittaker 1975), a system that is experiencing a greater net water loss might not see this positive correlation between NPP and ET. Though this correlation between NPP and ET is significant, RGR also depends on initial plant size as well as ET (Laube & Zotz 2003).
In plants, multiple nutrient uptake relationships and respiration rates depend on temperature and CO$_2$ levels (Ryan 1991); however, the data on how plants will respond to temperature changes is not clear-cut. Epstein et al. (2000) found that in Arctic plant communities increased temperatures caused an increase in nitrogen mineralization rates and growing season, which resulted in increased biomass. Contradicting Epstein, other studies have shown that when growth temperature was increased by 3°C, final plant biomass was reduced by 30% (reviewed by Zotz & Bader 2009). Shaver (2000) also showed that not all ecosystems will respond the same way to rising temperature.

In addition to temperature, nutrients greatly regulate the amount of NPP of a plant (Wedin & Tillman 1996). The majority of plants are Nitrogen (N) limited, especially when the N:P ratio is below 16 (Koerselman & Meuleman 1996). Studies have been focused on the abundance and mobility of N and Phosphorus (P) in soils and how this affects which nutrient is limiting. Epiphytes primarily undergo nutrient uptake through their leaves. More generally, plants respond to nutrient concentration by varying their biomass production. Nutrient use efficiency (NUE) and RGR are the main measures for how plants allocate nutrients to biomass. NUE is maximized when plants have high resorption efficiency, enabling the plants to recycle nutrients (reviewed by Aerts & Chapin 2000). Chapin et al. (1986) defined one measure of nutrient limitation to be the “enhancement of primary production in response to a large addition of the limiting nutrient.”

Empirical studies can use this measure to determine important nutrient uptake characteristics of plants. Multiple factors, including elevated CO$_2$ levels (Bassititad 2000) and plant size (Reich et al. 2006) are positively correlated with N uptake and therefore affect NUE, SLA, and RWR. All of these studies display the complexity of nutrient uptake and the necessity of measuring a wide range of variables.

Most of these studies on temperature and nutrient change have focused on land plants. Epiphytes, which are plants that live on plants, are in the interchange zone between the atmosphere and the biosphere; thus, they may be especially sensitive to global change (Zotz and Bader 2009). Additionally, there are approximately 25,000 species of vascular epiphytes (Benzing 1990), making them a crucial plant group to study. Nutrient and temperature change may affect epiphytes differently because Epiphytes, unlike the majority of land plants, are theorized to be limited not by nutrient levels, but by water (Zotz & Heitz 2001), which may make the role that ET plays of NPP even greater. The physiological variance in epiphytes allows certain morphology to tolerate water stress better (tank bromeliads) or worse (bark bromeliads) (Benzing 1990). It is currently unclear as to the direct effects that nutrient limitation has on epiphytes because of the corresponding high stress of the instability of water supply (Zotz & Hietz 2001). This high uncertainty as to what governs epiphyte growth combined with their associated high diversity shows that a study into the effects of how combined temperature and nutrient levels has on
plant growth. Because of the complex relationship between temperature and nutrient levels governing plant growth, this study used a factorial design to explore how a 5 degree C temperature increase will affect growth. I measured the effects of increased temperature on the nutrient uptake dynamics in two species of bromeliads (Vriesea cathy, Tilandsia bulbosa). Bromeliads are vascular epiphytes, which are plants that live on other plants (see Cardelús et al. 2006). Vriesea cathy is a tank bromeliad that has the potential to store water for an extended period of time in its phytotelmata, while Tilandsia bulbosa, an atmospheric bromeliad, has a much more limited time for moisture uptake. I hypothesize that 1) there will be a significant decrease in growth (both as a function of biomass and rate) in the plants exposed to the higher temperature. 2) There will be a significant effect of nutrient treatment on growth.

Methods

Plant Species

My study species were Vriesea cathy and Tilandsia bulbosa. Both species are native to lowland rain forest and were propagated in Florida, USA (Russel’s Bromeliads) before being housed in the Colgate University greenhouse (86% humidity and 27° C). Before experimental treatment, each leaf length was measured and labeled (new leaves were defined as leaves that emerged after this initial labeling and measuring period). V. cathy is a tank bromeliad, which means that its leaves develop around a “tank” like container in the middle where water collects. Nutrients from either wet or dry deposition into the tank are absorbed through the leaves surrounding the tank. Leaves grow externally from the inside of tank. The tank morphology allows V. cathy to retain moisture for extended periods of time (Zotz & Laube 2005), which Martin (1994) identifies as critical towards maintaining stomatal conductance and photosynthetic rates in temperature and water stressed environments. Additionally, the size of the plant plays a disproportionate role in water retention and must be controlled for (Zot & Thomas 1999). T. bulbosa is an atmospheric bromeliad (lacking roots and an overlapping leaf base) that absorbs nutrients and water from specialized foliar trichomes in their shoots (Benzing & Dahle 1971). Though this allows T. bulbosa to resist desiccation in temperature and water stressed environments, juvenile T. bulbosas are more susceptible to temperature and water stress and therefore its tolerance is not consistent across ontogeny.

Experimental Treatments and Design

I had two treatment temperatures (27° C and 32° C) and four nutrient levels within each treatment (N, P, NP, and a control [C]). Humidity within each growth chamber was provided by continuous water vapor input via a portable humidifier. In addition to the humidifier, the plants were watered every three days. Eighty individual plants from each species were used in total. Forty individuals of each species were placed in either an ambient or a 5° C above ambient growth chamber.
respectively. Within each temperature treatment, ten individuals were randomly assigned each nutrient level.

The C treatment broth was made up of Bold's Medium and each successive treatment consisted of the Bold’s Medium with a doubling of the respective nutrient (e.g. double nitrogen for the nitrogen treatment). Fifteen milliliters (mL) of each nutrient broth was added to each individual plant; however, due to the physiology of each plant, the solutions were applied in different ways. 15mL of nutrient media was poured directly in Vrieseia cathyi tanks, while 15mL of nutrient media were sprayed onto T. bulbosa.

I marked and measured new leaf growth as growth proceeded. New leaves were monitored on three separate occasions for T.bulbosa (Tbt1-t3) and two times for V. cathyi (Vct1-t2), the difference in time between measurement was taken into account when calculating growth rates. Similar to using RWR as a proxy for nutrient acquisition, leaf length can provide an estimate for response to nutrient levels because epiphytes uptake nutrients through their leaves.

Statistical Analysis

Relative growth rates were calculated by re-measuring these new leaves and determining their percent growth as a function of time. Growth rate was calculated as the difference between t3-t1. The number of clonally produced buds were also noted for each individual and each leaf on the bud was marked. Biomass was determined by measuring new leaf length. Percent biomass growth was measured by adding up the total new leaf length of a plant and using that value to calculate new leaf growth as a percentage of initial total leaf growth in order to control for initial plant size. The number of new leaves produced was calculated as a function of initial biomass. The statistical effect of fertilization on leaf length, growth rates, biomass, and bud production was determined using an ANOVA. Across species tests only compared initial leaf size and rate of growth which controlled for days that the plants grew in between sampling periods. Letters are used to denote significance within species whereas numbers are used to denote significance across species.

Results

1) Analysis of Growth as a Function of Temperature Treatment
Tilandsia bulbosa

New leaf growth was compared over time and between temperature and
nutrient treatments. The data were not normally distributed (Test for Normality, p = 0.001) and so they were square-root arcsine transformed. Plants that did not grow any new leaves were assigned a value of zero. There was a significant effect of nutrient treatment on plant growth (Figure 1, F3 = 3.626, p = 0.018).

There was a significant effect of temperature on plant growth across treatments (One way ANOVA, F = 7.46, p = 0.0081). Within the P treatment, the plants in the 32°C chamber grew significantly less than the plants in the 27°C chamber (Figure 1, Wilcoxon/Kruskal-Wallis Tests, S = 33, Z = -2.896, p = 0.0038). There was no significant effect of temperature (MANOVA F1 = 0.976, p = 0.327) on new leaves produced.

Vriesia cathyi

Biomass and growth rates were, on average, significantly higher in the 27°C treatment. Temperature had a significant effect on the biomass production in sampling period Vct2 (ANOVA F1 = 4.599, p = 0.036) and on the growth rate of plants across the whole sampling period (ANOVA F1 = 4.202, p = 0.044).

2) Effects of Nutrient Treatment on Growth

Tilandisa Bulbosa
T. bulbosa Individuals in the 27° treatment grew significantly more under N and P separately than with NP combined (Student’s t-test, t = 2.0289, p = 0.0027). There was no significant effect of nutrients on new leaf growth rates in the 32° treatment (Oneway ANOVA, F3 = 1.59, p = 0.22). There was no significant effect of nutrient treatment (MANOVA F3 = 2.059, p = 0.114) on number of new leaves produced. There was also no significant effect nutrient treatment (MANOVA F3 = 0.512, p = 0.675) on growth rate of new leaves (See figures 1 & 2). Under ambient conditions, P-fertilization had the predicted effect of increased growth; however, under higher temperatures this was not the case (as shown above). Because there was no significant effect of nutrient treatment on growth rate of new leaves within species, all the nutrient categories were combined for the across species comparison.

Vriesia cathyi

V. cathyi saw a marginal significant effect of nutrient treatment on relative biomass (F3=2.55, p=0.073); within nutrients but across temperatures, the N treatment was the only one with marginal significance (F1=3.77, p=0.072). Because these results are only from 30 days of growth, these data suggest that there is some significant interaction of nutrient treatment on growth.

3) Effects of Development on Growth and Across Species

There was no significant effect of temperature (MANOVA F1 = 2.835, p = 0.097) on growth rate of new leaves in T. bulbosa; however, new leaves of V. cathyi grew significantly slower in the 32° treatment (as shown above). Because there was no significant effect of nutrient treatment on growth rate of new leaves within species, all the nutrient categories were combined for the across species comparison.

There was no significant difference in biomass of initial leaves produced under treatment (ANOVA F1 =
however there was a significant effect of species on growth rate (ANOVA $F_1 = 53.8, p = 0.000$). Within the 27° treatment, V. cathyi leaves grew significantly faster in the N treatment ($F_1 = 15.5, p = 0.001$), NP treatment ($F_1 = 38.2, p = 0.000$) the P treatment ($F_1 = 5.06, p = 0.037$), and the C treatment ($F_1 = 4.85, p = 0.044$). Within the 32° treatment, V. cathyi leaves grew significantly faster in the N treatment ($F_1 = 10.43, p = 0.007$) and the NP treatment, ($F_1 = 15.70, p = 0.001$) but not the P treatment ($F_1 = 1.44, p = 0.252$) or the C treatment ($F_1 = 2.66, p = 0.122$). New leaves of Vriesia cathyi grew significantly faster than new leaves of Tilandsia bulbosa.

**Discussion**

**Combined Factors of Nutrients and Temperature**

This study provides a first glance at the effects that increased temperature and different nutrient availabilities have on epiphytic bromeliad plant growth. Within treatment variance was higher in the 27° dataset than the 32° dataset. This suggests that there is some selective pressure that is restricting the variation in plant phenotypic response concerning leaf growth at the higher temperature. The restricted variation within the 32° dataset may be one of the reasons that the lack of an effect of nutrient treatment on plant growth in that environment. Various ecosystems around the globe see differential nutrient availability (Cornwell & Grubb 2003) and consequently, previous studies hypothesized that global warming would effect different ecosystems with respective nutrient availabilities differently (Vitousek 1994). Especially because previous studies hypothesized that increased nutrient availability might decrease species biodiversity (Bedford et al. 1999), our study showing that there might not be a difference in response to global warming across habitats with differing nutrient availabilities and that the effects of nutrient availability diminish in a temperature stressed environment are quite relevant. These results are similar to those found in other studies (King et al. 1999).

Phosphorus has been hypothesized to be the limiting nutrient in epiphytic communities (Zotz & Richter 2006), which may be one reason why we saw a significant effect of temperature on the P treatment plants. Temperature’s effect on growth is intensified when looking at limiting nutrients; consequently, the 27° P fertilized plants were able to grow significantly more than the 32° P fertilized plants. Because the 27° plants had excess of their hypothesized limiting nutrient, (P), their growth was only inhibited by factors such as water availability but not temperature stress. In the 32° treatment, the P fertilized plants may have had excess of their limiting nutrient as well, but they also had the increased stress of higher temperatures. Even having an excess of P in the 32° chamber was not enough to counteract the stresses of having a higher environmental temperature.

Nutrient immobilization might be the reason why the NP fertilized plants showed significantly less new leaf growth than the P and the N fertilized plants in
the 27°C treatment. The plants could have been responding to the surplus in nutrients by immobilizing them in order for them to be available for future growth. Luxury consumption has been shown to be present in P fertilization studies on bromeliads (Winkler & Zotz 2008). Another factor may be that the stress of increased temperature reduces water use efficiency (due to elevated ET) and therefore the plants need to keep their stomata closed more and are subsequently not able to uptake enough nutrients to display significant differential growth with respect to nutrient availability. It was hypothesized that variation in nutrient availability results in variation in leaf structure and plant response to environmental stressors (reviewed by Gutschick (1999)) which we say in terms of growth rate and new biomass produced; however, data from future analyses is necessary in order to fully explain the effects that different nutrient loads are having on plant growth.

**Temperature**

That temperature showed a significant effect in both the Vriesea cathyi and Tilandsia bulbosa suggests that temperature was an important factor in these epiphytic communities for governing growth. Interestingly, in the bulbosas, temperature did not show a significant effect on the growth rate of newly produced leaves but it did show an effect on percent relative leaf growth (for the phosphorus treatment). Evolutionarily, this might mean that after plants produce new leaves that develop in the changed habitat (32°C chamber), they are able to phenotypically adapt through their development in the higher temperature and subsequently grow at similar rates to those produced in the original habitat (27°C chamber). While the original, fully developed plant, decreases its total amount of growth in a warmer temperature, the new leaves that develop in the warmer temperature do not. This could mean that development plays a certain role in governing plasticity in temperature tolerance. By this, I mean that instead of phenotypic plasticity being constant throughout ontogeny, it may be more sensitive or at least more able to change during development of new physiology. Contradicting my bulbosa data are the cathyi data that show a significant effect of temperature on growth rate of newly produced leaves, with the 32°C leaves growing more slowly. A possible explanation for the difference across species could be due to how the leaves develop in their respective plant types.

The emergence of new leaves in the bulbosa species was more immediate because they emerge from already existing elongated leaves, with whole leaves sometimes emerging fully grown. The bulbosa leaves seem to grow inside of already established leaves and then emerge for unknown reasons. Cathyi leaves grown from the middle tank and are external for their entire measured length. These physiological traits can be presented by the data that showed the cathyi having a significantly greater growth rate of new leaves than bulbosa; therefore, the cathyi leaves are developing externally significantly more so than the bulbosa leaves. Therefore, there are unexplained physiological
characteristics that seem to be at play that might be able to explain some of these differences. Another potential reason why there was no difference in growth rate between treatments is because the T. bulbosa leaves do not grow very much after they emerge and subsequently there is not enough measurable new leaf growth within the time frame of this study. In order to draw concrete conclusions as to what is really going on during leaf development, a more in depth study of leaf development comparing across species is necessary to explain the difference in response.

This study has laid the groundwork for future studies that can perform more in depth analyses of factors controlling growth in the plants. A more in depth study using nutrient isotopes will be useful in showing us where physiologically the plants are placing the nutrients. A study keeping track of individuals and their clonal offspring is necessary also in order to tease apart how different stages of development affect phenotypic plasticity.

**Bibliography**


IPCC (Intergovernmental Panel on Climate Change). *Climate Change 2007: The Physical Science Basis*, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Solomon, S., D. Qin, M. Manning, Z. Chen, M.,


The relationship between science and religion is largely conceptualized within two particular paradigms. One viewpoint holds that science and religion are mutually exclusive realms with no basis for meaningful interaction, as they are concerned with radically different facets of existence. This position is typified by the cliché that, “science asks ‘how?’ religion asks ‘why?’” Others have seen science and religion as antithetical opposites, arguing that one must be privileged at the expense of the other. The tension between biblical literalists and scientific materialists is particularly illustrative of this position. Yet there are those who see the relationship between science and religion in more reconciliatory terms; they are dissatisfied with the idea that the two can be neatly compartmentalized and separated, or that only one can offer a means of knowing the truth.

It is with the latter group, those who seek a meaningful reconciliation between science and religion, that this paper is concerned. More specifically, I propose to detail what has been called a ‘Theology of Nature’ as a reconciliatory strategy concerning religion and the natural sciences. Ian Barbour, John Polkinghorne, Arthur Peacocke and Francis Collins elucidate the ideas associated with a ‘Theology of Nature’ and it is through their works I hope to articulate the areas in which science and religion can (and cannot) find common ground. The interpretation of scientific discoveries, particularly with regards to cosmology, biological evolution, quantum mechanics, and genetics, offers the theologian an opportunity to cast scientific insight into a theological framework. It is in the actual process of conducting scientific investigation that reconciliation with theological perspectives proves troublesome. Specifically, miracles, or special instances of God’s interaction with the world that seem to defy natural laws, highlight a seemingly irreconcilable point between theology and the natural sciences.

These ‘Theologians of Nature’ present a distinguished perspective on the science-religion dialogue, as they are all eminent scientists as well as devoutly religious persons. With respect to scientific credentials, Barbour, Polkinghorne, and Peacocke have doctorates in physics, mathematical physics, and biochemistry, respectively, while Collins is an MD with a PhD in physical chemistry. Additionally, they all are members of the Christian religious tradition: Barbour has a degree from Yale Divinity School, Polkinghorne is a former Anglican Priest, Peacocke is a former priest in the Diocese of Oxford, and Collins is a self-described Evangelical Christian. It is important to
acknowledge that these scholars are operating from a specific religious tradition (what could broadly be described as ‘Christian’) and as such they are primarily focused on how Christian theology may be reconciled with modern science. They do not explicitly touch on questions concerning reconciliation under the pretexts of other religious traditions. Such ventures are by all means worthwhile, but for the purposes of the study at hand, the ‘Theology of Nature’ presented by these scholars is acknowledged as stemming from Christian perspectives.

Before going into the intricacies of ‘Theology of Nature’ it is necessary to detail more specifically the scientific and religious contexts that ground this concept. While exhaustive definitions do not exist for either ‘science’ or ‘religion’, I hope here to sketch a broad picture of what will be implied by each term throughout this paper. Two general parameters encapsulate the natural sciences. The first is that the scientist assumes ‘metaphysical naturalism’, or the view that science “can pursue, identify, and entertain only natural causes as plausible explanations of natural phenomena, with the universe as a whole regarded as if it were a closed system of natural causes” (Gregory 505). Secondly, the scientist practices ‘critical-realist empiricism’, the idea that he or she “can examine only what can be observed, investigated, verified, and (in principle) falsified through empirical methods as an extension of human sense perception” (Gregory 505). As such, we see science (in so far as it is a means of gaining knowledge) as an exercise whose participants (i.e. scientists) are concerned exclusively with natural processes and admit of only natural (as opposed to ‘supernatural’) explanations. Additionally, scientific theories are open to constant revision in the light of new data gathered.

Having acknowledged that the above mentioned scholars of ‘Theology of Nature’ operate from a specific religious tradition, I’ll attempt here to set forth a working definition of ‘religion’ that encapsulates the position from which these thinkers are articulating their ideas. Rodney Stark proves especially helpful on this point. He posits that ‘religion’ “consists of explanations of existence based on supernatural assumptions and [includes] statements about the nature of the supernatural and about ultimate meaning” (111). He goes on to further qualify this definition by noting that ‘supernatural’ “refers to forces or entities beyond or outside nature which can suspend, alter, or ignore physical forces” (108). Additionally, he notes that ‘Gods’ are “supernatural ‘beings’ having consciousness or desire” (108). This conceptualization of ‘religion’ touches on two important facets that the Theology of Nature scholars explicitly endorse. The first is the idea that there is a ‘supernatural’ realm that transcends the temporal and physical constraints associated with natural laws. Secondly, these scholars recognize a ‘God’ who is not only ‘supernatural’ but also an agent (‘having consciousness or desire’) who continually interacts with the world and is responsive to humans. In this sense, these scholars are decidedly theistic as opposed to deistic. That is, they do not see God as an entity that set the universe
in motion and then stood back to let the whole process unwind itself. Rather, they understand God as an agent who is creatively and actively engaged with the universe and those beings who inhabit it.

As mentioned in the introduction, these scholars are seeking to go beyond the mindset that science and religion are two entirely distinct domains with no meaningful overlap, or that one must be excluded in favor of the other. The former position is a separate-but-equal type doctrine, commonly referred to as the ‘Independence’ view (Barbour 2000, 17) or the Non-Overlapping Magisteria view (‘NOMA’ ) (Gould 1999). This ‘Independence’ position is partially grounded (at least for the religious adherent) in what has been called the ‘Linguistic-biblical-narrative trend.’ This trend acts as

[A]n approach to theological discourse which insists that whatever Christianity has to say it says on grounds which are unique to itself...Science is 'spoken' in the laboratory: theology is 'spoken' in the church. There neither is, nor needs to be, any communication from one to the other...theological discourse is sui generis (Helfing 20).

That is, the language associated with God can be employed without recourse to any ‘scientific’ language, and further, language relating to God cannot be rendered intelligible through ‘scientific’ discourse. Another manner in which this compartmentalization of science and religion unfolds is via the ‘Existential-pastoral-spirituality trend’ in which “[c]onversion, prayer and liturgical participation...give theology all it needs by way of motivation and subject matter...emphasis thus falls...not on texts but on devotion, not on God as disclosed or mediated but on God as personally immediately present” (Helfing qtd. in Byrne 21). Whereas the first trend establishes theological language as entirely distinct (‘sui generis’) from the language of science, this second trend posits religious experience (independent of text or intellectual pursuit) as being the only necessary element for understanding God. Either way, under both of these ‘Independence’ trends, science is categorized not so much as being antithetical to religion, merely non-consequential.

The same cannot be said when it comes to trends that favor excluding one domain at the expense of the other. Ian Barbour calls this tendency the ‘Conflict’ view and cites the strife between scientific materialists and biblical literalists concerning evolution as particularly demonstrative of this trend. He states, “both [scientific materialists and biblical literalists] claim that science and religion make rival literal statements about the same domain (the history of nature), so a person must choose between them. They agree in saying that a person cannot believe in both evolution and God” (2000, 11). Perhaps this ‘Conflict’ trend, typified by ‘New Atheist’ scholars Richard Dawkins and Daniel Dennett on one side and the American Christian Right’s push to teach Intelligent Design in schools on the other, is the most popular contemporary confrontation concerning science and religion. Yet the ‘Conflict’ trend extends well beyond the realm of biological evolution. Dawkins and Dennett both assert that evolution is only one area in which religious people are fundamentally misguided. Conversely, for a growing
number of people there exists a profound distrust of science, whether it be in relation to evolution, global climate change, or genetic engineering. Whereas the ‘Independence’ trends highlighted above may render a sort of lukewarm truce between science and religion, this latter position actively foments clash and is a particularly salient feature of the contemporary ‘culture wars.’

Many people find these ‘separation’ and ‘conflict’ strategies quite inadequate, and it is on this point that the Theology of Nature scholars have attempted to construct a more harmonious relationship between their theological and scientific outlooks. From a scientific perspective, these scholars see science as an integral, yet limited human activity. From a theological perspective, they see science as a means of coming to know more about God. As such, they seek to meld their scientific and theological insights in order to give a more holistic account of the human experience, both in relation to the natural world and to God.

These scholars tend to reject the ‘Independence’ trends in favor of what they feel is a more holistic view of reality. John Polkinghorne contends that “if reality is generously and adequately construed, then knowledge will be seen to be one; if rationality is generously and adequately construed, then science and theology will be seen as partners in a common quest for understanding” (1998, xiv). Polkinghorne is positing that the ontological make-up of the universe is unitary as opposed to binary. That is, while we may have separate realms investigated by science and theology, these realms when ‘generously and adequately construed’ will be seen in terms of a harmonious whole. Additionally, Polkinghorne is recognizing both science and theology as valid epistemic instruments in our ‘quest for understanding.’ Ian Barbour mirrors this view, stating, “We cannot remain content with science and religion as unrelated languages if they are languages about the same world. If we seek a coherent interpretation of all experience, we cannot avoid the search for a more unified worldview” (2000, 22 emphasis added). This idea of a ‘more unified worldview’ runs contrary to the idea that science and religion are completely un-related realms which cannot have any meaningful overlap. Indeed these scholars strongly contend that if we are to make full sense of our position as embodied beings within the natural world of God’s creation, we must utilize both scientific and theological perspectives.

The ‘Conflict’ position, in which either science or religion is seen as the exclusive means of knowledge and truth is rejected by these scholars because they feel both sides present a distorted picture of science and its relation to religion. Thinkers such as Dawkins and Dennett are seen as giving science too wide of a scope. In The God Delusion, Dawkins suggests that “the existence of God is a scientific hypothesis like any other...God’s existence or non-existence is a scientific fact about the universe, discoverable in principle if not in practice” (73). While the ‘Theology of Nature’ scholars may have a deep respect for science, ‘scientific’ claims such as these are seen as overstepping important boundaries. David S. Gregory contends,
Perhaps God is metaphysically transcendent [i.e. He doesn’t exist in spatial/temporal dimensions or is inconceivable in spatial/temporal categories].... It would then be a mistake born of dubious metaphysical assumptions to expect or demand that God be rendered conceptually, linguistically, or scientifically accessible (503, 505).

Given that the ‘Theology of Nature’ scholars see God as supernatural (‘metaphysically transcendent’) they don’t expect that the natural sciences could either prove or disprove his existence.

Questions concerning the existence or non-existence of God are not the only ones these scholars see as being beyond the scope of scientific enterprise. Polkinghorne states, “Science is unable itself to offer any reason why natural laws take the particular form that they do, or why we can discover them through mathematical insight” (1998, 11). Thus while Polkinghorne has full trust in the scientific process as a means of discovering truth about the natural world, he doesn’t see science as being able to account for the fact that such ‘truths’ happened to have taken the particular forms they did. He sees the natural sciences as a means of discovering the intelligibility of the natural world, but for Polkinghorne it’s not the intelligibility of mathematics or physics, but “intelligibility itself that, apart from God, is incomplete, an unexplained brute fact” (Helfing 26-27).

As such, scientists can uncover intelligibility, but cannot use science to explain that the universe is intelligible in the first place. Just as Polkinghorne doesn’t think science can account for the existence of intelligibility, neither does Peacocke feel it can adequately inform the moral sphere. He quotes Mary Hesse as stating that scientific knowledge “does not yield truth about the essential nature of things, the significance of its own place in the universe, or how it should conduct its life” (2004, 19). Hence, with respect to the ‘Conflict’ trend, these ‘Theologians of Nature’ see scientific materialists as overstepping boundaries when trying to explain questions concerning the existence of God, intelligibility, or moral and ethical responsibility in entirely material/natural terms.

Conversely, they see biblical literalists as taking an unnecessarily closed-minded approach to scientific inquiry and discovery. Arthur Peacocke not only feels this position is a disservice to science, but to religious understanding as well. He states that the ‘deep’ questions of theology “cannot be asked at all without directing them to the world as we best know and understand it, that is, through the sciences” (2004, 47). He is essentially contending that if God created the world, and we ignore our most effective means of understanding the world (science), then we are closing off a door to a greater understanding of God. Perhaps Francis Collins sums up the situation most succinctly: “Science is the only legitimate way to investigate the natural world... [But] Science is not the only way of knowing. The spiritual worldview provides another way of finding truth” (208). As such, these thinkers seek to transcend any ideology that strictly separates scientific and religious inquiry, as well as any position that gives science
an overblown, or underappreciated, role in understanding the world.

A Theology of Nature is the general strategy adopted by these scholars in their attempt to overcome the ‘Independence’ and ‘Conflict’ trends and build a more fluid relation between religion and the natural sciences. In detailing more specifically what a ‘Theology of Nature’ entails, it is helpful to distinguish it from ‘Natural Theology.’ Natural Theology is a line of thought which contends “that the existence of God can be inferred from (or is supported by) the evidence of design in nature, of which science has made us more aware” (Barbour 2000, 17). Generally speaking, ‘Natural Theology’ is an umbrella term for ‘arguments from design.’ As John Polkinghorne explains, Natural Theology rests on the idea that “physical fabric is endowed with transparent, rational beauty” (1998, 1 emphasis added). The term ‘endowed’ implies that an agent created the universe in such a manner that it is orderly and rational. The Intelligent Design movement, which contends that organisms are so complex and perfect that they must have been created by a higher intelligence, highlights the thinking that underwrites Natural Theology. Ultimately, Natural Theology differs from ‘Revealed Theology’ in so far as it posits that the existence of God can be deduced from observations of the natural world, independent of any sort of divine revelation (Peacocke 2001, 33). While the Theology of Nature scholars do not deny that the apparent ordering and intelligibility of the universe suggests a divine creator, they espouse a much more nuanced understanding of God’s relation to the created order.

In contrast to the ‘Independence’ and ‘Conflict’ trends previously highlighted, Barbour posits an ‘Integration’ trend, and it is on this idea of integration and reconciliation that the Theology of Nature rests. Barbour explains that under Theology of Nature, the theologian starts “from a particular religious tradition and argue[s] that many of its beliefs are compatible with modern science but some beliefs should be reformulated in the light of specific scientific theories” (2002, 1). Whereas the Natural Theologian starts from a scientific investigation of the world and subsequently deduces God’s existence based on the ‘rational beauty’ of the observations, the Theologian of Nature embarks from a specific religious tradition (Christianity in the present case) and seeks to cast (or re-cast) his or her theological understandings in a manner consistent with what has been uncovered about the natural world via science. There is a degree of reflexivity and openness to this theology, and it is through this adaptive mindset that these scholars hope to narrow the gap between scientific discovery and theological insight. Arthur Peacocke explains that for religious persons,

[T]he terms which describe the reality to which they are committed are not, should not, in my view, be regarded as fixed and irreformable...Such believers should always be ready to expand their terms, to take in new meanings and to enrich their imaginative resources as their consciousness and experience changes and enlarges (not least with the growth of the natural sciences themselves) (2004, 22).
As such, these ‘Theologians of Nature’ recognize a reciprocal link between science and religion. Instead of being mutually exclusive or in opposition, they see one as informing the other. Not only do ‘Theologians of Nature’ view the natural sciences as a means of uncovering the nature of the world created by God, but also they see the evidence uncovered as offering insights into the character and mind of the divine.

Under the umbrella term of ‘Theology of Nature’ these four scholars highlight methodological stances which inform their relating of scientific discovery to theology. John Polkinghorne endorses a ‘Critical Realist’ approach. Regarding Critical Realism, he explains:

The noun expresses the conviction that the scientists are indeed exploring a physical world whose nature ‘out there’ is independent of human social construction...while the adjective acknowledges that physical reality is often partly veiled and obliquely encountered (contra the expectation of simple objectivity that was entertained by the thinkers of the enlightenment)” (2009 , 25).

The ‘realist’ assertion of this strategy is vital to Polkinghorne because he contends that the physical world is indeed created by God and not a figment of our imagination. As a scientist, however, he is acutely aware that our encounter with the physical world is understood through approximation and interpretation: “Our attainment of knowledge is verisimilitude, not absolute truth. Our method is creative interpretation of experience, not rigorous deduction from it” (1998, 104). Ian Barbour mirrors this understanding, stating that Critical Realism “preserves the scientists’ realistic intent while recognizing that models and theories are imaginative human constructs. [Yet these models] make tentative ontological claims that there are entities in the world something like those postulated in the models” (1990, 43). As such, these thinkers contend that God has given an objective truth to the natural world, even if our intellectual models only give us an approximate means of understanding such truth.

While neither Arthur Peacocke nor Francis Collins explicitly acknowledge Critical Realism, the same basic tenet underlies their understanding of the physical world. Additionally, Peacocke employs what he refers to as the ‘Inference to the Best Explanation’ (IBE) model. With respect to the IBE model, Peacocke inquires, “If X were true, then would it not cover appropriately the range of experiences or experiment I am trying to explain?” (2001, 27) Essentially, this model asks that we make a certain postulate (X) and then see if that hypothesis makes observed experience more intelligible and coherent. Unsurprisingly, Peacocke asserts: “The best explanation to be inferred from the very existence of the world ...is that the whole process, with all its emerging entities, is grounded in some other reality which is the source of its actual existence” (2001, 39). Namely, he contends that the existence of God grounds the most intelligible interpretation of our experience. From this IBE model Peacocke constructs an equation that more or less encapsulates the enterprise of Theology of Nature:
IBE: \( S + CRE \rightarrow RT \)

Where:

- **S** = the realities of the world and humanity discovered by the Sciences
- **CRE** = the Jewish and Christian communal inheritance of claimed Classical Revelatory Experience
- **RT** = Revised Theology


This equation proposes that an amalgamation of what has been discovered via the natural sciences and what has been understood through ‘classical revelatory experience’ should inform a ‘revised theology’ or a Theology of Nature. Francis Collins endorses this amalgamation with his ‘BioLogos’ concept, in which Bio refers to ‘bios’ (the Greek word for ‘life’) and Logos alludes to the Greek rendering of ‘Word’. He explains, “To many believers, the Word is synonymous with God... ‘BioLogos’ expresses the belief that God is the source of all life and that life expresses the will of God” (203). Collins too is proposing a synthesis of ‘S’ (what we know about life on earth, or ‘bios’) and ‘CRE’ (the revealed word of God, ‘logos’). As such, Critical Realism, the IBE model, and BioLogos underlie the basic tenet of Theology of Nature, namely that scientific reasoning and insight lend themselves to a fuller understanding of both the natural world and God.

As previously noted, Barbour posits that Theology of Nature hinges on the idea that ‘some beliefs should be reformulated in the light of specific scientific theories.’ By focusing on four specific scientific domains (cosmology, biological evolution, quantum physics, and genetics), we can begin to see how these scholars adapt their theological positions in light of scientific evidence and what they contend such scientific discoveries tell us about the nature of God.

With respect to cosmology, or the creation of the universe, these Theologians of Nature unanimously accept the Big Bang theory. That being said, Francis Collins contends, “The Big Bang cries out for a divine explanation. It forces the conclusion that nature had a defined beginning. I cannot see how nature could have created itself. Only a supernatural force that is outside of space and time could have done that” (67). Within this statement we can see several key theological underpinnings. The first is that the universe had a defined beginning. This implies that there was an epoch before the universe, presumably only inhabited by a supernatural force. Additionally, this statement posits that the creation of the universe was contingent, not necessary. As such, the universe is not sui generis and therefore must be dependent upon some type of creative agent. While these scholars argue that the Big Bang theory is consistent with a divine, creative agency, they accordingly acknowledge that the six-day creation story presented in Genesis cannot be read literally. To this end, Arthur Peacocke goes so far as to offer a reformulation of the first book of the Bible in what he calls Genesis for the third millennium:

There was God. And God was All-That-Was. God’s Love overflowed and God said, ‘Let Other be. And let it have the capacity to become what it might be, making it make itself—and let it explore its potentialities.’
And there was Other in God, a field of
energy, vibrating energy—but no matter, space,
time or form. Obeying its given laws and with one
intensely hot surge of energy—a hot big bang—
this Other exploded as the Universe from a point
twelve or so billion years ago in our time, thereby
making space.

Vibrating fundamental particles appeared,
expanded and expanded, and cooled into clouds of
gas, bathed in radiant light. Still the universe went
on expanding and condensing into swirling
whirlpools of matter and light—a billion galaxies
(2001, 1).

This rendering of Genesis, with its
smattering of scientific terms, is meant
to re-construct the Biblical creation
narrative in a manner consistent with
current cosmological understandings. It
is explicit in acknowledging that the
universe gradually took its shape over an
evolutionary period of ‘twelve or so billion
years.’ This idea that the universe
evolved to take its present form, and
wasn’t created in a fixed, static manner,
will present itself later as a direct
analogue with respect to the biological
evolution of life on earth.

Specific facets of Peacocke’s new
narrative such as ‘matter, space, time or
form’, ‘given laws’ and ‘expanding and
condensing’ are all referenced in the
‘Anthropic Principle.’ In its ‘weak’ form,
the Anthropic Principle states, “Our
location in the universe is necessarily
privileged to the extent of being
compatible with our existence as
observes” (Barrow 2). This position rests
on the idea that our ability to even
observe the universe is exceedingly rare,
and thus to some extent ‘privileged.’ In
its ‘strong’ form, the Anthropic Principle
suggests, “The Universe must have those
properties which allow life to develop
within it at some stages in its history”
(Barrow 21). The teleological implications
of the ‘strong’ Anthropic Principle are
explicit, as it contends that the universe
must permit the emergence of life.
Whether in its ‘weak’ or ‘strong’ form,
the Anthropic Principle rests on
discoveries made by modern scientists
concerning the apparent ‘fine-tuning’ of
the universe. Recent insights suggest
that if the physical constants of the
universe had been even slightly different,
the universe as a whole would be
radically different. ‘Matter, space, time or
form’ as well as the ‘given laws’ could
have been completely unrecognizable or
even non-existent. Referencing John
Polkinghorne, Alvin Plantiga explains,

We know that there has to have been a very close
balance between the competing effect of
explosive expansion and gravitational contraction
which, at the very earliest epoch about which we
can even pretend to speak (called the Planck
time, 10^-43 sec. after the big bang), would have
corresponded to the incredible degree of
accuracy represented by a deviation in their ratio
from unity by only one part in 10 to the sixtieth
(1).

Because the degree of accuracy
had to be so exact in the initial stages of
the Big Bang in order for the universe to
take its present form, the Theologians of
Nature contend that this strongly
suggests the presence of an intelligent
creative agency. Accordingly, had the
initial conditions of the universe been
ever so slightly different, life as we
currently know it would most likely not
have emerged. And it is to the emergence
and development of life that we now
turn.

Just as the universe came into
being over a long, evolutionary process,
the Theologians of Nature recognize that
life on earth followed a similar evolutionary path. Through biological evolution, Peacocke identifies “God as ‘exploring’ and ‘composing’ through a continuous, open-ended process of emergence’ (2004, 209). The process is ‘open-ended’ in so far as it reflects Peacocke’s revised Genesis notion of God saying, ‘Let Other be. And let it have the capacity to become what it might be, making it make itself—and let it explore its potentialities’ in which the ‘Other’ is creation, and as an expression of its free-will, it is allowed to ‘make itself.’ Via biological evolution, God is seen as ‘exploring’ or “unfolding fugally all the variations and combinations inherently possible for and derivable from the tune he originally called” (2004, 210). Francis Collins mirrors this understanding, and puts forth a six-part formula coined ‘Theistic Evolution.’ This formula starts from the basic premise that God is the impetus for everything, but states at step:  

4. Once evolution got under way, no special supernatural intervention was required. 5. Humans are part of this process, sharing a common ancestor with great apes. 6. But humans are also unique in ways that defy evolutionary explanation and point to our spiritual nature. This includes the existence of the Moral Law (the knowledge of right and wrong) and the search for God that characterizes all human cultures throughout history (200).

Collins conceptualizes the evolutionary process in deistic terms. He sees God as setting the process in motion, but in such a manner that He wouldn’t have to intervene substantially to alter it. While God may interact with the products of the process, the process in and of itself is allowed to direct its own course within a set of God-given parameters. Collins’ idea that humans are ‘unique’ reflects what Peacocke earlier characterizes as ‘emergence.’ Emergence is the idea that at higher levels of complexity, entities take on novel forms that prevent them from being exhaustively described through concepts pertaining to lower levels of complexity. Thus a book can’t be meaningfully understood just in terms of its atoms, nor can a society be understood solely in terms of the individual. The idea of ‘emergence’ is adopted by the Theology of Nature scholars as a stance against materialist reductionism. They argue that humans have ‘emergent’ capacities (namely spiritual qualities) that have evolved over time and defy explanation in exclusively material terms. Aside from the idea of spiritual ‘emergence’, the theistic and materialistic concepts of evolution differ with respect to agency. Daniel Dennett explains, 

Blind, directionless evolutionary processes ‘discover’ designs that work. They work because they have various features, and these features can be described and evaluated in retrospect as if they were the intended brainchildren of intelligent designers who had worked out the rationale for the design in advance (59)

A theistic interpretation of evolution doesn’t recognize it as ‘blind’ and ‘directionless’ but contends that evolution is the tool of an agent (God) who means to actualize a certain desire and purpose. Not only do Theologians of Nature look to the natural sciences a means of understanding the world, but they also acknowledge that scientific discoveries can tell us something about the nature of God. What does it say
about God that He chose to produce the universe and life through an evolutionary process as opposed to creating them in an already-made, static form? John Polkinghorne contends that we must understand God in ‘kenotic’ terms. Kenosis refers to the idea of self-limitation; God is kenotic is so far as “that by bringing the world into existence God has self-limited divine power by allowing the other to truly be itself” (Polkinghorne 1998, 13). In order for the other to ‘truly be itself’ God self-limited his omniscience (specifically his knowledge of the future) so as to allow creaturely free-will. He also limited his omnipotence to the extent that He gives his creation a certain degree of autonomous power to create itself and exercise its free-will. In this sense, God is decidedly non-interventionist with respect to the evolutionary process. Biological evolution is the means by which creatures are allowed to ‘make themselves’ and in order to allow this process to be fruitful, God chose to stand back, or embrace a kenotic ethic.

Concerning theodicy, Ian Barbour rejects the idea of kenosis, and it is on this point that we can see a theological variance between him and other Theologians of Nature. He claims, “If behind God’s kenotic actions there was an omnipotent God who refrained from rescuing the victims of pain and suffering, the problem of theodicy would still be acute” (2002, 107). Thus he rejects the idea of a God who chooses to stand back, as this choice opens the door for suffering. Instead, Barbour embraces process theology, derived from Alfred North Whitehead’s process thought. The idea of “process thought suggests that the limitations of divine power are the product of metaphysical necessity rather than voluntary self-limitation” (2002, 107). Process thought holds that events, not objects, are the fundamental constituents of reality. This temporal focus on events suggests that God didn’t choose to stand back and not know the future, but rather that the future is intrinsically yet to be known. Accordingly, “In process thought, god provides initial aims relevant to particular occasions, so very specific divine initiatives are possible though always in cooperation with finite beings in the world” (2002, 118). Thus how events will actually unfold is unknown by God, but there is a cooperative relationship between God and his creation in how those events will be actualized. While there is a nuanced variance concerning the role of kenosis, the Theologians of Nature all contend that the evolutionary process represents some limiting of God’s omnipotence, as it is through evolution that creation (whether the universe, or life more specifically) was able to ‘make itself.’ That being said, they do not see the evolutionary process as entirely ‘blind.’ The Theologians of Nature maintain that creatures with some sort of ‘God-consciousness’ would eventually arise via the evolutionary process. As such, God isn’t entirely hands-off in the evolutionary process, as He set the parameters and conditions by which creation would ‘make itself.’

With respect to humanity, this notion of ‘making oneself’ correlates heavily with the idea of free will. For the Theologians of Nature, insights into quantum mechanics provide glimpses of
the relation between human free will and God’s providential action within the world. The rise of quantum mechanics ushered in a paradigm shift in which the mechanistic notions espoused in Newtonian mechanics underwent substantial revision. At the sub-atomic level, quantum events cannot be ‘predicted’, but can only be thought of in terms of probability. The Heisenberg uncertainty principle states that an electron’s position and momentum cannot be known simultaneously, whereas on the macro-scale (the realm of Newtonian mechanics) both an object’s position and momentum can be calculated accurately. The Heisenberg uncertainty principle posits that our inability to know both position and momentum isn’t due to limited observational capacity, but is rather reflective of the intrinsic uncertainty associated with quantum events.

Regarding the intrinsic uncertainty at the quantum level, Polkinghorne states that “epistemological uncertainties become an ontological openness, permitting us to suppose that a new causal principle may play a role in bringing about future developments” (1998, 60). Polkinghorne thus sees the quantum level as a possible causal nexus between God and the world, or the region through which God injects influence. He goes on to explain that “as embodied beings, humans may be expected to act both energetically and informationally. As pure Spirit, God might be expected to act solely through information input.” He further identifies ‘information’ as “influence that brings about the formation of a structured pattern of future dynamical behavior... [Or] influence by directional preferences but not by the transfer of energy” (1998, 63). The ontological openness (i.e. unpredictability) at the quantum level correlates with free will because it defies any sense of determinism. Concerning God’s providential interaction with the world, Polkinghorne implies that God inputs ‘active information’ (that is, His ‘influence’) at the quantum level, but doesn’t dictate the quantum event, just creates a ‘Portfolio of Possibility’, or a narrowed-down range of possible events (1998, 72). This way, God can input information at the quantum level, but does so in a way that doesn’t determine the quantum event, just influences it in a certain way. Barbour explains that, “most quantum events occur by chance, but God influences some of them without violating the statistical laws of quantum physics” (2002, 27). It is then suggested that God’s influence at the quantum level can somehow manifest itself as action on the macro-level, although the causal relation between the micro and macro level remains quite unclear.

The idea that God interacts with the world via the input of ‘active information’ at the quantum level is highly controversial and only vaguely understood at best. Regardless of its actual validity as a causal nexus, quantum indeterminacy nonetheless highlights two prominent facets of Theology of Nature. The first is that it lays out a manner by which God could interact with the world without abrogating the natural laws He supposedly ordained in the first place. Arthur Peacocke rejects the notion that God acts at the quantum level, favoring the idea that God effects the entirety of
world systems, or the ‘System-of-systems’:

If God interacts with the world-system as a totality, then God, by affecting its overall state, could be envisaged as being able to exercise influence upon events in the myriad sublevels of existence of which it is made without abrogating the laws and regularities that specifically apply to them” (2001, 109).

Thus while Peacocke and Polkinghorne disagree about the actual system God uses to insert influence, they nonetheless hold to the central idea that his interaction with the world is conducted via the natural processes that are already in place and isn't dependent on a 'supernatural' usurpation of natural laws.

The second facet of Theology of Nature highlighted by quantum indeterminacy is that the scientific mode of thinking, while useful, doesn't give an exhaustive account of reality. Polkinghorne states that:

If quantum physics requires its idiosyncratic quantum logic, Trinitarian theology may very well require its own kind of logic also. If the quantum world cannot be known with a Newtonian clarity that assumes precise knowledge of both position and momentum, then maybe the assertions of apophatic theology—that there is an element of irreducible mystery involved in encounter with the infinite reality of God, beyond any finite human ability to articulate—should also be accorded appropriate respect (2009, 26).

Thus Polkinghorne sets up quantum indeterminacy as a challenge to ‘logical’ reductionist science and thus leaves the door open for a wide range of interpretation, especially concerning encounters with the divine. The ‘mystery’ associated with quantum indeterminacy speaks to the overall ineffable facets of God.

While theological discussions about quantum physics may seem rather divorced from everyday life, the same cannot as easily be said when those discussions turn to DNA and genetics. With President Obama’s appointment of Francis Collins (an evangelical Christian who gained worldwide notoriety as the leader of the international Human Genome Project) as director of the National Institutes of Health, the relation between science and religion, especially concerning genetics, has been put in the forefront. At the White House ceremony in 2000 in which President Clinton announced that the human genome had been mapped in its entirety, Collins remarked, “It’s a happy day for the world. It is humbling for me, and awe-inspiring, to realize that we have caught the first glimpse of our own instruction book, previously known only to God” (Collins 3). Collins’s statement typifies a trend termed ‘God Talk’ in which biologists “are using spiritual constructs and religious rhetoric to describe their work and to convey its significance” (Nelkin 139). As biological science expands our knowledge about cloning and genetic engineering, growing ethical dilemmas are poised to cause tension, especially from people concerned that biologists are manipulating fundamental aspects of humanity. More specifically, many religious peoples feel that scientists are in a sense ‘playing God’ and entering territory humans were not meant to traverse.

‘God Talk’ is employed as a means of allaying these fears, and hinges on one of the central tenets of Theology.
of Nature, namely that through science we can come to know more about ourselves and God. Accordingly, under the ‘God Talk’ trend, “DNA is not just a biological entity in the rhetoric of science; it is a so-called sacred text, the core of essential humanity, or the master code...DNA, as it appears in God talk, has also become a sacred entity that holds the key to the essence of personhood” (Nelkin 140). To what extent the mixing of religious rhetoric with genetic science will ease concerns remains unclear. Yet it nonetheless represents an effort to cast scientific findings in a way that leaves room for a creator-God. Just as evolution came to be understood as the means God chose to develop life, so too is DNA portrayed as the mechanism through which God enables life to replicate and persist.

Cosmology, biological evolution, quantum mechanics, and genetics, offer insights into a reconciliatory strategy that seeks to ‘bridge the gap’, so to speak, between science and religion by melding scientific discoveries into a theological superstructure. That is, under the Theology of Nature, what is discovered via the scientific process is creatively interpreted so as to maintain coherency with respect to a supernatural agency. The notion of interpreting scientific discoveries and theories within a theological framework underwrites much of this reconciliatory process, and as Michael Buckley explains, “Concepts such as field of energy, vector, organism, evolution or (even) the second law of thermodynamics can and do pass analogous and heuristic structures into theology” (Byrne 12). However, scientific discoveries, theories, and concepts only constitute a portion of what falls under the umbrella term ‘science.’ While not easily definable, the ‘scientific method’, or the process of conducting science, presents new reconciliatory challenges and appears to offer less room for compromise with theological insights and presuppositions. Thus, in separating scientific discoveries from scientific method we can more clearly see the non-reconcilable facets between science and religion.

At this point, perhaps it would be helpful to re-examine the tentative definition of ‘science’ offered earlier. The first parameter of this definition posits that, for the sake of hypothesizing, researching, and conducting experiments, the scientist assumes ‘metaphysical naturalism’, of the view that the entirety of the universe is a closed system of only natural processes. This view, which admits exclusively of natural phenomena, is decidedly atheistic because it brackets out the ‘supernatural’ agency explicitly acknowledged under Theology of Nature. However, David Gregory posits that one must not be an atheist to be a scientist: “In contrast to atheists, scientists qua scientists do not believe in metaphysical naturalism—they accept it is as a necessary prerequisite for doing science, whether or not they believe it is true” (506). This differentiation between accepting metaphysical naturalism as a ‘necessary prerequisite’ and believing it to be true still allows one to a posteriori cast scientific discoveries in a theological context, but it nonetheless demonstrates that the process of coming to those discoveries (via hypothesizing, researching, and experimenting) is
necessarily done without reference to any supernatural presuppositions.

The second parameter in our definition of ‘science’ contends that the scientist “can examine only what can be observed, investigated, verified, and (in principle) falsified through empirical methods as an extension of human sense perception.” The Theologians of Nature specifically recognize a facet of ‘human sense perception’ that is vital to their lives as religious persons, namely that of human experience with the divine. Polkinghorne argues that a “university that does not have a faculty of theology is incomplete since it fails to engage with the widely attested human experience of encounters with the sacred dimensions of reality” (2009, 30). However, this ‘human sense perception’ of the divine does not find a direct analogue in the scientific realm because it does not lend itself to empirical testing nor is it falsifiable. A scientist would be hard pressed to devise an experiment in which a control subject was made to have a divine encounter. Additionally, there is no way to account for or control a supernatural agency within scientific experimentation. Cosmologist Lawrence M. Krauss quips, “One cannot proceed with the process of scientific discovery if one assumes a ‘god, angel, or devil’ will interfere with one’s experiments” (WSJ 2). Thus two central tenets for the Theologians of Nature, namely the importance divine experience, and that this ‘divine’ possesses supernatural agency, appear irreconcilable with a scientific process that presupposes metaphysical naturalism.

Under Theology of Nature, it is supposed that God can intervene ‘miraculously’ within the created order to precipitate a specific event. It is with respect to miracles that we find a particularly poignant non-alignment between naturalistic and theistic perspectives. Francis Collins states, “If, like me, you admit that there might exist something or someone outside of nature, then there is no logical reason why that force could not on rare occasions stage an invasion. On the other hand, in order for the world to avoid descending into chaos, miracles must be very uncommon” (53). Collins recognizes that the regularity of natural laws is essential, for if they were continually abrogated the life-giving patterns which allowed for biological development would have been irreparably disrupted. Furthermore, a key reason why the world can be rendered intelligible via the natural sciences is precisely because of regularities within nature. That being said, miracles are given a sort of protection against the prying jaws of natural science: “It simply does not and cannot follow from the overwhelming regular course of natural processes that exceptions cannot occur. It cannot be said more plainly: science does not and cannot demonstrate that miracles are impossible” (Gregory 511). Because the scientific method cannot be used to prove or disprove God, the same logic is applied to miracles. However, under the auspices of a scientific method that presupposes metaphysical naturalism, anomalous events within nature cannot be attributed supernatural status just because they defy a full explanation in solely natural terms. It does not appear possible for the natural sciences to admit of a supernatural
agency that can arbitrarily usurp the system of natural regularities.

Philosopher Alvin Plantiga takes issue with the notion that a scientist must assume ‘metaphysical naturalism’, and argues that adopting metaphysical naturalism will from the outset “produce theories incompatible with theistic religion” (1). If one adopts the idea that the universe is a closed system of natural causes, the data rendered will be interpreted with the same naturalistic assumptions. Arguing from a theistic perspective, Plantiga asks us to

Consider the truth that human beings have been created in the image of God, but have also fallen into sin. This dual truth might be very useful in giving psychological explanations of various phenomena. If it is, why should a Christian psychologist not employ it? Why would the result not be science? (van der Meer 200).

Essentially, Plantiga is asking why metaphysical naturalism must be the default scientific mode of operation. Robert Klee offers a retort, stating:

The earliest form of inquiry that crudely resembles science began when serious inquirers ceased being satisfied with culturally approved supernatural explanations of events in the natural world. Those inquirers sought naturalistic explanations of things in terms of processes and entities unrelated to the workings of arbitrary deities or mystical forces (1).

As such, the scientific method focuses exclusively on non-agential, natural processes (as opposed to supernatural agencies) which lend themselves to controlled observation, prediction, verification and falsification. These four facets do not find direct analogues with respect to theological thought, because this endeavor a priori posits a non-falsifiable hypothesis (God exists) that cannot be empirically observed or tested. Furthermore, this hypothesis admits of an agency which transcends and can disrupt natural laws, and thus defies the parameters of natural observation. While the Theologians of Nature seek to understand how scientific discoveries relate to the presence of a supernatural agent, it nonetheless appears that such a supernatural agent must be excluded from the actual process of conducting scientific investigation.

Concerning the scientific method, the ‘Independence’ trend, or the idea that ‘scientific’ and ‘religious’ perspectives must be bracketed, has a strong bearing. It is when the individual moves beyond the process of science, into the more holistic sphere of making sense of the entirety of his or her experience as a human, that the freedom to incorporate or further separate scientific discoveries and theistic perspectives truly lies. I use the term ‘freedom’ intentionally because it speaks to the fact there is a degree of human choice that lies in constructing and/or adopting a certain metaphysic, whether is theistic, naturalistic, or something completely different. As John Brooke explains, “When the cultural and metaphysical implications—whether sacred or secular—of a scientific achievement are assessed, there will be a plurality of competing views of greater or lesser plausibility, but never reducible to one alone” (282). Humanity has exponentially increased its understanding of the world in the relatively short time modern science has been employed. Yet what is discovered via the scientific process is never self-evident. That is, discoveries do not come
with metaphysical implications etched into them. It is up to the individual to decide the over-arching meaning of a scientific discovery. Regarding the biological development of life, “[t]he claim that evolution demonstrates that human beings and other living creatures have not, contrary to appearances, been designed, is not part of or a consequence of the scientific theory, but a metaphysical or theological add-on” (Plantiga 1). It is in this process of ‘adding-on’, of creating and applying metaphysical significance to insights of the natural world that the scientist and the theologian are most free to establish common ground.

Works Referenced


Byrne, Patrick, ed. The Dialogue Between Science & Religion: What We Have Learned From One Another Scranton: University of Scranton Press, 2005


Murphy, Nancy and George F.R. Ellis. On the Moral Nature of the Universe:


<http://plato.stanford.edu/entries/religion-science/>


---Modern Culture from a Comparative Perspective. Albany: State University of New York Press, 1997


Issues of Modernity in Dead Poets Society
Stephanie Zanowic, Class of 2011

In “Challenge of Modernity” we have read groundbreaking works that ask us to rethink the way we look at the world. We have examined controversial paintings and sculptures and pondered what the artists were trying to say. In choosing a work to add to the Modernity curriculum, I considered what we discussed in class and thought of what I’d read or seen that dealt with similar issues. While rereading my notes on Nietzsche, I was strongly reminded of one of my favorite movies: Dead Poets Society. Not only does this movie deal with issues of Modernity, it examines the classroom, the roles of teacher and student, and what should be taught and how to teach it. It is for these reasons that I suggest Dead Poets Society be added to the Modernity curriculum.

Dead Poets Society takes place at the Welton Academy for boys in 1959, where the students are taught the virtues of “tradition, honor, discipline and excellence”. The new English teacher, John Keating, is hardly traditional. His radical teaching methods delight his students but shock the faculty. Inspired, one group of boys, led by Neil Perry, decides to revive the club Keating founded when he was a student, called The Dead Poets Society. They meet in a cave to read poetry and find a new appreciation for the art form. Following Keating’s command to “seize the day” (carpe diem), Neil stands up to his controlling father, and another boy confesses his feelings to the girl he loves. Even after the tragic death of one of the boys, the break-up of the club, and Keating's dismissal, the students remain loyal to their teacher and the lessons he taught them.¹

Keating’s interpretation of carpe diem is mixture of two ideas Nietzsche references in On the Advantage and Disadvantage of History for Life: memento mori and memento vivere.² Memento mori means to remember you must die; memento vivere, remember to live. Keating uses the knowledge of inevitable death to spur his students to live a full life. On his first day teaching, Keating takes his class into the hallway to look at a display case full of pictures of students from years past. “These boys are now fertilizing daffodils,” he tells them. “Believe it or not, each and every one of us in this room is one day going to stop breathing, turn cold, and die.” He urges, “Make your lives extraordinary.”³ Nietzsche laments that being conscious of death causes “hopelessness” and an aversion to anything new or different;⁴ Keating embraces the new and makes that consciousness beneficial to life.

³ Dead Poets Society.
⁴ Nietzsche, 44.
Nietzsche’s memento mori is burdensome; Keating’s is liberating.

Carpe diem is also similar to Nietzsche’s idea of the unhistorical. Nietzsche describes an unhistorical outlook as “being able to forget”; in other words, to live life entirely in the moment. For Keating, carpe diem is not so much forgetting history as living life in spite of it. Never mind that you will one day die; make the best of your life as you can today. Keating does encourage his students to participate in history; he tells them: “The powerful play goes on, and you may contribute a verse.” Keating wants his students to own their role in history in a way Nietzsche might very well approve of. His attitude toward history avoids many of the problems Nietzsche describes in his essay.

The elite prep school setting of Dead Poets Society easily links to Nietzsche’s “exhausted hens” analogy. Nietzsche compares the rapid ingestion and regurgitation of knowledge to hens “forced to lay eggs too quickly.” The rigorous curriculum at the school puts stress on the students, but the most striking example of a slavish commitment to knowledge is Neil Perry’s father. When Neil first arrives at Welton, his father informs him that his is taking too many extracurricular activities and he must drop one. Neil’s father wants nothing more than for his son to go to college and become a doctor, and he will let nothing stand in the way of that, not even his son’s unhappiness with the plan. For Mr. Perry, everything, even enjoying life, must be secondary to success. This is the lifestyle that Nietzsche warns against, the very opposite of Keating’s.

Prep school life as portrayed in Dead Poets Society is very structured and regimented. Students’ days are tightly scheduled, they have a long list of rules to follow, and they are beaten when they disobey. They are the embodiment of the lack of spontaneity Nietzsche says occurs with an excess of history. This can even devolve into a loss of personality and self-confidence. Nietzsche writes:

So the individual becomes timid and unsure and may no longer believe in himself: he sinks into himself, into his inner being, which here only means: into the heaped up chaos of knowledge which fails to have an external effect, of teaching which does not become life.

It is this loss of self that Keating seeks to help his students avoid. He encourages them to follow their dreams and to think for themselves. One student, Todd Anderson, arrives at Welton shy and unsure of himself. He is the only member of the Dead Poets Society that refuses to read aloud at the meetings. When Keating asks his students to write an original poem and read it to the class, Todd doesn’t do the assignment. Keating brings Todd to the front of the room and shows him a photo of Walt Whitman. He asks Todd to describe what he sees, “even if it’s total

5 Nietzsche, 9.
6 Dead Poets Society.
7 Nietzsche, 42.
8 Dead Poets Society.
9 Dead Poets Society.
10 Nietzsche, 28.
11 Nietzsche, 29.
gibberish.” Todd does, and before he knows it, more words fly out of his mouth and he’s written a poem. Keating has a talent for boosting students’ self-confidence and helping them find their gifts. He wants to ensure that they do not become “only machines that think, write and talk.”

If there are a striking number of similarities to Nietzsche’s essay apparent in Keating’s teaching style, it may be because John Keating is a critical historian. For Nietzsche, there are three types of history: monumental, antiquarian, and critical. He describes critical history as “dragging [history] to the bar of judgment, interrogating it meticulously and finally condemning it.” When Keating arrives at Welton, he alters the curriculum to suit his needs, sometimes rejecting parts of it altogether. During one lesson Keating asks a student to read aloud from the first page of their poetry textbook, which describes a scale for rating the greatness of a poem. When the student finishes reading, Keating asks the class to rip out that page. He then has them rip out the entire introduction, to the horror of a teacher who is passing by the room. In contrast to the school’s emphasis on tradition, Keating tells his students: “We must constantly look at things in a different way.”

For Keating, nothing is sacred, not even the time-honored curriculum of Welton.

When we look at the way women are portrayed in Dead Poets Society, it is clear that this film speaks to some of the gender issues we have discussed in class. The few women that appear are often accompanied by men; Griselda Pollock observes a similar phenomenon in some impressionist paintings, as she writes in her article “Modernity and the Spaces of Femininity.” Often the women of Dead Poets Society are somehow being manipulated: Chris, the girl Knox Overstreet is in love with, is dating Chet Danbury, a football player widely considered to be a jerk; Charles Dalton arrives at one Dead Poets Society meeting with a girl on each arm, neither of whom seem to be aware that they are being used. Though women of the 1950s certainly were not unintelligent, the idea that they were confined by the will of men is at least partially accurate.

Some of the themes of gender and family life in To the Lighthouse are apparent in Neil’s relationship with his family. The strained father-son relationship of Neil and Mr. Perry parallels the animosity between James Ramsay and his father, though Neil seems to fear his father more than he hates him. Neil’s mother appears in a scene near the end of the movie that recalls the difficulty Mrs. Ramsay has with expressing her feelings. Neil took a part in a play even though his father forbid him to; after the play goes up, Neil’s father takes him home and informs him that he is being withdrawn from Welton and enrolled in military school. While her husband and son argue, Mrs. Perry does little more than look at her

12 Dead Poets Society.
13 Nietzsche, 30.
14 Nietzsche, 21.
15 Dead Poets Society.
17 Dead Poets Society.
18 Virginia Woolf, To the Lighthouse (San Diego: Harcourt, 1927), 4.
son with tears in her eyes. In To the Lighthouse, when Mr. Ramsay wants his wife to say she loves him, she can't; not because she doesn't love him, she insists, but because “she never could say what she felt.” Perhaps Mrs. Perry wanted to tell her son that she loved him, but could not find the words; it is also possible that she was held back by the will of her husband.

Dead Poets Society asks us to examine how we live and how we learn, two things any student should be concerned with, and especially college students. We should aspire to be free thinkers, and this movie chronicles students on the path to freeing their minds. Making the most of the one life we are given is another honorable lesson to be learned from this film. A Modernity curriculum that includes Dead Poets Society would be one that encourages students to engage themselves in their learning and constantly seek new perspectives. It is poignant, thought-provoking movie that begs to watched, discussed, and watched again, each time coming out of it with new insights and inspirations.

19 Dead Poets Society.
20 Woolf, To the Lighthouse, 123.
Team Production Function and Player Shirking in Major League Baseball

By Michael Kodesch, Class of 2010, and Kevin Macios, Class of 2010

Introduction

Major League Baseball has long been recognized as a useful tool in modeling other labor markets. Not only does the system perfectly replicate personal psyche and motivation, but few other industries record worker statistics to the extent of the MLB. In fact, members of the Society for American Baseball Research (SABR) are dedicated to producing a myriad of performance measures in an attempt to help quantify individual and team production. With these measures, various topics can be discussed within a numerical context. Baseball is also a very interesting industry due to its monopsonistic nature, where the owner has total contract control in a sea of salary-hungry players.

Despite the expansive amount of research dedicated to shirking, researchers and econometricians have yet to reach agreement on whether this dark art exists within Major League Baseball. The issue has become the forefront of owners’ concerns with the advent of long-term contracts, largely because pay is now uncoupled with performance. In lieu of contract incentives, on-field player performance has become questionable in light of guaranteed income and security.

The first section of this paper is dedicated to understanding the background of shirking in a historical context. There have been four critical eras in this time frame in which contracts have experienced systematic change, resulting in differing player attitudes towards productivity. While the owners’ preferences have remained constant through these four eras, players have received different circumstances regarding salaries, and have leveraged their performance to compensate these changes.

The second part of our analysis empirically estimates a production function across both the American and National leagues using models previously specified in conjunction with stipulations derived from the new baseball regime. Cross-sectional data was acquiesced from the 2007 and 2008 seasons and is used in a multiple regression analysis. We will be able to determine a reliable estimate for the production function which will assist us later in our shirking analysis. With this production function, a team could very easily appropriate a salary structure for their players given the revenue information of the firm.

Finally, based on the production function, the third section of the paper will establish the marginal productivity of individual players. In particular, we will be focusing on a group that has signed multi-year contracts between the 2007 and 2008 seasons. To aid the

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21 Sherony says “a player shirks when his pursuit of a personal goal hinders the owner’s efforts.”
statistical adequacy of our two-part model, we will also include the analysis of two additional groups, one-year contract players and players that are in the second year of a contract to control for any stochastic variance in player performance.

Baseball contains significant differences from other production processes, and there must be some caution when translating results. However, sports labor markets at the least “can be seen as a laboratory for observing whether economic propositions at least have a chance of being true” (Kahn 2000). In this light, we can make some important inferences in regards to long-term contracts and their subsequent effect on performance in a larger context.

I. Background

The first era of Major League baseball (1865-1921) was most notably a transition from an amateur to a professional sport. There was little structure within the league in terms of player salaries, where baseball was mostly a part-time affair. Due to the loose nature of the system, a form of shirking was practiced termed “hippodroming,” describing payments made from gamblers to players to assure results in high-stakes games. The most infamous incident of hippodroming was the Black Sox scandal of 1919, in which eight players were banned from baseball for taking part in throwing the World Series. The major issue within the scandal stemmed from poor relations between the monopsonistic owner and the players. In order to exploit an incentive within these player’s contracts, the owner physically controlled player output by directly impeding player production, resulting in resentment and distrust between the two parties. This distrust has served as a strong foundation for the relations between owners and players today, and continues to act as an ingredient for the propensity to shirk.

Following the scandal, the Commissioner of baseball instituted a system known as the reserve clause, which subdued most incidences of shirking. Under this system, players salaries were based solely on the past years performance with no room for negotiation. A team was also forbidden from offering players under different firms higher salaries, giving an owner total control of his roster. This system applied to all players other than those considered superstars, who were the select few to receive long-term contracts. Superstars were an exception to the reserve clause era, as their “extraordinary talent and popularity with fans may have afforded some bargaining leverage” (Sherony, 2002). These select few players were considered irreplaceable, and this aspect gave them more control relative to replaceable players in terms of salary. Shirking in this period of time was practiced via holdout, where players would withhold their services until a more favorable contract was negotiated for higher salary. This crippled profits for firms whose fans paid top dollar to see these superstars play, forcing owners to negotiate in order to achieve optimal revenue. Yet, these contracts were not performance based, allowing shirking to ensue.
In 2003, Glenn Knowles calculated stochastic frontier estimations for the career of Babe Ruth, which yielded some particularly interesting results. Many players shirk by becoming injured more often, allowing them to play less at the team’s expense. In Knowles’ study, total bases were used as the key output for performance; a measure that effectively takes playing time into account. After comparing the actual data to Babe Ruth’s stochastic frontier, two largely skewed terms show up in 1922 and 1925, with 1922 being the first year of Ruth’s long term contract. This contract had no incentive bonuses and consequently, Ruth’s batting average and other average statistics had dropped significantly. His behavior during both periods of lackluster execution can be directly attributed to both his on-field and off-field performance. To confirm that shirking existed, Ruth “acknowledged his mistakes and vowed to work hard, which he did accomplish the next season” (Knowles 2002).

The third era of baseball, from which our model was acquired, marked a period of open free agency. Starting in 1973, the reserve clause was nearly dropped as players who performed one season without a signed contract would be eligible to sell their services to the highest bidder. Salaries sky-rocketed giving birth to a contract that would secure a player on a team for some time: the long-term contract. In 2001, of all players who were eligible for salary arbitration, “62.9 percent had multi-year contracts. Furthermore, when considering the twenty-five players with one year contracts who also had option years as part of their deal, only 32 percent of experienced players had one-year contracts” (Sherony 2002). With a large prevalence of long-term deals in mind, owners became haunted with the pretense of shirking within their firm.

Anthony Krautmann conducted a study in 1990 measuring the marginal productivity of players scattered throughout history against a stochastic interval based on means, standard errors, and extrema analyses. By using a player’s slugging average, Krautmann was unable to reject the null hypothesis that shirking did not exist and instead credited any variance in performance to the stochastic nature of baseball. As noted earlier, however, shirking is also the byproduct of an increased propensity to be injured, and is not reflected within the slugging average statistic. Furthermore, Krautmann admits this flaw citing a study that concludes “on average, every additional year remaining on a multi-year contract was associated with a 25 percent increase in number of days spent on the disabled list, as well as a significant increase in the probability that a player is injured” (Lehn 1982).

In 1997, Mark Woolway extrapolated a different model that accounted for injury and once again put shirking on trial. Additionally, he designed his model to adjust for players that switched teams from non-contract year to contract year. After calculating a production model based on the 1993 season for team victories, he calculated the marginal products of players before and after entering a long-term contract, and found results that contradicted those of Krautmann.

While Woolway’s model takes the problems of past models into

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consideration, there are a few significant changes found in today's regime that must be addressed. During the Labor Strike of 1994 and 1995, player salaries once again increased tremendously, in lieu of any expectations of increased performance. The implications of shirking seem more relevant and threatening in this environment; the possible existence of which motivates the primary question in our study. Moreover, certain statistics within the game have become either more or less prominent, changing the effectiveness of Woolway's model. Finally, while Woolway only included a list of long-term contract players in their first year, it is equally important to analyze players in different situations to touch base with regression towards the mean.

II. Empirical Estimate of Major League Baseball's Production Function

Using Woolway's model as a guide, we will run a cross-sectional regression using data from the 2007 and 2008 seasons. Accordingly, we will use the Cobb-Douglas functional form as it is very straightforward in reporting relative factor shares and returns to scale. We will also be using the same dependent variable, team win percentage (W%), as it ultimately explains a team's productivity and success. “Other considerations play a part in determining team revenue, such as stadium amenities, player popularity, and geographic location, but the major element in long run profitability of a team is success on the playing field” (Woolway 1997). It is important to note that using team wins is analogous to using team win percentage as all teams play the same amount of games during the regular season.

The inputs that determine team win percentage fall under three categories: offense, defense, and pitching. In simple terms, a team must score runs to win games (offense), while limiting runs scored by the opposing team (defense and pitching). Speed has become increasingly important in the game of baseball, as it affects both stolen bases for offense as well as a player's range in the field.

Sabermetricians have come up with a seemingly endless list of statistics that describe offense; however, we will focus on three statistics that encompass everything that an offense can produce. The first two statistics fall under hitting. Hitting can be broken down into two sub-skills: hitting to get on base, and hitting for power. Past models had used batting average, but we find this to be incomplete, as walks and hit-by-pitches factor into getting on base, and ultimately assist teams in scoring runs. For this reason, we have incorporated the statistic On-Base Percentage (OBP) in our model. OBP is calculated the following way:

\[
OBP = \frac{\text{hits} + \text{walks} + \text{hit-by-pitches}}{\text{at-bats} + \text{walks} + \text{sacrifice flies} + \text{hit-by-pitches}}
\]

To statistically account for power hitting, the best measure to use is slugging percentage (SP). Home runs would seem like a good choice, but doubles and triples also factor in to power hitting. Slugging percentage is calculated by dividing the total number
of bases earned from hits by the total number of at bats, which effectively realizes singles, doubles, triples, and home runs. Despite its illusive name, it is important to note that a player can theoretically achieve a slugging percentage greater than one, two or three for that matter, though this is not commonly seen over the course of a season. After running the full regression with offense, defense, and pitching, we discovered a large deal of variance inflation between SP and OBP. Looking closer, the two statistics have become increasingly correlated since the 1993 season model. Because it is important to include both types of hitting as both types of hitters exist, SABR has recently come up with a statistic that combines these two categories, called On-Base plus Slugging Percentage (OPS). This value is calculated simply by adding OBP and SP. The third and last component of offense is stolen bases (SB), as thieveries increase the chances to move runners into scoring position, and subsequently increasing the chance to score runs.

The second major input to calculate team win percentage is the efficacy of a team’s pitching staff. As the efficiency of pitching increases, less runs are scored giving the team a better chance of victory. In this respect, we are in full agreement with Woolway that Earned Run Average (ERA) is the best statistic to incorporate. Earned run average is calculated on a nine inning basis by multiplying the total amount of earned runs by nine and then dividing by the total innings pitched. Earned runs are scored runs that did not involve the complacency of fielding, but were scored on what statisticians identify as hits. Runs that are the result of a defensive mishap are recorded as an error for a player on defense rather than a hit, and are measured within the statistic called unearned runs (UER). In past models, the ratio of strikes to walks was used as the key indicator of pitching performance. However, some of today’s best pitchers have low strike out totals but are extremely effective on the mound by forcing batters to ground out and fly out. This would not show up within the context of strikes to walks, whereas ERA can consistently measure the adequacy of a pitcher.

Woolway designates defense as the final component in determining team production. In past models, fielding percentage and total chances were found to be statistically insignificant in a production model. In light of this insignificance, Woolway used the UER statistic aforementioned which demonstrated significance in his model. After trying all three defensive statistics in our model, we have found that none of them proved to be significant in terms of determining team win percentage. After further investigation, we have found that the correlation between UER and win percentage was negative in 1993 [Figure 5], but surprisingly non-existent in 2007/08 [Figure 4]. While defense is undeniably important in baseball, players have become somewhat systematic in their fielding abilities, and defense now plays less of a role in the outcome of a game. In this regard, we have assumed that pitching and speed are the two primary factors in defense, both of which are already accounted for in our current model.
Our last difference between the model of Woolway and our theoretical model involves the use of a dummy variable separating differences between the American and National Leagues. Dummy variables should be included in a model where the same inputs produce a different output due to qualitative differences. However, since there is very little interleague play, AL and NL win percentages should both be centered around mean .500. Since the standard deviations and means of win percentage of the different leagues are approximately the same, we have left out the dummy variable from our model. On a separate note, Woolway’s dummy variable came out to be insignificant at the 10% significance level, supporting our claim.

By removing the logarithms from our four variables, W%, OPS, SB, and ERA, we can prepare our variables for multiple-regression analysis. Additionally, we followed Woolway’s model by indexing each of these logged variables in order to standardize the differences in measures. In order to do this, we divided each of the categories by their respective American League and National League averages in attempt to enable inference. We now have the following equation and regression result:

\[
\ln \left( \frac{W\%}{\text{avg}_{W\%}} \right) = \beta_0 + \beta_{\text{ops}} \ln \left( \frac{\text{OPS}}{\text{avg}_{\text{OPS}}} \right) + \beta_{\text{sb}} \ln \left( \frac{\text{SB}}{\text{avg}_{\text{SB}}} \right) + \beta_{\text{era}} \ln \left( \frac{\text{ERA}}{\text{avg}_{\text{ERA}}} \right) + u
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*Data is based off of MLB data from ESPN.com and MLB.com*
The data that we used is from reliable baseball reporting websites. Every team and year is counted as a separate observation, so that we ended up with 60 sets of different W%, ERA, SB, and OPS. As for win percentage, because the teams play the same amount of games and the competitive balance is theoretically equal between all teams, the histogram for win percentage is approximately normal.

It is extremely important that the model is well specified in order to make consistent and unbiased inferences. The second part of our analysis involves using the production function to calculate marginal productivities of several groups of players. If the model above is wrongly specified, then any inferences we try to draw from our final product would be meaningless. For this reason, several tests and graphs were constructed to ensure the reliability of our model.

As the table shows, all of the variables used are statistically significant at the 1% alpha level. Additionally, the variance inflation levels are relatively low indicating the absence of significant multi-collinearity. After reviewing graphs of the residuals against different variables, there is no evidence of heterogeneity within the data [Figures 6 and 12]. Additionally, since the residuals are uncorrelated with the independent variables, there is no evidence of omitted variables bias. Although it is warranted to be cautious, as the outcome of a game is determined by many factors. With the exception of a few outliers, there exists no pattern suggesting that the variables require a different functional form. Our adjusted $R^2$ value was equal to .8042, which can be interpreted as a relatively strong correlation between the explained and explanatory variables.

In order to test whether non-linearities had been excluded from our model, we performed a regression specification error test (RESET) [Figure 7]. With numerator degrees of freedom equaling 4 and denominator degrees of freedom equaling 53, we regressed our dependent variable over squared and cubed terms of our predicted y-hats from the original production function. With a critical value of approximately 2.58 at a 5% significance level, we calculated an F-value of .94 and a corresponding p-value of .3985. With this information, we cannot reject the null hypothesis that the coefficients of the non-linear possibilities equal zero. This means that the model does not need any non-linearities, as the current definition is adequate.

Finally, to test whether the assumption of homoskedasticity holds, we performed a Breusch-Pagan test [Figure 8] as well as a White test [Figure 9]. The null hypothesis of both tests posits that the model is homoskedastic. With degrees freedom 4 and significance level .05, we fail to reject at a critical value below 9.49. After completing the tests, we received Chi-squared values of 3.55 and 1.02 for the BP and White tests respectively. With this information, we fail to reject the null hypothesis, and our model can be considered homoskedastic.

Since we now have a model that is statistically adequate, we can use this model in our analysis of the marginal product of players entering their contract year.
III. Model for Calculating Marginal Productivity of Major League Baseball Players

Our first reaction to analyzing a change in one year from the next was to use a two period panel. This is almost always the most appropriate method in understanding policy change. However, there are several problems within the realm of baseball that made this approach obsolete. First, there are only 40 to 50 long term contracts granted per year. Two period panel models work best when the amount of observations is great enough to outweigh any outliers. Also, many players sign long term contracts with a different team from their non-contract year, creating irregularities in terms of what to use for the difference in the dependent variable. The final predicament we ran into when using this model was finding that the residuals were correlated with our explanatory variables, rendering the model useless. For this reason, we can account for all of the problems in the two period panel model with our current strategy using a production function and marginal analysis.

Once there is a working model able to predict a team’s win total, it can be applied to the final step in deciding whether or not players shirk. The team production function model is crucial to this second model as player productivity will be determined with respect to the player’s contribution to his team; after all, it is the team that should be most concerned with whether or not a player shirks. A player’s marginal productivity will essentially be determined by how many wins that player added or subtracted from a team. Presumably a player who shirks will contribute less wins in the year preceding the signing of his new multi-year contract than he did in the year before.

In order to account for all variation and to safely be able to conclude that shirking either does or does not exist, three groups of players were put through the model. All three groups consisted of 43 players; 26 position players and 17 pitchers. The first group is the 43 players who signed multi-year contracts between the 2007 and 2008 seasons. This is where our sample size of 43 comes from. The second group is a random group of 43 players who signed one year contracts between the 2007 and 2008 seasons. The third and final group is a random sample of 43 players who signed multi-year contracts between the 2006 and 2007 seasons and therefore had not yet completed their contracts entering the 2008 season. In order to select these random groups, two separate lists were compiled including all of the one-year contract players for one list, and all of the second year long term contract players on the other. After dividing the pitchers from the position players, random numbers were assigned to each name. Finally, to pick these players for analysis, 17 and 26 random numbers were generated for pitchers and hitters respectively to create the two extra data sets.

The first group of players is the set that this paper focuses on. These are the players who signed multi-year deals after the 2007 season and according to our theory, are susceptible to shirking during the 2008 season. The second and third groups are to act as controls to determine if the first group was shirking...
or if their seasons were simply products of the stochastic nature of baseball. By including these control groups we can compare the marginal productivities of the players who signed multi-year contracts to the marginal productivities of other players in major league baseball. In theory, these control players have extra incentive to play better as they are presumably trying to earn multi-year contracts for a guaranteed salary.

In order to consider the marginal productivity model accurate, a few assumptions must be made. First, we assume ceteris paribus alongside of the multi-year contract. While the base year is held constant in our model to account for players that switch teams, there are a few assumptions that must be made to allow for ceteris paribus. We must assume that a player’s performance for moving from a hitter-friendly stadium to a pitcher-friendly stadium, or vice-versa, is negligible. Additionally, players who change teams moving into a more or less productive lineup, bolstering or weakening said player’s statistics must also be assumed insignificant. It should also be noted that each player’s ability may have waned with one additional year of age or increased with an additional year of experience. Later in our paper we will consider this factor by breaking up players and their respective results into three sets of ages to analyze any disparities in marginal product.

The first step in calculating a player’s marginal productivity is to compare the team’s 2007 model-predicted win total to the model-predicted win total of the same team without the player’s 2007 stats. The difference between these two win totals is the player’s marginal productivity for the 2007 season. A positive number indicates that the player won that many more games for the team in 2007 than the team would have won without him. Likewise, a negative number indicates that the player’s performance was sub-par and cost his team that many wins in 2007.

The next step is to calculate each player’s marginal productivity for the 2008 season. This is where we need to designate a base year so that everything other than the player’s change in performance can be held constant. By taking the team’s 2007 performance minus the player’s stats from 2007, and adding the player’s 2008 stats, the new set of team statistics represents what the team would have done if they had had the 2008 version of the player in question on the 2007 team. Again, by comparing the model-predicted win total of this new set of stats to the model-predicted win total of the 2007 team without the 2007 (or the 2008) player, the resulting number represents the player’s 2008 marginal productivity.

Now that we have the marginal productivities of each player from 2007 and 2008, we can look into shirking. The difference between the two marginal productivities represents the change in a player’s productivity between the 2007 season and the 2008 season. A positive number indicates that the player produced that many more wins in 2008 than he did in 2007. A negative number indicates that the player produced that many fewer wins in 2008 than he did in 2007.

The model was run on all 129 players and all marginal productivities
and changes in marginal productivities were calculated accordingly [Figure 1]. The change in marginal productivity from 2007 to 2008 for the three main samples of players can be summarized as follows:

<table>
<thead>
<tr>
<th>Group</th>
<th>Pitchers</th>
<th>Position Players</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>'08 Multi-year contracts</td>
<td>-0.84</td>
<td>-1.34</td>
<td>-1.14</td>
</tr>
<tr>
<td>'08 One-year contracts</td>
<td>0.07</td>
<td>0.34</td>
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<tr>
<td>'07 Multi-year contracts</td>
<td>0.75</td>
<td>0.26</td>
<td>0.46</td>
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</table>

The results obtained from the marginal productivity model appear to suggest that shirking does indeed exist among players who sign multi-year contracts. Both pitchers and position players who signed long-term contracts between the 2007 and 2008 seasons saw their marginal productivities decline on average. The two other groups – players who signed one-year contracts for 2008 and players who were in the midst of a multi-year contract – showed an increase in marginal productivity from 2007 to 2008. The fact that these numbers are small implies regression to the mean, and the variance from year to year for a player still solicits evidence of stochastic production.

In order to make inferences from these results, we will now test these sets to consider sample size and deviation from the mean. Since our data strictly relies on a change in marginal productivity, we can apply a one-tailed t-test at a 5% significance level to see whether performance for each group had declined. The test for all players who signed multi-year contracts between the 2007 and 2008 seasons resulted in a t-statistic of -1.75 and a critical value of -1.684. The null hypothesis that the players’ marginal productivities did not decline after signing their new multi-year contracts is rejected. For pitchers alone the t-statistic is -2.038 with a critical value of -1.753, while the t-statistic for hitters is -5.469 with critical value of -1.711. In both instances, the null hypothesis can once again be rejected. At this point in his research, Woolway concluded that shirking existed in the 1993 season. However, we must also test the other sets before making a generalized conclusion.

For players who signed one-year contracts prior to the 2008 season, the t-tests failed to reject the null hypothesis that their marginal productivities had declined. The same can be said for players in the second year of a long-term contract, where the t-tests lacked evidence to find declines in marginal productivity.
productivity [Figure 10]. Using all three pieces of knowledge, we have come to the conclusion that shirking exists the year after a player signs a long term contract. While a one game reduction in wins may seem insignificant for a 162 game season, we speculate that it is noteworthy in at least two specific historical contexts. “The first Dodger team to finish last in eighty-seven years had acquired five 1991 [long-term contract signers]. Similarly, the Mets team that collapsed in 1993 had acquired three 1992 [long-term contract signers]” (Vrooman 1996).

Woolway continues his study by addressing age as a possible component in productivity differences from year to year. We decided to break down age into slightly different categories than that of previous models, as 28-32 is considered a player's prime in the new era of baseball. After computing the marginal differences in year to year performance, we came up with the following results:

### Pitchers

<table>
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<th>28-32</th>
<th>33 and above</th>
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### Position players

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<th>28-32</th>
<th>33 and above</th>
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Players who signed multi-year contracts between the 2007 and 2008 seasons saw their marginal productivities decline across all age groups except for one: pitchers ages 33 and above. This sample of players consists of only two pitchers, Troy Percival and Mariano Rivera, both 38 years old. Percival experienced a decline in marginal productivity of roughly one game but Rivera’s productivity increased by over a game and a half. With a sample size this small, a t-test to reveal any existence of shirking is inconclusive.

One-year contract players and second year contract players saw positive changes in marginal productivity over all age ranges and positions except for one. In this case, pitchers ages 33 and over saw their marginal productivities decline by almost one game. It is possible that this is another anomaly, especially since the set once again only contains two pitchers. However, it is more likely that these players are experiencing a natural decline in productivity as they get older, particularly Tom Glavine who was 43 years old in 2008. The fact that these two pitchers only received one-year contracts may be indicative of their declining skill set. Overall, age does not appear to be as much of a factor in player marginal productivity as signing a multi-year contract is. Essentially, shirking spans all age groups within players who are in the first year of a multi-year contract. Regardless of age, other players are subject to the stochastic nature of baseball.

IV. Conclusion

Major League Baseball offers a unique opportunity to study the behavior of buyers and sellers in a market with supporting statistics for their respective movements. As economists, we can use this lucrative setting to extrapolate both sociological and psychological patterns that influence similar systems. In our paper, we have specified a statistically adequate relationship to effectively model team victories using the explanatory variables OPS, SB, and ERA. The combination of these statistics fully encompasses the offense, defense, and pitching of a major league baseball team and a player's marginal product can be ascertained through the clever use of the model.

The evidence we gathered in this paper suggests rather strongly that Major League Baseball players tend to shirk in the year following the signing of a multi-year contract. The basic idea is that once a player has a guaranteed salary for a guaranteed number of years they tend to put in less effort. Our findings support
many owners’ arguments that vouch for one-year contracts to protect them from the evident shirking associated with long-term contracting. As Woolway recommends, a regime of one-year contracts would create performance incentive rather than performance disincentive.

Owners should concern themselves with the aggregate effect that these findings can potentially have on a team. One player shirking on a team costing, on average, one win may not make a difference. Then again, it might make a huge difference when you consider that the 2007 New York Mets finished one game behind the Philadelphia Phillies for the NL East title and subsequently missed the playoffs. Also consider a team that has five players on their team signed to multi-year contracts. If those five players combine to cost their team five wins it could have drastic effects. Consider the 2008 Phillies who won 92 games and went on to win the World Series. If the Phillies had lost five additional games they would have missed the playoffs all together.

The next question to ask is how these findings can be related to other job and labor systems. It is possible and even likely that other industries granting similar job security may be prone to the same negative effects. Institutions that utilize methods such as seniority rule or tenure may be making themselves vulnerable to similar disincentive effects. We cannot easily assume a professor would act differently to tenure than a baseball player would to a guaranteed long-term contract. Yet, just as it may take an aggregate of several shirking players to have a substantial impact on a team, a combination of several shirking professors may have a substantial impact on a University. With this note, we encourage managers within comparable labor systems to conduct similar research to optimize firm productivity.
Appendix:

Figure 1. 2007-2008 Team Win Percentage vs. Team OPS
Figure 2. 2007-2008 Team Win Percentage vs. Team ERA
Figure 3. 2007-2008 Team Win Percentage vs. Team SB
Figure 4. 2007-2008 Team Win Percentage vs. Team UER
Figure 5. 1993 Team Win Percentage vs. Team UER
Figure 6. 2007-2008 Residual vs. Predicted Win Percentage
Figure 7. Results of a RESET test
Figure 8. Results of a Breusch-Pagan Test
Figure 9. Results of a White test
Figure 10. T-test Results for Marginal Productivity
Figure 11. Marginal Productivity listed by player, position and contract
Figure 12. Residuals vs. Independent Variables

Figure 1.

[Diagram showing a scatter plot with labeled axes]
Figure 2.

![Figure 2](image1.png)

Figure 3.

![Figure 3](image2.png)
Figure 4.

Figure 5.

48
Figure 6.

![Residual Plot]

Figure 7.

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Figure 8.

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49
Figure 9.

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Figure 10.

Pitchers

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Position players

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Combined

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Figure 11.

’08 Multi-year contracts

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<th>Hitter</th>
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### '08 One-year contracts

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Figure 12.
References


Teaching for Tolerance: The Case for Religious Study in American Public Schools

By Lauren Kerby, Class of 2011

Introduction

When the average American student enters the classroom for the first time in a public school, he is greeted by classmates from an astonishing diversity of backgrounds. They may be from different economic classes. They may be of a different race. They may have been raised by parents with different political opinions. And they may be of different religions.

In the classroom, any discussion of those religious differences is avoided. Religion, when it is acknowledged at all, is treated as a historical phenomenon, and its relevance to the modern world is not usually discussed. Teachers, like most Americans, believe that religion is off-limits to the schools, thus they avoid the subject altogether for fear of controversy.

But when students graduate, they will enter a world where religion matters. The Arab-Israeli conflict makes little sense without an understanding of the religious motivations of both parties involved. Presidential candidates use religious rhetoric in their speeches, trying to win the support of religious groups. Debates over abortion and homosexuality divide communities, and one side always has religious reasons for its stance. Religion has been and continues to be at the heart of many of today’s most prominent conflicts, and to avoid the subject in the classroom is a disservice to the students.

Before graduating, students need to know that religion does matter in today’s world, and they need to be educated in order to negotiate it. This means that instead of skirting the edge of difficult religious issues, schools need to address them and make them a part of the curriculum. Religious studies should be made a mandatory course for high school students in all public schools, and courses at all levels should include religious subjects where they naturally arise in the curriculum. In addition to educating students about world religions, these courses should emphasize the need for religious tolerance and the means by which students can cultivate respect for the religious rights of others without compromising their own faiths. Though many Americans’ reluctance to discuss religion in the public schools stems from the widespread belief that doing so would violate the separation of church and state, the First Amendment has in fact never prohibited teaching about religion, and leaving students in ignorance about this important part of our world is no longer an option. We live in a religiously diverse nation and world, and religion is a necessary component of the curriculum, despite the challenges its inclusion will pose.
Legal Secularism and the Schools

As a rule, American public school teachers shy away from so much as mentioning religion while in the classroom, mistakenly believing that the separation of church and state prohibits it. A series of twentieth-century Supreme Court cases in which the Court outlawed school prayer and devotional Bible reading is largely responsible for this widespread misconception. However, the concept of a wall between church and state, though coined by Thomas Jefferson, is nowhere to be found in the religion clauses of the First Amendment: “Congress shall make no law respecting an establishment of a religion, or prohibiting the free exercise thereof.” The clauses are open to interpretation, and their meaning has evolved considerably in the past half century.

In the wake of World War II and the Holocaust, the interpretation known as legal secularism began to take shape in the Court’s jurisprudence. Americans were becoming cognizant of the religious diversity in the United States, and the Supreme Court sought to protect religious minorities from the sort of persecution experienced by European Jews in the preceding year. The Court concluded in Everson v. Board of Education that the best way to avert potential conflicts caused by religious diversity was simply to eliminate any hint of religion from the public square. The government would take no side when it came to religion. The result, in theory, was that no religion would be privileged over another by any legal institution: citizens of all religious beliefs would be treated equally. This legal secularism was the Court’s way of overcoming the challenges posed by a religiously diverse society, and it provided the reasoning behind the “Lemon test,” the criteria by which the Court judges whether or not the government is violating the First Amendment through a particular action, so named for the 1971 case Lemon v. Kurtzman. Under the Lemon test, a government action violates the Establishment Clause if it does not have a clear secular purpose, if it has the primary effect of either advancing or inhibiting religion, or if it results in “excessive entanglement” between the government and religion. The goal, of course, is absolute neutrality on the part of the government so that America’s religious diversity does not result in inequality.

The schools were of particular concern to the Court, since students’ youth makes them particularly susceptible to feelings of inferiority on account of being different. If it appeared that one religion was preferred, students would be under significant pressure to go along with that majority, rather than remain an outsider. As Justice Frankfurter noted, “Nonconformity is not an outstanding characteristic of children.” By removing religion from the schools, the Court hoped to eliminate “divisive forces” and encourage a sense of unity. If religion were

24 Feldman, 178.
allowed in the schools, whether through Bible-reading, teacher-led prayer, or excusal to attend religious classes, students would inevitably be reminded of their religious differences. The justices wanted to avoid this wherever possible. Justice Frankfurter in particular wished to avoid any situation in which “the state chose to make religion into a defining feature of students’ experience.”26 In order to allow students of different faiths to attend school together without conflict, religion became a personal matter that was not acknowledged in the classroom.

However, instead of resulting in the schools being neutral in the matter of religion, this tactic has lead to schools involuntarily sending students the message that religion is not cause for concern or serious academic study. In effect, they tell the students that religion doesn’t matter. This is not neutrality: this is taking a side, the side of irreligion, and that, too, is prohibited by the Supreme Court. Legal secularism is not nearly as neutral as it was once thought to be; a new approach to religion in the schools is needed.

Fortunately, at the same time as the Court was banishing the teaching of religion in schools, it was taking care to emphasize the importance of teaching about religion. In 1948, Justice Robert Jackson wrote that completely removing all religious references from the classroom would “leave public education in shreds...The fact is that, for good or ill, nearly everything in our culture worth transmitting, everything which gives meaning to life, is saturated with religious influences.”27 Fifteen years later, in the same decision that outlawed Bible reading within the classroom, the Supreme Court gave its full support to teaching about religion. Writing for the majority in Abington School District v. Schempp, Justice Thomas Clark said “it might well be said that one’s education is not complete without a study of comparative religion or the history of religion and its relationship to the advancement of civilization.”28 Later rulings made the Court’s position even clearer. In Edwards v. Aguillard, Justice Lewis Powell wrote that “courses in religion of course are customary and constitutionally appropriate.”29 As Stephen Prothero notes, however, constitutional they may be, but courses in religion have become far from customary.

The Rationale for Religious Studies

The most common misunderstanding surrounding the issue of religion and public school education is that its purpose is to indoctrinate children into a certain faith. This is not without cause; America’s public schools have a long history of being a place where Protestant Christianity alone was taught as the truth. However, the reasons for instituting a religious studies program transcend merely sectarian concerns. No doubt there will be some religious parents and officials who harbor hopes that this is a backdoor through which prayer might reenter the schools,

26 Ibid, 178.

29 Prothero, 129
but this reason is not one that can be considered in making a case for religious studies. Indeed, for this to be a motivating factor would make the program unconstitutional from the start. Nor can the program’s stated purpose be to teach a non-sectarian morality that is a watered-down version of mainstream religious principles. Americans tend to equate religion with morality, but a religious studies program is not intended to be a course through which students develop sound moral values. The opposition should not jump to conclusions about religious motivations behind such a program. It is easy to dismiss it as a religious ploy, but they should wait to draw any conclusions until they hear the legitimate—and secular—arguments in favor of a religious studies program.

Yet just as the secular side suspects its religious counterparts of having unconstitutional motives for implementing such a program, the religious side harbors its own suspicions, and they, too, are justified. Critics of religion may feel a certain horror at the thought of children being raised in the faith of their parents without any knowledge of other options, and they may wish to correct this by presenting religious alternatives through the religious studies curriculum. They feel strongly that children ought to learn of all the religious options before choosing the one that suits them best. In the United Kingdom, this is a stated goal of the well-established religious studies curriculum. The intention is that “students learn from religious traditions as they seek to develop their own religious perspectives.”

However, just as indoctrination in one faith is not an acceptable reason for religious studies, encouraging children to consider breaking away from their own faith in favor of another—or none at all—is also unacceptable. A similar argument can be made for students understanding the discrepancies and shortcomings of religion before choosing to believe or not to believe. Nel Noddings argues in favor of this, claiming that blind faith should not be tolerated. Critics of religion may feel a certain horror at the thought of children being raised in the faith of their parents without any knowledge of other options, and they may wish to correct this by presenting religious alternatives through the religious studies curriculum. They feel strongly that children ought to learn of all the religious options before choosing the one that suits them best. In the United Kingdom, this is a stated goal of the well-established religious studies curriculum. The intention is that “students learn from religious traditions as they seek to develop their own religious perspectives.”

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But it is not and may not be the place of the public schools to point out the shortcomings of one faith or another so that the child can make an “informed decision.” Surely this would constitute inhibiting religion, making the program by default unconstitutional. Clearly it is not the task of the public schools to influence the faith of their students one way or the other. It is a fine line to walk between these two opposing camps, religious and secularist, in determining the purpose for a religious studies program. However, if the program is to have any chance at success, the middle ground allowed by the Constitution must be found at the start.

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31 Noddings, Nel, Educating for Intelligent Belief or Unbelief (New York: Teachers College Press, 1993), 39.
and firmly held against opposition from both sides through the process.

And that middle ground provides an ample supply of reasons for including religious studies in the curriculum, all of them both secular and constitutional. The first, and most obvious, is that without the study of religion, a gaping hole is left in a child’s education. The hole encompasses not only the lack of understanding about religion’s role in history, literature, art, and other disciplines—though that is undoubtedly true and of concern as well—but a lack of understanding about how other people live their lives. “The purpose of a liberal education is to prepare students for living in the world, not for graduate work or professional school...Whatever continues to shape people’s lives and thinking in some profound way, should be taken seriously in the curriculum.”

As one leader of a California effort to teach about religion said, at least some knowledge about major religions is necessary for a person to be “considered truly civilized.” Religion cannot simply be ignored if educators wish to educate students thoroughly. Furthermore, to turn one’s back on religion and pretend it is so unimportant as not to merit a place in the curriculum is to ignore the fact that it is a powerful force in the world, despite academic assumptions to the contrary. It has been and still is an extraordinary force for both good and evil, and for that reason alone, we ought to study it.

The second reason is that a working knowledge of the world’s religions as well as respect for them is necessary if children are to be expected to exist in a religiously diverse society. Students need to face their differences and welcome them, even at an early age, if they are to be prepared for life outside the classroom. “If the United States is to survive and thrive in the twenty-first century, the nation’s schools must be places for embracing and building tolerance and love of diversity.” Where else can students learn to treat religious differences with respect? “When Americans succumb to name-calling and hyperbole in discussions about religion in the public square, their deliberative failures likely stem at least in part from the previous failure of schools to provide students with accurate information about religion and the failure to model civil discussions about religion.” It is the school’s responsibility to educate students about other faiths and to give them the opportunity to consider how they will relate to those who believe differently from themselves.

Likewise, in dealing with cultural debates that involve religious beliefs, students need to be educated about the different sides, but not forced to choose between them. In learning about such conflicts—the obvious examples are abortion and evolution—students should

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33 Lester, Emile, and Patrick S. Roberts. Learning about World Religions in Public Schools: The Impact on Student Attitudes and Community Acceptance in Modesto, California. (Nashville, Tenn.: First Amendment Center, 2006), 17.
35 Fraser, James W., Between Church and State: Religion and Public Education in a Multicultural America (New York: St. Martin’s Press, 1999), 4.
36 Lester and Roberts, 17.
learn what the issues are and what different positions are on them, including religious positions.\textsuperscript{37} They should not believe unconditionally in any side they are taught, nor should they dismiss any stance out of hand. As Gerald Graff says, “The best solution to today’s conflicts over culture is to teach the conflicts themselves, making them a part of our object of study and using them as a new kind of organizing principle to give the curriculum the clarity and focus that almost all sides now agree it lacks.”\textsuperscript{38} Such disputes are all too frequent in our society, and students must be able to understand the religious sides of the issue as well as the secular: “It is not enough to teach the truth as one party in the disagreement understands it; if we teach only that view, students will not have the critical resources to make educated judgments about it. It is one thing to believe (what one takes to be) the truth; it is another thing to be educated to make reasonable judgments about it.”\textsuperscript{39} Students need to be taught the religious positions on critical issues alongside the secular positions so that they will be willing to understand and respect the arguments of their opponents, even if they disagree.

Yet another reason that religion ought to be included in the curriculum is that the questions it confronts are addressed nowhere else in school. Questions of meaning or purpose—the “big” questions—are pushed to the side in the race to score highest on a test, to get into a good college, to obtain a high-paying job. Students ought to be allowed, or even encouraged, to consider these questions and how they and others might answer them. There is more to life than grades and paychecks, and students know it. Noddings, a professor of education and former high school teacher, writes, “We underestimate teenagers when we suppose [getting a good job] is all that matters to them. They are in fact intensely interested in the questions we have been considering, especially those concerning life and death: Does life have any meaning? Is life worth living? Is there life after death? What does the fact of death mean for life?”\textsuperscript{40} Those are daunting questions to ask, but students should be given the opportunity to learn that others have answered them in many different ways, and that the questions themselves are important. This was a stated goal of a highly successful program in Modesto, California: “The countless hours of corporate advertising to which children are exposed, and the tremendous emphasis that many schools place upon test scores, leave many students with the impression that competing for well-paying jobs and being able to afford valuable consumer goods is not only paramount, but should be the only important concern in their lives.”\textsuperscript{41} While results of the program showed that students’ overall attitude toward consumerism was unchanged by the program, at least they were made to think for a time about bigger concerns. “Public schools should help students think critically about the messages

\textsuperscript{37} Nord, 229.
\textsuperscript{38} Ibid, 235.
\textsuperscript{40} Noddings, 78.
\textsuperscript{41} Lester and Roberts, 18.
students receive in the marketplace and expose them to the moral and spiritual goals that are important to millions of people.”

The final and most compelling reason to include religious studies—and to make the subject mandatory—is that students need to learn about the First Amendment, the protection it offers them, and how they should behave so as not to infringe upon the rights of others. Living in a religiously diverse society poses significant challenges, not least of which is according others’ beliefs the same respect one expects for one’s own. To exhibit such respect requires education: “Full respect for the rights of believers requires at least a basic education in the complexity of a religious tradition. Increasing understanding through education is also the best practical means to increase mutual respect, as countless studies have shown.” This leads to safer, more inclusive schools and communities, while avoiding the pitfall of relativism. “The point...is not a dilution of belief or a slow movement toward a common faith. The goal is rather a common democratic culture in which a diversity of citizens, each holding their own creed with passion and wisdom, respects other citizens who hold other creeds, or no creed, with equal passion and—it is hoped—equal wisdom.” Such would be the ideal of a religiously free society, but if it is to be fully realized, each child needs to be taught respect for others’ rights from the earliest age possible.

Thus one goal for a student who has completed the program is a better understanding of and respect for religious rights, a goal which should be relatively easy to accomplish if the classroom is consistently a place where religious views may be expressed without fear of mockery or attack. A student who is respectful of others’ religious views will be able to enter a civil conversation about a controversial religious topic without dismissing an opponent’s viewpoint as superstition or ignorance, resulting in a more tolerant atmosphere between believers of different faiths or no faith.

In addition to this respect for the rights of others, students should also gain a substantial understanding both of what religion is and of how it is studied academically. This includes knowledge about specific religions as well as religion in the abstract. They should be able to appreciate the many different ways the “religious dimension of human life is manifested” Students should understand the complexity of the topic and the varied approaches to it, especially the method(s) that will be used in their particular course. They should be aware of the strengths and weakness of those approaches, and “the dimensions of religions which seem to elude analytic investigation.” They should also recognize that studying religion in the classroom is a far different

42 Ibid.
43 Ibid, 4.
44 Fraser, 7.
46 Ibid
experience from practicing it. This study need not be comprehensive, however; the students should gain a foundational knowledge that prepares them for more advanced study if they choose. The limitations imposed by the length of the course and the age of the students will determine how much depth is possible, but at the very least a broad foundation should be the result of the course, and, ideally, a desire to learn more.

Students should come away from the course with an increased respect for the impact of religion on history and society, which will translate into a willingness to take religion seriously in areas such as foreign policy. Religion’s role in American and world history cannot be overstated, and from studying its effects, students will understand the power of religion to shape civilizations. The smaller scale effects of religion should be noted as well: students should be able to appreciate the impact religion can have on an individual, and they should recognize the “meaning and significance” of making a commitment to a religion and living one’s life by it. This is possibly the most important thing students might learn, and that is just how vital religion is in many believers’ lives, which will again emphasize the need for them not to underestimate it.

Two Examples of Teaching about Religion

In recent years, the school district of Modesto, California, has received national attention for its groundbreaking religious studies program, a required nine-week course for all ninth grade students. It is the first of its kind—a religion course that is required in order to graduate. The response to it has been overwhelmingly positive, which bodes well for those who may attempt to follow Modesto’s lead. But it is worth paying attention not only to the results, but also to the process by which Modesto implemented this course.

Modesto’s course of action was triggered by a divisive debate over whether adding “sexual orientation” to the existing safe schools policy constituted an endorsement of homosexuality by the school. After months of unproductive arguments, an outside facilitator was brought in to assist a 115-member committee in finding common ground. The result was a realization that no acceptance of a particular religion or philosophy is required in order to accept that no student should be harassed or discriminated against for any reason, including race, religion, gender, and sexual orientation. (Haynes 36) Their commitment to the safe schools policy led them to begin several new initiatives, one of which was the decision that religion should become a required portion of the ninth grade social studies curriculum. The first two weeks of the course were designed to be spent discussing religious liberty to ensure that

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48 Ibid; Nord, 213.
49 Ibid.
50 Lester and Roberts
51 Haynes, Charles C., Religious Liberty and the Public Schools (Bloomington, Ind.: Phi Delta Kappa Educational Foundation, 2001), 35.
52 Ibid, 36.
53 Ibid.
students understood how the course fit into the safe schools policy.\footnote{Ibid.}

The committee proceeded to choose a textbook and outline the basics of the course, but then, rather than implementing it without further consideration, assembled an advisory council of religious leaders from the local community, including Protestant, Catholic, Islamic, Sikh, Jewish, and Greek Orthodox representatives. Others were invited, but chose not to participate.\footnote{Ibid.}
This council debated and eventually came to a resolution on how much time should be spent on each religion, and how certain controversial events should be treated, such as the split between the Catholic and Orthodox churches.\footnote{Ibid.}

The school board unanimously approved the course shortly thereafter, despite initial concerns from conservative board members. After the course’s goals were explained to these members, however, they no longer objected.\footnote{Ibid, 23.}

This openness to community input cannot be taken too far, however: Linda Erickson advises that having a solid outline of the course before inviting community opinion was key to success. If religious leaders are allowed to influence too much of the course, it could easily become controversial.\footnote{Ibid, 48.}

Another crucial step in the process that took place before the students even entered the classroom was the effort by the school district to prepare teachers for this course. Teachers were required to participate in thirty hours of in-service training the first year the course was taught. These hours were spent in workshops with history and religion professors from CSU Stanislaus, “meetings with local religious leaders and visits to local religious institutions and training sessions on how to teach major themes of religious liberty with First Amendment Center consultant Marcia Beauchamp.”\footnote{Ibid, 49.}

Though this preparation seemed satisfactory to the teachers involved, unfortunately, it was not repeated in the subsequent years. New teachers of the course complained that their training was “pretty much only videos,” which supplemented credit they received for college courses dealing with world religions.\footnote{Ibid, 59.}

The most regrettable change between teachers who underwent the original training and those who did not was that the newer teachers “were not particularly aware that the promotion of religious freedom was an essential purpose of the course” and spent less classroom time discussing it.\footnote{Ibid, 59.}
Though it only lasted nine weeks, the course covered a broad range of material, albeit in little depth. After the first two weeks, which were intended to be spent discussing religious liberty in the United States, seven major world religions were taught in order of their historical appearance: Hinduism, Buddhism, Confucianism, Sikhism, Judaism, Christianity, and Islam. Religion was approached descriptively, rather than comparatively, in an effort to be as neutral as possible. Sectarian differences within the traditions were not discussed because of the lack of time. “Discussion would focus on the historical development and major contemporary beliefs and practices of each religion.” Teachers were given strict guidelines and cautioned against entering any controversial discussions. The goal was ostensibly to prevent teachers’ biases from entering the classroom. Nonetheless, teachers managed to bring in current events, such as the Supreme Court case concerning the words “under God” in the Pledge of Allegiance and an article about Sikh students wearing ceremonial daggers in school. Teachers also utilized their personal experiences with other religions, such as attendance at weddings, as concrete examples for students. The textbook used was the sixty-page Usborne Book of World Religions, chosen for its balanced treatment of the different religions, even distribution of pages between them, and numerous pictures. Despite this, however, the textbook was deemed unsatisfactory, and several teachers supplemented it with other materials. Modesto is not the only school district challenged by the lack of appropriate textbooks; as we shall see, the problem is nearly universal.

The results of the course were overwhelmingly positive, contradicting many of the traditional fears about religious studies. In addition to increasing knowledge about and interest in religious studies, the course did not lead students to abandon their own religious beliefs after studying those of others; indeed, many reported that their own faith had been strengthened by the course. Nor did students come to the relativistic conclusion that all faiths are the same, even as they did recognize and appreciate the “similarity of the moral foundations of the major world religions.” The most important result of the course was the effect it had on students’ “general respect for First Amendment and political rights overall and their general respect for the rights of religious liberty.” Both forms of respect significantly increased. Respect for religious liberty was measured by two categories in Lester and Roberts’ survey. The first was “students’ decreased willingness to express disrespectful opinions,” while the second was “students’ greater comfort with their religious identity.”

If Modesto were the rule, rather than the exception, there is little doubt

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64 Ibid, 22.  
65 Ibid.  
66 Ibid, 49.  
67 Ibid, 50.  
68 Ibid, 51.  
69 Ibid.  
70 Ibid, 56.  
71 Ibid.  
72 Ibid.  
74 Ibid, 27.
that far more religious studies programs would have been implemented in the United States in recent years. Unfortunately, Modesto remains a unique case in many ways, not least of which is the lack of parental opposition and community outrage that every educator fears. Perhaps a more typical case is that found at Excelsior Middle School, only fifty miles from Modesto, where in 2001 an Islamic studies unit in seventh grade world history overstepped what some parents thought was appropriate. The state of California requires a unit on Islamic history, culture, and religion in seventh grade world history classes. While the standard textbook is Across the Centuries, teachers have the option of supplementing the textbook with other units, which the two teachers in question chose to do with a role-playing module. “Islam: A simulation of Islamic history and culture” simulates the experience of a Muslim believer through activities representative of the Five Pillars of the Islamic faith. The parents of Chase and Samantha Eklund misunderstood the module as an attempt to indoctrinate their children into the Muslim faith, and, naturally, sued the school district and teachers.

The student guide to the module begins with the controversial statement “From the beginning, you and your classmates will become Muslims.” Brooke Carlin, Chase Eklund’s teacher, distributed the guide to the students, but says she was certain to clarify that the students would be role-playing only; they would not actually become Muslims. Students had the option of choosing Muslim names for themselves, though Ms. Carlin did not use them when addressing the students, and they were also allowed to dress up in traditional Arab costumes for their presentations if they wished. During the module, Ms. Carlin read prayers and passages from the Qur’an to the class, required students to recite selected lines from prayers, such as “In the name of God, Most Gracious, Most Merciful,” and asked them to make banners with Arabic phrases praising Allah, which certain students chose to write in English as well. To simulate the Muslim practice of fasting during Ramadan, Ms. Carlin asked students to give up something for a day, such as eating candy or watching television. She also required students to perform a community service task in representation of zakat, the required charitable donation. (Eklund 3-4). Finally, to simulate the hajj, or journey to Mecca that every Muslim must make if financially and physically able, Ms. Carlin used a board game call “Race to Makkah” in which students rolled dice, drew a card, and, if they answered the card’s trivia question correctly, moved their camel game pieces ahead on the board. The Eklunds objected to the board game in particular because the questions on

75 Ibid.
76 Ibid.
77 Ibid, 3.
78 Ibid, 3-5.
79 Ibid, 3-4.
80 Ibid, 4-5.
the cards required answers that stated Muslim beliefs as fact or truth, rather than simply what Muslims believe. Ms. Carlin insisted that she prefaced the game by telling the students that the cards were representative only of what Muslims believe to be truth or fact.

The final point of contention was the exam on the unit. The essay question asked for a critique of certain elements of Islamic culture, but it came with this warning: “If you do not have anything positive to say, don’t say anything!!!” Carlin intended the warning to serve as a reminder of her previous remarks to the class that racist remarks or criticism without supporting reasons would not be tolerated. Given that the exam was only a short time after the terrorist attacks of September 11, 2001, the warning seemed merited to avoid unwarranted expressions of racism or hostility. The Eklunds, however, saw the warning as an attempt to force students to see and say only good things about Islam if they hoped to pass the exam.

The Eklunds were so upset by Chase’s experience with the Islam module that when their daughter Samantha entered seventh grade the following year, they requested that she be allowed to opt out of the unit. According to Samantha, however, when she presented the note from her parents asking for her to be excused from class, her teacher, Michelle Carr, appeared angry, intimidating both Samantha and another student intending to opt out. The Eklunds decided to sue both teachers, the principle, and the school district, claiming that students were being coerced into becoming Muslims and that the school was illegally advancing and endorsing Islam.

The U.S. District Court for the Northern District of California disagreed with the Eklunds. Judge Phyllis Hamilton ruled in favor of the school district, and her ruling was upheld by the Ninth Circuit Court of Appeals. The case was taken to the Supreme Court, but the court declined to hear it, allowing the ruling to stand. Hamilton declared that the role-playing activities in the module did not constitute actual religious practices, making the Eklunds’ claim of coercion, as laid out in Lee v. Weisman, a moot point. The students did not truly perform the five pillars of the Muslim faith; rather, they performed activities that were “analogous” to those pillars.

Role-playing activities which are not in actuality the practice of a religion do not violate the Establishment Clause,” she said in the ruling, which cited Altman v. Bedford, and Elk Grove Unified School District v. Newdow, among other cases. From Brown v. Woodland Joint Unified School District, a case concerning complaints that students were role-playing occult practices, she quoted the following: “Fantasy activities...that happen to resemble religious practices...are not overt religious exercises that raise Establishment Clause concerns.” Nor did the activities advance or endorse Islam, as would be prohibited by both Lemon v. Kurtzman and Lynch v.

81 Ibid, 19.
82 Ibid, 6.
84 Eklund, 12.
Donnelly, since, in Hamilton’s view, students wouldn’t have “reasonably” seen the role-playing activities as advancing Islam.\(^{86}\) The purpose was secular (educational), therefore the module would have been acceptable even if it had included a real religious ritual, so long as it was used for a secular, pedagogical purpose, according the Ninth Circuit in Brown.\(^{87}\) The purpose of Decalogues in classrooms, for instance, was religious and therefore unconstitutional; the purpose of the students’ banners in this class was secular and therefore permissible.\(^{88}\)

Though the Eklunds lost the case, it is worth taking note of their experience and their objections when considering religious studies programs in general. The chief objection to the Islam module, raised by the Eklunds and numerous conservative religious groups, is that while Islam can be taught in such a way, Christianity cannot. Legally, perhaps, one can teach about Christianity just as one can teach about Islam or any other religion as per Abington v. Schempp. But the Eklunds have a point: if Islam were replaced by Christianity in such an interactive module, chances are the outcry would be far greater. Richard Thompson, chief counsel for the Thomas More Law Center, which represented the Eklunds in this case, said, “Public schools would never tolerate teaching Christianity in this way. Just imagine the ACLU’s outcry if students were told that they had to pray the Lord’s Prayer, memorize the Ten Commandments, use such phrases as “Jesus is the Messiah,” and fast during Lent.”\(^{89}\) Clearly, if religious studies are to be made a part of the curriculum, painstakingly balanced treatment of the major world religions is necessary if schools want to avoid the appearance or even reality of a double standard. Tiffany Eklund summed it up: in teaching about religions, “it should be all or none.”\(^{90}\)

### Developing a Curriculum

The simplest way to avoid the appearance of preferring or endorsing one religion is to teach as many as possible in equal depth at some point during the child’s school years. Rather than spending an isolated three weeks on Islam, what is needed is a full course that teaches each religion in turn. This is no easy thing to accomplish, but it is what is necessary. As seen in Modesto’s examples, if schools can involve the community when planning the course or courses, a great deal of controversy can be avoided from the start. Then, if teachers are upfront with students about the controversial nature of the course, they can make use of it as an opportunity to explain the rights given by the First Amendment and the nature of religious tolerance.

Of course, it is important to realize that religion is already in the curriculum. As we saw in the example of

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87 Ibid, 16.
88 Ibid.
Excelsior Middle School’s 7th grade world history classes, religion is an inextricable part of many subjects, and it would be unwise to ignore those instances where religion is naturally included in the curriculum. Some even argue that limiting religious studies to these instances of “natural inclusion” is the best option for educating children about religion. However, this is an inadequate solution. Natural inclusion should continue, particularly in the lower grades, but separate courses about religion are needed as well. “What would we think if economics or biology were to be taught only by natural inclusion in history or literature courses by teachers who had done no course work in economics or biology? Obviously the importance and complexity of these fields warrants separate courses taught by faculty educated to teach them. So it should be with religion,” writes Warren Nord.91

The first thing to consider when planning a religion course is when to teach it. When will the students have the foundational knowledge and emotional and intellectual maturity to engage in an in-depth study the world’s religions? Certainly not in elementary school, or, judging from the Eklunds’ example, in middle school. This is not to say by any means that religion should be avoided in these early stages of education. Indeed, this is the time at which teachers ought to take advantage of the tool of natural inclusion, so that from the beginning, students see religion as a natural part of life and education. Religion studies in primary and secondary schools “ought to develop that modicum or more of knowledge as a basis for advanced (usually college or university) inquiry.”92 However, it should be a purely historical and factual study, as is appropriate at this age. Co-authors Suzanne Rosenblith and Beatrice Bailey do argue against teaching any religion in primary school, for fear of “inculcating the very young with a preference toward religious or non-religious life.”93 To be sure, separate courses in religion are inappropriate for young children; however, to ignore religion altogether would be to do that which Rosenblith and Bailey fear by giving preference to non-religious life. I argue that natural inclusion is necessary from the earliest stages of education in order to give a complete picture of the world, but critical thinking about religion should not be asked of a student until high school.

Furthermore, if we expect children to learn to be good citizens, their education in how to treat religious differences with respect should begin at the earliest possible age. They ought to learn the “Golden Rule for civic life” as stated in the Williamsburg charter: “Our rights are best protected when we guard the rights of others, even those with whom we disagree.”94 If students can learn to do this in elementary school, they will be well prepared not only for later critical study of religion, but also for life in a religiously diverse society.

High school, then, is the best option for introducing students to the complexities and controversies of religion. Courses should begin with particular and concrete religious

91 Nord, 211.
92 Piediscalzi, 36.
93 Rosenblith and Bailey, 157.
94 Haynes and Nord, 68.
traditions, then later, in the junior or senior year, explore “the universal and more abstract phenomena and forms of religious experience.” But how long should the courses be, particularly one that is mandatory for all students? And where, in the overcrowded curriculum, will space be found for it?

In answer to the first question, at least one semester must be devoted to the study of religion. Modesto’s program lasted only nine weeks, and students complained at the lack of time. Ideally, the course could take more than one semester, but at the very least, one should be mandatory, and others might be offered as electives. The length also depends on what will be taught, which will be discussed later. As to the second question, there is a simple answer: something else must go. Surely one semester of something else can be sacrificed so that students may learn about this vitally important aspect of human life that has been neglected in the development of curriculum until now.

Warren Nord makes an eloquent point: “How can anyone believe that a college-bound student should take twelve years of mathematics and no religion rather than eleven years of mathematics and one year of religion? Why require the study of trigonometry or calculus, which the great majority of students will never use or need, and ignore religion, a matter of profound and universal significance?” Aside from the debate over what students will ever actually “use” in the real world, Nord is right. This is a matter of profound importance, worth knocking off a semester of mathematics (or, better yet, physical education) in order to fit it in. According to Prothero, “There is no getting around the fact that a student ignorant of the Bible and the world’s religions cannot be said to be ready for either college or citizenship.”

As to the matter of what topics to include in the curriculum itself, there are no bad suggestions, only unbalanced or unrealistic ones. There is a fairly broad consensus that as many world religions as possible should be taught, given the time constraints inherent in the school year. However, there are numerous other topics to address, ranging from the relationship of religion and modernity to religious tolerance. Most scholars require more than one semester to accomplish the goals they set for their curricula. Nord wants a series of three high school courses: world religions, religion and modernity, and moral philosophy (Nord 287); at least one course covering all these areas must be required, with appropriate exemptions. Rosenblith and Bailey want four high school semesters, focused mostly on religious experience in America. Prothero wants a mandatory semester of Bible study and another of world religions.

There are different drawbacks to all of these that are likely to make the plans unworkable. Nord presents a balanced, well-planned curriculum, but his expectation of three full semesters is unrealistic, particularly in the earliest stages of religious studies programs.

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95 Piediscalzi, 36.
96 Lester and Roberts, 43.
97 Nord, 212.
98 Prothero, 139.
99 Nord, 287.
100 Rosenblith and Bailey, 158.
101 Prothero, 132-137.
is it likely that the full scope of the material he wants to include can be more than superficially addressed in a condensed, single semester version of the course. Rosenblith and Bailey, on the other hand, have insufficient breadth in their planned courses, focusing almost entirely on the American religious experience rather than including religions in other parts of the world as well. While knowledge about American religious life is important, globalization is one of the reasons students need to learn about religions, so to limit studies to American religion would be counterproductive in equipping them to handle worldwide religious diversity. Prothero’s design differs from the previous two in that the content is sound and the time required for the program is reasonable. However, his insistence upon giving over an entire semester to the Bible would have a good chance of holding the program back from ever being started. Undoubtedly, the Bible is the most influential book of all time, and deserves an in-depth study, but it is simply not feasible in the early stages of religious studies. I would argue that a reasonable high school observer, with or without the benefit of a world religions course, might see a full semester spent on the Bible as an endorsement of Christianity. Unfortunately, appearances are everything in this endeavor, and until religious studies are accepted as a natural part of the curriculum, care must be taken to avoid any appearance of preferential treatment. Perhaps, in time, a Bible course could be made mandatory, but it would only set efforts back if it was implemented first.

A mandatory religion course at the high school level might look something like the following. It would be taught in the sophomore year, in order to allow interested students to choose religious studies electives during their junior and senior years. As a single semester course, it would give a reasonable amount of time to teach a brief survey of major world religions as well as certain other selected topics. In future years, depending on the success of the program, the course might be expanded to take a full year.

The course should, like that in Modesto, begin with a discussion of the First Amendment, religious tolerance, and how religion may and may not be taught in the public schools. Students should know what to expect and where the lines are before venturing any further into the course. After these boundaries have been clarified, the course can progress into a study of selected major world religions as well a local minority religion, and, perhaps, the worldview of atheism. It is unfortunate that not every major religion can be covered in a single semester, so the community will have to use its best judgment in deciding which are to be included. The three Abrahamic faiths should be included, as well as at least one Eastern religion, though two would be preferable. The local minority religion might be represented by study of American Indian traditions, or Sikhism, or others, depending on the local population. Atheism may seem out of place in a religion class, but it can be included to demonstrate how people make sense of the world without religion, so that it does not appear that religion is preferable or necessary and neutrality
can be preserved. Atheism is an accepted part of the British religious studies curriculum, and communities would do well to consider including it in new American religious studies courses. However, it would be preferable not to end the semester with a study of atheism, since studying the negative view of religion at the end of the course could be misconstrued as the point of the course itself having been to display the faults of religion. The middle of the semester would be a better place for this particular topic.

**Attitudes and Approaches**

One of the most crucial aspects of the course to consider is the overall opinion it conveys about religion. The title of the 2005 book co-authored by Warren Nord and Charles Haynes says it all: Taking Religion Seriously. Religion is a subject that has all too frequently been dismissed as not being worthy of serious academic study. We have already discussed the many reasons to make religion part of the curriculum. But simply adding a course on religion will do little to change students’ outlook if the course treats religion as a throwback to the days before science, a mere superstition that does not hold any influence today. Not only would this be profoundly inaccurate, but also it would instantly alienate any religious student in the class. Students must learn from the start that dismissing any religious belief as nonsense is unacceptable, whether it is one found in the textbook or one expressed by a classmate. A sort of golden rule needs to govern any classroom discussion: “I want you to take me and my ideas seriously and I don’t think you can understand me without listening to what I have to say about my beliefs and actions; therefore I must (morally) take you and your ideas seriously.” This is a courtesy that students need to learn, and it can and should be extended to the study of any other way of life. Warren Nord cites John Dixon’s approach: “We are not free to treat others as less than ourselves, to be explained by our wisdom...We must do them the courtesy of taking them seriously...To treat them otherwise is to reduce them to an it. Explanation is an act of power inflicted on an it. True interpretation is an attempt to grasp the other as “thou.”

This is a difficult attitude to ask students to take at the outset of the course, but at the very least it can be required of teachers and of the curriculum, and students can be encouraged to adopt it so that by the end of the semester, it is second nature to them take seriously the religious views of others. This is not to say that students must accept that those views could be or are right or wrong, but they must accept that those views have value for the believers and thus should not be disrespected.

In order for students to appreciate fully the dedication of adherents to a particular religion, Nord, among others, has suggested that religion courses should be taught “from the inside.” It is not enough to study religion from the outside, removed a safe distance from the students. Rather, students must be engaged in actively trying to think as a religious person might.

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102 Nord, 215.
103 Ibid.
Nord suggests four different ways for the teacher to take the students inside the religion being studied. Students can perform or observe religious actions, such as participating in a ritual. They may read literature or poetry that has been written from a religious perspective, such as scripture, apologetics, autobiography, or theology. They also might read or hear third-person accounts of a religious experience. Finally, they might hear personal accounts from teachers or guest lecturers. All are valuable pedagogical tools, but caution is needed particularly in this last case. Nord and Haynes suggest several guidelines worth repeating for a situation in which a guest lecturer speaks to the class. The guest ought to have a suitable academic background to handle a classroom discussion, and he or she must understand that the First Amendment requires teaching about the religion, not proselytizing on its behalf. The teacher also ought to take care to explain to the class that the speaker represents only one of multiple points of view from within his or her religious tradition. In addition, regardless of their personal experience, students should never function as guest speakers about their own faith, nor should the teacher ask a student of a particular tradition to clarify points of that tradition.

Some might question the wisdom of allowing students to participate in religious activities, which brings us to the fine line that the teachers in Eklund v. Byron were forced to walk. If students are to be expected to understand religion from the inside, surely there is no better way to teach them than to allow them inside the religion by having them participate in religious activities. After all, they both study and practice music and drama—why not religion? If students only read about the beliefs of musicians, or scanned sheets of musical notation, or learned acoustics, it is safe to say they would develop neither an understanding of, nor an appreciation for, music. It is only in listening to it, or better yet, in performing or composing it, that any full understanding becomes possible,” writes Nord. Many students will have practiced a religion at home, but that is typically only a single tradition. Students should, argues Nord, be given the opportunity to participate in religious activities and “open [their] hearts to religious experience,” just as they participate in music and drama, and, for that matter, science. The key phrase is “given the opportunity”—care must be taken to ensure that no student feels pressure to participate. He suggests that taking students of a sufficiently mature age to a worship service is possible without fear of controversy if enough precautions are taken. Students should be seated at the back of the room, with the service leader’s permission, so that they feel no compulsion to participate, but may simply observe. The teacher should make sure everyone—students, parents, and religious leaders—understand that the purpose is purely education, and there should be an excusal policy for any student whose religious convictions still

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104 Ibid, 220.
105 Haynes and Nord, 74.
106 Nord, 217.
108 Ibid.
cause him to object to the experience.\textsuperscript{109} If teachers are unable to take students to a service, a high-quality multimedia presentation might provide an acceptable alternative.\textsuperscript{110}

Care should certainly be taken in making the decision to allow students to experience a religion first-hand, regardless of the numerous court decisions supporting student participation that were quoted in the Eklund v. Byron ruling. In the case of role-playing, though, it is probably best not to use it as a teaching tool. Particularly in the lower grades, there is too great a chance of students misunderstanding. “No matter how carefully planned or well intentioned, role-playing religious ceremonies risks undermining the integrity of the faith involved...In all cases, the possibility that a moment or ritual considered sacred might be trivialized or mocked, even unwittingly, is too great to risk.”\textsuperscript{111} Useful as it may be pedagogically, role-playing invites controversy, so in the interest of continuing and strengthening a new religious studies class, the best choice may be not to use it.

\textbf{Training and Preparation}

Undoubtedly, one of the greatest challenges that will be encountered in a religious studies program is the challenge to the teacher to remain neutral even while leading discussions about controversial issues about which the teacher himself may hold strong convictions. This, therefore, should be a key component of the preparation to teach religious studies. Regardless of their own private beliefs, when acting in their professional capacities as educators, teachers are required to be “pedagogically neutral,” as Nel Noddings says, fulfilling their “obligation to present all significant sides of an issue in their full passion and best reasoning.”\textsuperscript{112} The teacher’s goal should never be to convince a student as to the rightness or truth of any particular religious belief, or, for that matter, of its wrongness or inaccuracy. Rather, “they should always help students to see why an issue is controversial.”\textsuperscript{113} One of the goals for a religious studies program is, after all, for students to understand what controversies are about and what the different sides of the argument are. Teachers need not take sides to do this: “They need only refer to beliefs clearly stated by others and let students weigh the evidence or decide consciously to reject it in favor of faith.”\textsuperscript{114} The question is whether they will be able to keep themselves from doing so.

The ability of teachers to remain neutral is at the heart of many objections to religious studies programs. These objections have their roots in fear of two different things. The first is the fear of teachers who are deeply religious, and whose faith prevents them from teaching objectively about beliefs that differ from their own. This applies, too, to irreligious teachers who are hostile to religion in general. “If teachers have dogmatic views or even views that are opposed to all religious beliefs, they may teach about

\textsuperscript{109} Ibid, 217-219.
\textsuperscript{110} Rosenblith and Bailey, 155.
\textsuperscript{111} Haynes and Nord, 73.
\textsuperscript{112} Noddings, 122.
\textsuperscript{113} Ibid, 123.
\textsuperscript{114} Ibid, 134.
religions in a derogatory manner." This may well be true—teachers with dogmatic views would indeed have difficulty being objective. However, one must remember that teachers will choose to specialize in religious studies. Would a teacher who holds such intolerant views really choose to teach religious studies, or, perhaps more to the point, pass a certification program that consistently requires the objective presentation of information? Unless there is a vast conspiracy of undercover believers infiltrating the ranks of religious studies teachers, teacher bias is cause for concern, but not for dismissal of the idea of a religious studies curriculum.

The other common fear is of teachers with good intentions, who nonetheless teach the religion course badly and only reinforce students’ prejudices. This would be a direct result of the lack of preparation available to prospective teachers of religion. “We can safely assume that many secondary school teachers did not receive an education in the world’s religions as part of their own schooling. Their ignorance could cause them to inadvertently make the unfamiliar traditions sound bizarre and contemptible.” This is true—there is a deplorable lack of training available to teachers of religious studies—but it is no reason to simply give up on the program. "They haven't been exposed to the academic study of religion so they often don’t have the content knowledge or the methodological tools to think about how you integrate religion responsibly," said Diane Moore, head of the Program in Religion and Secondary Education at Harvard, but those skills can and should be taught. Teachers are perfectly capable of teaching about religion, but only if they are given the proper preparation, by means of a certification program. Instead of fighting the introduction of religious studies in the curriculum because teachers are unprepared, we should be focusing on giving teachers the preparation they need to make the programs a success.

Currently, there are a handful programs in the United States that serve to train teachers to teach about religion, but they are all too few. The oldest, which is still relatively unknown, is found at Harvard Divinity School. The Program in Religion and Secondary Education (PRSE) has existed since 1972, giving graduate students the opportunity to earn a teaching certificate in one of eight subjects along with their Master of Divinity or Master of Theological Studies. In addition to their student teaching and the usual coursework required for the master’s degree, PRSE students take a course in adolescent psychology and a course taught by Diane Moore, entitled “Religion, Values, and Education.” Another program is at

116 Ibid.
119 Brustman, 1.
California State University at Chico, where the religious studies department offers prospective teachers a course that deals with the First Amendment and world religions in the context of the classroom. In both California and Utah, religious studies departments at colleges and universities have worked with their local school districts to assist in training and certifying teachers in the area of religion. These efforts, however, are not enough.

All teachers need some preparation for when they inevitably encounter religion in their courses. Nord and Haynes suggest that teachers should take an elective concerning religion and their field, such as Religion and Science, Religion and History, etc. For science teachers, such a course might entail study of the religious opposition to the teaching of evolution and how teachers can respect the religious beliefs of their students while remaining true to scientific principles. For history teachers, the course might prepare them to give a balanced account of religion’s role in history, so that they can avoid focusing solely on the good or bad aspects of it, or glossing over it without acknowledging its importance. Literature teachers might learn ways of explaining religious references in texts so that students better understand the work as a whole, rather than avoiding mentioning such references for fear of offending a student. To be frank, "teachers already teach about religion," says Moore. "What we do is give them better tools to do so more explicitly and responsibly by helping them understand more about religious traditions themselves, as well as how religion and religious worldviews are embedded in social, cultural, and political life." Scholars are unanimous in one area: teachers of religion need to be certified. The subject is too complex to be taught without a solid education not just in religion itself, but in how to teach it. "There is no way that one can study religion and then just teach it; a whole raft of constitutional, political, moral, and epistemological considerations must be weighed in the pedagogical balance." Furthermore, schools must not phase in courses in religion until there are competent teachers. Nor are teachers the only ones who need preparation. Teachers need to feel safe teaching religion, which means administrators need to be educated about First Amendment concerns in the classroom. Administrators should be required to take courses or workshops about religion and education to clarify what the ground rules are. School boards need to adopt policies explaining that religion is a part of the curriculum and how it must be treated. These policies should make it very clear that religion is to be taught for educational, not devotional, purposes. Defining the boundaries should be a project undertaken by the community as a whole. "The development of these policies should be exercises in defining common ground in which

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120 Prothero, 131.
121 Ibid.
122 Haynes and Nord, 56-57.
123 Brustman, 1.
124 Haynes, 42; Nord, 318; Piediscalzi, 6; Nord and Haynes, 56-57; Rosenblith and Bailey, 157.
125 Nord, 317.
126 Nord and Haynes, 56-57.
representatives of various local constituencies work together to establish ground rules within the constraints of the Constitution.”

A final consideration in implementing a new religious studies program is that parents need to be educated as well. Communication is obviously important so that parents are well informed and aware of the programs’ goals and methods, but I argue that schools should go further and offer at least one evening workshop or lecture that is open to parents. This would give parents the opportunity to hear about the program first-hand, and to ask any questions they might have. The complexity of the program makes it difficult to explain it fully in a letter sent home with students, and if parents had a chance to experience an example of the sort of class their children will be taking, they would be reassured and far more supportive.

Of course, parents will also be involved in the development of the program, since the ideal religious studies curriculum would be developed by educators in close collaboration with the community. However, it is simply not feasible for every parent to be involved in that stage of the process, and in future years, new parents will need to be informed of the goals and history of the program. For this program to succeed, everyone needs to know the ground rules, including parents, and that goal would be accomplished best by giving parents a forum each year in which to ask questions and state their concerns.

Conclusion

In the years since Abington v. Schempp, academia’s support for religious studies has grown significantly as religion has been recognized as an important factor in American life. Warren Nord, Charles Haynes, and Stephen Prothero are only the latest in a long line of scholars who have seen the benefits of educating American students about religion in preparation for life in a religiously diverse society. And Americans are not the only ones in need of this education. In a globalized world, students everywhere are in need of education about the religious beliefs of the citizens of other nations as well as their own. To this end, the Tony Blair Faith Foundation has developed “Face to Faith,” a program designed to supplement existing curricula and improve students’ religious literacy in countries all over the world. Through facilitated video-conferencing between schools and an online community, students are able to discuss their beliefs directly with students of different faiths and discover their similarities, differences, and goals they can accomplish together. Though the program is nowhere near the length of a full course, it is a step in the right direction, and its success in the United States could lead to increased support for longer, permanent courses in religion.

The process of developing and implementing religious studies courses

127 Ibid, 57.


129 Ibid.
will inevitably be a long and difficult one, but sincere efforts need to be made toward making them a reality. Religious issues are everywhere today—in the media, in politics, in the courts, and in the schools. Instead of remaining silent and hoping to avoid controversy, schools need to meet the challenges posed by religious diversity by educating students and giving them the tools to understand it, instead of telling them religion does not matter. Religion does matter to billions of people, and it matters to those students now and will matter to them for the rest of their lives, whether they are religious or not. James Fraser notes, “Prior to the 1960’s, many school leaders took this same approach [silence] to issues of race and sex. They seemed to say, ‘Maybe if we never mention the subject we will be ok.’ This continues to be the approach to religion in far too many schools at the end of the twentieth century. Yet this approach is not helpful.”  

Students need to be taught about religion just as much as they need to be taught about science, or history, or mathematics, and with properly trained teachers, there is no reason this course would intrude upon the religious rights of students. It is time for the public schools to make a point of preparing students for life in a world where religion matters by allowing the study of religion to matter in the schools.

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130 Fraser, 6.
College Major Choice in the Liberal Arts Context: 
Exploring the Links Between Undergraduate Field of Study, Expected Career Outcomes, and Graduate/Professional Study

By Justin Etinger, Class of 2011

Introduction

Choosing a college major is an important decision in any undergraduate college student’s academic career. For many students it represents the first time that they have significant say in the making of a major educational decision that directly affects their future. The undergraduate major defines what department the majority of their courses will be taken in, what types of learning and research they will be conducting, and with whom they will surround themselves with in the classroom. As part of a culmination of over four decades of research on college’s affects on students, Pascarella and Terenzini (2005) make a definitive conclusion: “undergraduate academic major can play a significant, if not always totally consistent, role in one’s career” (p. 500). While this is an inevitable and crucial choice that students must make, various avenues open to investigate the influencing factors behind a student’s choice of major, and to research the purported consistent role that it plays in career outcomes.

Stemming from my own experiences with choosing a major, this exploration is aimed at investigating how students come to make this choice. Specifically, it looks at students at liberal arts colleges and their experiences with the parameters implied by the array of majors that these institutions offer to students. Different from larger universities and specialized institutions, the academic offerings at liberal arts colleges are not vocationally linked and aim to provide the student with a wide view of academia and of the prospects that lay ahead of the undergraduate realm.

The niche for this study is therefore to supplement preexisting literature on the subject of college major choice. Qualitative in nature, this study explores the decision making process behind choosing a field of study for liberal arts college students, the influences in this decision, their predictions for employment, and their perceptions of the vocational applicability of their major.

Review of the Literature

Much of the current discourse on the subject agrees that the undergraduate major choice is significant in its implications, both for when the decision is made and for a student’s future (Beggs, Bantham, & Taylor, 2008; Freeman & Hirsch, 2008; Porter & Umbach, 2006). For students in large non-liberal arts universities, the major
that they ultimately declare directly impacts what job they seek upon graduation (Horn & Zahn, 2001). However students at liberal arts colleges face a different set of options in that the majors from that which they have to choose do not include directly vocationally-linked concentrations, such as Business, Marketing, Advertising, or Journalism. Related majors that students declare which are related to these fields are Economics, English, and Mathematics. The three most popular majors at liberal arts colleges are telling in their applications following the undergraduate education: English, Economics, and Political Science. These three majors represent popular feeders into business school and law school. It is not surprising then that at the elite liberal arts college studied here, Cannon University, 18% of graduates enter graduate or professional school immediately following their senior year.

A void in current research exists that fails to look at how students in liberal arts majors in the Humanities and Social Sciences chose their area of concentration. Given the fact that many students at liberal arts colleges find themselves asking, “what could I do with that major,” this study hopes to find how students come to ultimately answer that question (Jacobus & Pennsylvania State Dept, 1973).

Research surrounding the choice of major focuses on which students (based on race, gender, socio-economic status) pick certain majors, the reasons that students cite for their choice, and the profitability of certain majors (Beggs et al., 2008; Cebula & Lopes, 1982; Goyette & Mullen, 2006; Horn & Zahn, 2001; Porter & Umbach, 2006; St. John, Hu, Simmons, Carter, & Weber, 2004; Thomas, 1985). This investigation questions the existence of a link between the undergraduate major and employment occupation, a connection commonly made in existing research. The studies cited above were all done at large universities that do not have a liberal arts emphasis. While this literature provides useful information on the motivating factors for major choice, it is based on the assumption that students will pursue a career in the field of their major. It is under this assumption that for example, all Educational Studies majors will pursue either a career in or a graduate degree in the field of Education (Freeman, 2008).

A significant number of quantitative studies have investigated which racial groups have historically mobilized towards certain majors. Consistent throughout these studies is that black students are more likely than white students to declare majors in the humanities, social sciences, and education (Goyette & Mullen, 2006; Horn & Zahn, 2001; Porter & Umbach, 2006; St. John et al., 2004). Based on a large-scale national research project on bachelor’s degree recipients, findings surface which suggest that Asian/Pacific Islanders are increasingly more likely than black and white student to major in engineering (Horn & Zahn, 2001). There are useful links that can be made between racial statistics of college students and their major, however it is not the only trend being studies.

Other studies which research the gender themes related to undergraduate majors find that men are more likely to
major in engineering, computer science, and business and that women are more likely to major in the Humanities, Social Sciences, and in the Arts (Horn & Zahn, 2001; Porter & Umbach, 2006). Women also tend to major in areas of study that have historically and traditionally been predominately female, such as the Humanities (Porter & Umbach, 2006). Yet similar to the racial studies conducted, the research connecting gender and major choice is not all encompassing, and does little to explain the experiences of students who make this important choice.

A strong connection has also been discovered which suggests that with increased socio-economic status for male students comes an increased likelihood to choose a business major (Leppel, Williams, & Waldauer, 2001). Additionally, Leppel et al. notes that with increased socio-economic status of female students comes increased likelihood for choice of the humanities and social sciences. While these findings are interesting, they speak to universities that cater to vocationally specific majors and which offer the most popular major in the country: business (Horn & Zahn, 2001). This study therefore also investigates the situation facing liberal arts college students: without engineering, nursing, and business majors, what are students majoring in?

As widespread as research is surrounding the type of student who levitates towards a certain major, an equal emphasis has been placed on the personal motivating factors behind these students’ choices (Beggs et al., 2008; Galotti, 1999). Men choose their major based on conceptions of advancement opportunities and monetary gain (Goyette & Mullen, 2006; Horn & Zahn, 2001; Leppel, 2001; Leppel et al., 2001). Conversely, women are more likely to choose a major not directly linked to a job and based on factors such as how interesting the job is and on job security (Leppel, 2001). Other gender related studies investigate the extent to which students select their major based on characteristics of the corresponding departments: teaching quality, reputation, course requirements, probability for receiving good grades, and student competitiveness (Cebula & Lopes, 1982). Yet these studies are based on large scale surveys and do not explain why for example, a department’s reputation is important to students.

Outside of gender, race, and socio-economic class, researchers focus on numerous factors that are wide in breadth. Other factors include a student’s perception of the content area and the difficulty of the major, the job characteristics potentially leading from that major, and students’ self-perception of their academic abilities (Cebula & Lopes, 1982; Leppel et al., 2001). Politically affiliated links have also been drawn relating to major choice, with findings surfacing that student with more liberal views are more likely than those with conservative views to choose a non-science major (Porter & Umbach, 2006). Substantial research also illustrates a clear argument that certain personality characteristics of students make them more likely to choose certain majors (Porter & Umbach, 2006). It is clear from the breadth of research that exists that there are numerous factors
that both predict and influence a student’s choice of major.

The Liberal Arts Context

The liberal arts education has long been considered the “purest form of education” and that its most essential attribute is providing students with a wide-angled view of the world (Jacobus & Pennsylvania State Dept, 1973). As Goyette (2006) articulates, “training in the liberal arts is believed to strengthen a student’s character and to develop qualities such as reason, judgment, and a sense of social obligation...designed to prepare elite students with the qualities needed to govern” (p. 498). Equally important however is that while it is praised for its all-encompassing curriculum, “many students enter it without a clear idea of what it is and what be done with it” (Jacobus & Pennsylvania State Dept, 1973). This uncertainty experienced by students had yet to be researched in the context of choice of major, plans for graduate study, or career aspirations.

Nonetheless, researchers are far from reaching any sort of agreement on the subject. Some argue that liberal arts graduates are seen in the job market by employers as generalists and therefore lack specificity (Jacobus & Pennsylvania State Dept, 1973). In agreement with student’s perception of an apparent lack of connection between liberal arts majors and the job market, research points out that social sciences majors are in fact likely to be employed in occupations outside of their major, often in business environments (Horn & Zahn, 2001). From these it can be inferred that a liberal arts college enables various options for its graduates, yet can neglect them of a sense of defined occupational direction.

Limitations of the literature

Certain crucial questions still remain to be answered which have been largely left out of the current discourse on this subject. This study plans to gain an inside-look into the decision making process of liberal arts students in choosing their major.

How close is the connection between the student’s major and their desired employment upon graduation from a liberal arts college? What personal challenges does the nature of liberal arts majors present to students? How confident are liberal arts graduates with their choice of major when entering the work force? Are employers attracted to liberal arts graduates who have not majored in a field of study closely related to the desired job?

Surprisingly little literature exists to answer an important question: what situation does the liberal arts education present to students in the selection of their major? How does the lack of non-vocationally linked majors affect students in their educational plans, both on the undergraduate and graduate level? While the reviewed findings are interesting, they speak predominately to universities that cater to vocationally specific majors and which offer the most popular major in the country, business (Horn & Zahn, 2001). The level of understanding on the student’s part, in relation to the structure of a liberal arts education has not yet been the study of scholarly research. By interviewing
students at a small elite liberal arts institution like Cannon University, this study both examines how the students came to choose their major and their expectations upon entering this university of the liberal arts education.

**Theoretical Framework**

The factors and patterns surrounding a student’s choice of college major are numerous. However, many of these findings and related theories are based on the assumption that students pick a major related to a field in which they will ultimately be employed. The liberal arts education instead presents students with a wider-image of academia, and presses students to look beyond vocationally linked majors. Therefore the theoretical framework is necessitated by an applicability to all students, regardless of the size and academic focus of the institution which they attend or their educational plans.

The prevailing educational theory that provides useful insight into how college students choose their department of study and subsequent major is the Holland personality theory of person-environment fit (Allen & Robbins, 2008; Feldman et al., 2004; Miller & Miller, 2005; Pike, 2006; Porter & Umbach, 2006). Educational researcher John Holland formulized a theory that establishes a relationship between personality type, a person’s interaction with their environment, and their educational and vocational choices. The three governing assumptions of Holland’s theory are that “(1) people tend to choose environments compatible with their personality type; (2) environments tend to reinforce and reward different patterns of abilities and interests; (3) people tend to flourish in environments that are congruent with their dominant personality types ” (Feldman et al., 2004, p. 528). It is concluded that students choose the college major and related department that is consistent with their personality (Miller & Miller, 2005).

According to Holland’s personality theory, people fall into one of six types: realistic, investigative, artistic, social, enterprising, and conventional (Miller & Miller, 2005). Best summarized by Tokar and Swanson (1995) are the following common observations relating to Holland’s six personality traits: Realistic: asocial, frank, practical; Investigative: analytical, complex, critical, reserved; Artistic: emotional, open, expressive; Social: cooperative, emphatic, patient; Enterprising: agreeable, energetic; Conventional: careful, conforming, conscientious. Holland’s personality theory has been applied to numerous fields of study including job field, and in higher education. The Porter (2006) study is crucial for applying the six personality traits to students’ choice of major. As summarized by Allen and Robbins (2008), the extensive study found that “students higher in investigative, lower in artistic, and lower in enterprising were more likely to choose a science major” (p. 63). The literature on Holland’s personality theory helps to establish a commonality between college students, and between the colleges themselves. The Holland personality theory implies that while students vary in their career aspirations and reasoning for choosing a given major, they can nonetheless be categorized by their personality, and

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surveyed for important themes and trends. A student’s personality can then be juxtaposed to their educational choices, no matter how specific; as in this case it is students at a small elite liberal arts university.

In summary, Holland’s theory provides that based on students’ personality type their choice of major or vocation can be explained. The research that exists which further illustrates Holland’s personality theory fails to mention all but one of the researched contributing factors that have been mentioned in the review of the literature on major choice. As duly noted in the review of the literature, race and gender are both useful in predicting and explaining a student’s choice of major. The Holland theory has been applied to these parameters and was found to be “a useful lens through which to study racial and gender differences in student major choice” (Porter & Umbach, 2006, p. 433). However it does not directly address a student’s socio-economic status or plans for graduate and professional education. It is therefore the crucial role of this study to test Holland’s personality fit in the liberal arts context. In an environment that pushes students to explore as many departments as possible and to push academic norms to their limits to find new meanings, is Holland’s personality theory still relevant? Are students at liberal arts colleges strongly influenced by their own personality needs, so much to outweigh parental influence and monetary aspirations? All of these questions are addressed through qualitative research methods at the distinguished Cannon University.

Methods

The participants of this study are fellow peers of mine who are undergraduate students enrolled in the small, elite liberal arts institution Cannon University. This school is ranked amongst the top 20 liberal arts colleges in the United States according to the 2008 U.S News & World Report rankings of colleges. Made evident through materials distributed amongst prospective students, current attending students, and alumni Cannon University prides itself on the academic achievements of those who have passed through its doors. From the very first pages of the school’s academic handbook it is clear that the success of current students and alumni is largely attributed to Cannon’s richly diverse academic program, which “prepares students for many careers and life choices, including professions that require graduate school training.” The extensive array of fields that Cannon students enter, as the admissions officer happily listed for me, are both impressive in their scope and help maintain Cannon’s reputation as a leading undergraduate institution. These materials also address the focus of this research topic, that is the structure of its academic program. As the manual states, “it is structured to provide a well-rounded liberal education and to prepare students for graduate and professional schools.” Upon reading this catalogue, the focus on students entering schools of graduate and professional study becomes blatantly clear.

The nature of the majors offered is described as general education and serves students by urging them to take
advantage of the diversity of a liberal arts institution. By combining the two recurring themes that emerge from Cannon’s published materials, the academic structure and educational offerings of this school are designed to send students to pursue graduate degrees and to prepare them for a wide variety of occupations.

The three males and five females that were interviewed were all second-year students, while one other participant was a professor with an academic advising role, and the other an Assistant Dean of Admissions. All of the contributors have already declared their major and/or minor and are therefore asked to reflect on their selection process and their career aspirations and expectations in relation to this choice. This study was conducted on the campus of the liberal arts college that these students attend. Each of the participants selected the actual location of the interview themselves to ensure a comfortable setting and were aware of their rights as participants prior to the start of the questioning.

The research questions of this study are most appropriately answered by qualitative research methods. In examining how students experienced the major selection process at liberal arts colleges, it is necessary to get in the field and to be close to the participants (Patton, 2002). The goal of the in-depth interviewing that this approach requires is to see how students analyze their choice of major “how they perceive it, describe it, feel about it, judge it, remember it, make sense of it” (Patton, p. 104). That is the very essence of this qualitative study. Closely related to the phenomenological approach, and beneficially complimenting is the heuristic inquiry (Patton, 2002). Such requirements for this type of investigation are the researcher having personally experienced the situation and for them to be intensely interested in the phenomenon (Patton). I experienced choosing a major in a liberal arts college and was interested in exploring the experiences of my peers. Therefore qualitative research served as the perfect avenue for findings the answers to my question. I was looking to explore how students choose their major out of the limited offerings at liberal arts colleges,
whether or not they struggled, and what their perceptions of their choice are and how this will affect them post-graduation. These are all reflective questions that I myself once considered and continue to ask.

The phenomenon that Patton (2002) describes was also found in the current literature. I was intensely driven by the fact that no literature currently exists which questions the link between undergraduate major and career path. My goal was therefore to challenge this academic norm, and to investigate my own notion that this link does not exist for students at liberal arts colleges (Palmer, 2006). This was in fact a “fundamental misunderstandings of the group under study,” both on the part of the literature and of the participants. However the extent to which this misunderstanding affected the students was only to be determined through interviews. Similar to what Palmer experienced in his study, the reviewed literature framed both my researcher identity and my research agenda. These were my influences to look further at the experiences and perceptions of fellow students in a similar situation as me.

In direct relation to this is Patton’s (2002) explanation for heuristic inquiry:

- The uniqueness of heuristic inquiry is the extent to which it legitimizes and places at the fore these personal experiences, reflections, and insights of the researcher. The researcher, then, comes to understand the essence of the phenomenon through shared reflection and inquiry... a sense of connectedness develops between the researcher and research participants in their mutual efforts to elucidate the nature, meaning, and essence of a significant human experience. (p. 108)

This is the specific method of theoretical tradition for which this inquiry is grounded. The significant educational decision of choosing an undergraduate major is in fact an ‘experience,’ and is therefore worth deconstructing for meaning and greater understanding, both on my part and on the part of the participants.

The importance of qualitative research to this study lies in the fact that it necessitates a close, hands-on approach to exploring the issue at hand (Patton, 2002). The philosophy behind qualitative research emphasizes that, as opposed to other methods, it holds immense value as a source of grounded theory (Patton). This theory, rather than being the result of surveys or laboratory work is derived from the real-world and the direct observations of researchers (Patton). Qualitative inquiry strives to examine the human experience holistically, and connects that which links us all: activities, behaviors, actions, interpersonal interactions, and organizational processes (Patton). These five categories transcend into all aspects of life and it is the job and purpose of qualitative inquiry to make sense of, shed light upon and accurately illustrate these for the reader.
As a result of the nature of this study, qualitative interviewing was the primary method of data collection. Initially I provided the same topics, subject areas, and questions to each of the participants to ensure a basic form of uniformity (Patton, 2002). As I continued my research at Cannon University, my interview questions changed to help ensure meaningful results. As I began to more clearly understand the group under study, new questions helped me to gather more data on what I thought I was observing as a theme and on what I had learned from the review of the literature (Agar, 1996).

The theme of strong parental influence emerged from my first five interviews, and therefore I directly asked all future participants the extent to which this influenced their choice of major. Early on in the interview process, second-year student Patrick mentioned how he is relying heavily on the reputable weight of the Cannon University diploma to assist him in graduate school entry and in the job market. This therefore became a question that I posed to all my participants, and was one of the main focuses of my interview with an Assistant Dean of Admissions. This question was not easily answered by all participants, as it asked them to juxtapose realistic pressures like academic performance, extracurricular involvement, and graduate school entrance exams to that which many students take for granted, their actual diploma. Discussing the complexity and challenge of loaded questions, Coles (1997) articulates the precise affects of such a question: “questions that have moral implications are harder to hear, are not so easy to answer, and, for any of us, persist long after they have been asked” (p. 51). However only a certain amount of planning and preparation can help to ensure a successful interview, marked by informative and useful responses. It was ultimately the probes and follow-up questions that were the most vital to this research as they prompted the participant for a deeper, more thorough answer than that which was first given (Patton).

Data Collection Methods

Each interview was transcribed and attached to basic demographic information about the participant: sex, age, class year, hometown, and race. Immediately following each interview, extensive notes were taken that reviewed how I interacted with the participants, how they reacted to my questioning, what the feel of the environment was, the quality of the questioning and response, and any and all thoughts. Most helpful was to simply write everything down, even that which did not seem immediately relevant. As Patton importantly denotes, the immediate time following an interview is the first stages of analysis.

Inductive analysis was used to discover themes from within the interview transcripts (Patton, 2002). This inductive method involved looking for themes related to certain key phrases regarding a student’s choice of major. Answers that began with “I thought that the major,” “I was confused by, I was frustrated by,” and “when I graduate” were all indicators of important emerging themes. As is done with
preexisting literature and research, the interview transcripts were coded for what Patton defines as “patterns, themes, categories, and typologies” (p. 462). This involved reading the individual transcripts several times before marking anything, and then defining certain responses by a categorical denotation. For example, all participant responses that included the notion that students were unsure of how their major would apply to their occupation, the code “major-vocational link” was applied. At the end of each transcript a summary and review of the important data was included in order to allow for efficient referencing of the interviews.

As a second-year student less than half way through my undergraduate academic career, I asked myself at the start of this research inquiry why anyone would take me seriously. I have neither conducted large-scale research in any sense nor do I have the credentials of an established researcher. Touching on this search for researcher identity, Agar (1996) approaches the problem from both angles. Just as bias must be removed from the study, this skill is something that is acquired with time and with experience. With that said, it was even more crucial for me to establish who I am as a fellow student to my participants and to explain what I want to do (Agar). In addition, I found it to be beneficial to share with my participants some of the literature research I had conducted, and of several themes that have emerged from already completed interviews. By doing this I had deliberately grasped a hold of the participant’s attention, interest in the topic, and had set the bar for the type of answers that were most meaningful to my research, the most useful for my final paper, and the most personally rewarding for the interviewee’s own reflection of the major selection process (Delgado-Gaitan, 1993).

In order to maintain a sense of comfort during interviews, it was imperative to present myself as a fellow student and not as an outsider. My attitude going into the interviews was equally as important as the questions being asked, as it framed for the participants my method, style, and position for inquiry (Coles, 1997). In that case, I was both being honest and presenting myself in a purposeful way that would make sense to my participants (Agar, 1996). However being honest needed to be regulated.

As a researcher, no matter how much of an insider I was, I could not affect the participants’ responses during interviews. When conducting research as an ethnographer, having the same ethnic background as those being studied does not place the researcher at a definite advantage (Delgado-Gaitan, 1993). The same can be said for this research project, as being a fellow student of the participants does not make me “more knowledgeable about the meanings of the participants’ feelings, values, and practices” (Delgado-Gaitan, p. 391). Therefore it was crucial to completely refrain from any of my own personal struggles with choosing a major and to remain open to the various experiences that interviewees shared with me. It was most difficult to avoid probing my participants in a way that affirmed my own presumptions about the topic. As a part of the discipline of qualitative
research, all of these tactics employed by insider researchers are used to produce meaningful and accurate results, and not to, as one may assume, to conduct neutral research (Delgado-Gaitan, 1993). What is instead important to monitor is how the biases that I have as an insider heuristic researcher affect my research; to see if they jolt into awareness, slowly emerge, or lurk unrecognized (Agar).

It was this sense of openness that allowed me to investigate further some of the patterns and themes that emerged from my interviews that may have otherwise been ignored. The struggles I experienced with choosing a major were, as I found, not by any means unanimously felt by all of the students whom I interviewed at Cannon University. As this became immediately clear upon starting the interview process, the most important thing was to not dwell on what I expected to find, as “the more you cling to them, the less you will understand about the people with whom you work” (Agar, 1996, p.100). In fact, several of the students expressed that they felt that anyone could find something of interest to study and declare as their major at Cannon University, and that the non-vocationally linked areas of concentration posed little problems to their selection. This was both a shock to me as the insider researcher, and a major finding. As is recommended by established qualitative researchers, I strived diligently to understand my participants and what they were telling me, and to explain to myself what these themes meant to my larger research questions (Coles, 1997).

Part of understanding my participants was assessing their level of understanding of the research topic and related information. By not pushing the participants to elaborate on any frustration or discontent with the majors offered by Cannon University that for many does not exist at all, I was not only remaining ethically just, but was also avoiding “exploiting the researched and constructing the researched as ‘falsely conscious’” (Palmer, 2006, p. 482). Many of the students were in fact well aware of what a liberal arts education entails prior to their enrolling at Cannon. Even more telling was that several students recognized that the undergraduate major only plays a small role in future career and academic plans. As Palmer cautions, I found a very small presence of a false consciousness amongst the participants regarding the limited correlation between undergraduate liberal arts degrees and future career and educational goals. Upon realizing that many students were in fact content with Cannon’s concentration offerings and were also aware of the meaning and structure of a liberal arts degree, I began to view my own experiences as an outlier. While my status as a fellow student did not change throughout the research process, I separated my experiences from those being described by the participants. This trend is common in qualitative research as Patton (2002) describes, and is echoed accurately by Palmer’s own experiences: “I began to detach my experiences from their experiences and in the process realized that, while the students and I shared some similar life experiences, we were different in many ways” (p. 490).

While I am not a seasoned researcher, my proximity to the research
topic and my ability to be reflexive all legitimize my qualitative work (Agar, 1996; Patton, 2002). Palmer (2006) defines the insider researcher as some who shares common language, experiences, and themes with participants of their study. These elements are both the foundation of my insider status, and the inspiration for this study. Are there any similarities of experiences, or recurring themes between people of the same language and background at Cannon University, in relation to their choice of major? Yet the researcher’s identity goes beyond background and language, and extends into approach and manner.

My voice as a researcher was crucial and involved balancing between being a fellow student and a fellow student trying to accomplish a research inquiry. This was a balance between being “credible, authoritative, authentic, and trustworthy” and being another student engaging in a regular conversation (Patton, 2002, p. 65). As a student enrolled in the same liberal arts institution as the participants of the study, I am both an insider researcher and a trustworthy investigator. The credentials are two-fold. My proximity to the setting of the research and to the participants is what grounds not only my interviews, but my analysis of the data and my conclusions and implications. My background as a white, middle-class male student at the predominately white Cannon University is the “initial framework against which similarities and differences in the studied groups are assessed” (Agar, 1996, p. 93). How do the influencing factors of other ethnically similar students compare to those that led me to a major in Educational Studies? I began to ask, and to research the effects of being white on the flexibility one has in changing majors, and to see whether or not my ethnic background allowed me to choose between the natural sciences, the humanities, and the social science divisions. While the literature provided somewhat satisfying answers to my questions, these larger questions pave the road for valuable future research on this topic.

Findings

The section focuses on the major themes that emerged from the interviews and from the documents. These included official Cannon University materials that are made available to students in the Office of Admissions, and the Handbook to Academic Advisers which faculty receive as a guidebook for advising students throughout their undergraduate careers. From the data analysis several major themes emerged: motivation through interest, performance, graduate school plans, major applicability, the value of the diploma received, and study abroad requirements.

In an effort to explore the major selection process for different students at Cannon University, students were not individually picked given their potential value to this study. Three males and five female second-year students were randomly selected for participation in
this research project. All of these students had already declared their primary major at the time of the interview, were either 19 or 20 years of age, and were actively enrolled students at Cannon University.

In addition, one professor with additional academic advising responsibilities was interviewed, as was an Assistant Dean of Admissions from the Office of Admissions at Cannon University. The emerging themes are discussed here.

Amanda: “It wasn’t interesting enough to keep me motivated”

Of the eight interviews that were conducted with students, each participant noted interest as a strong motivator in their choice of major. Geology major Amanda described at length how her waning interest in her courses triggered her switch from taking International Relations and Political Sciences courses to the major she ultimately declared. She as well as several other participants noted that many of their academic interests that flourished in high school either did not meet their expectations at Cannon University or proved to be not engaging. While many Advanced Placement history courses are taught out of the textbook and heavily emphasize dates, facts, memorization, and document analysis, courses at Cannon University were taught differently. Amanda went on describe her experiences with Political Science, “I just lost interest basically, I felt that the work load wasn’t worth it, it was just too hard, and it was like I was working more for the grade more than anything else.”

Expressing similar concerns about the nature of her courses at Cannon, Neuroscience major Kendra told me that while she always wanted to be a History major due to her life-long interest in the subject, “when I finally took a history class, it was really really different from what I thought it was going to be. The focus was a lot different. I definitely thought, like wow, this is not what I want to do.”

This was yet another example of how the style of the course being taught and the materials being covered caused students to explore outside of the department which they had initially thought would be their major field of study. Across all of the interviews that were conducted for this study, students quickly identified their interest in their major as a strong motivator for their choice.

Paul: “If I had had a poor performance, that may have stopped me from going into that major”

Through much of the interview process the subject of performance was repeatedly brought up on the part of the participant. Several students cited their grades as motivational factors for continuing with courses in a particular department. Similar to the quote above, other students like Paul inferred that had they not performed well in certain courses they would not peruses that academic area for their major. Kendra also described how her introductory Neuroscience professor encouraged her by telling her that she was “doing really well in the class,” and that naturally she should investigate it as her major.
Sociology and Anthropology major Candice provided the following answer for how she decided upon her concentration, “It was the one I did better in.”

While the connection between interest and performance is clear, it is a significant finding that students are equally motivated by the two in reference to their choice of undergraduate concentration. In several cases, satisfactory grades in courses can encourage students like Candice to further investigate that field of study.

Candice: “I don’t know, maybe graduate school. Not sure what I want to do”

The most consistent finding from all of the student interviews was an expectancy to enter graduate school upon graduation from Cannon University. However, there was a nearly unanimous uncertainty about the specific type of degree that is being sought by students, in addition to a wide variety of reasoning that was provided. With the exception of French major Jessica who has concrete plans to enter law school upon graduation and Neuroscience major Adam who is working directly towards medical school, all other six student participants are unclear of the details of their future plans. Sociology and Anthropology major Daniel said in an interview that he plans to go to graduate school, but when asked for the nature of the degree he is seeking, he said “I’m not exactly sure, I haven’t really been informed.” During my interview with Paul, his idea of continued graduate and professional education was even more vague, citing that law school was a possibility, but in general “I’m not sure about that.” Second year students Amanda and Kendra both reiterated this uncertainty about the specifics of the graduate degree that they seek, but were both confident that this degree was both necessary for success, and a personal goal and requirement.

While Kendra laughed at the question of what type of graduate schools she was looking at, Amanda elaborated that “my entire family and everyone [I] have know have all at least gotten their masters.” Her motivations for seeking the graduate degree are evidently clear, however in relation to the nature of her future studies, “That’s still up in the air, but I just know I should probably get [a] masters at the least.” Compared to the literature reviewed, this finding is significant in that none of the current discourse on the distinct motivating factors of major choice rate the seeking of a graduate degree high on a student’s agenda. However taking an additional look at Cannon University’s student catalogue, this parallel is clear: “it [academic offering] is structured to provide a well-rounded liberal education and to prepare students for graduate and professional schools.” This mission statement proves to be both effective in its purpose, yet provides little direction for students.

Amanda: “I knew that she would have been really upset if I were one those kids who were like, “I want to major in art and music””

The influence of parents on a student’s choice of major is clear in both the literature and in my findings.
However the extent of the influence of the persuasion is vastly different in magnitude. While the reviewed studies found similar conclusions, the percentage of participants that cited the influence of their parents in choosing their academic concentration was significantly lower than that which was found through this study (Beggs, 2008; Chung & Others, 1996). These studies noted 4% of participants citing their parents as an influence, while every one of the student in this study mentioned that they were to some degree influenced by them.

As students expressed to a certain extent that they looked for real-world applicability in their majors, many did elaborate extensively on the fact that their parents were concerned about whether or not their major would be useful. Kendra presented two conflicting arguments that her parents gave to her, further highlighting the feeling that students get regarding how important the choice of major is: “My parents have always told me that I should do something first and foremost that I enjoy” but that they were also saying “you need to get a degree in something that is going to be useful to you in the real world”. For this particular student, this duality led her to change from a Psychology concentration to Neuroscience, as she felt that that it was perceived as more challenging by employers and was more “specialized”. As an academic advisor in the Educational Studies department, Professor Brittany Roland confirmed what the students were describing, saying that student are “very constrained by their parents... the biggest opposers to educational studies... they say I didn’t spend all this money on your education for you to go out and become a teacher.”

While Daniel seems to have plans of directly integrating his Sociology and Anthropology major into future work, he discussed that he in several ways agrees with some of the hesitations his parents have expressed with his major choice. As he explains, “my parents think the Sociology and Anthropology major is not really a useful major, like there’s nothing, not a big market for that type of education that you get, very specialized.” His tone and demeanor during this part of the interview strongly suggested that he found truth in this assumption about the perceived usefulness of his major, but soon after reassured that “I’m interested in it. So it more fits my interest right now, and I’ll figure out later on the [nature of] work.” Again he emphasizes the importance of interest in his subject, but in connection with the lack of clarity he has about future work plans or continued education, he may in fact benefit from academic and career advising, assisting with paths that he hasn’t “really been informed” about.

Looking at how this study came to be through my own struggles with my parents and myself switching from a Biology and pre-med student to an Educational Studies major, second-year Paul mirrored my major choice process the most closely. Like many other students, Paul entered Cannon with little to no idea of what he was going to major in, other than it “wasn’t going to be science or one of the regular sciences”. Through his first-year seminar course and the ability to explore numerous
departments early on in his undergraduate academic career, Political Science emerged as something that “sounded interesting, a little bit more relevant to the world [than English], and the job market, but more hard knowledge, what actually goes on”. In comparison to his second major English, Political Science was the most useful major in both his own eyes and in those of his parents. In reference to the influence and reactions of his parents, “I will admit that my dad really didn’t like the idea of being an English major. He actually had a hard time accepting the whole liberal arts program in general”. As a result he says that he took more Political Science courses, telling his father about “the more real world stuff”, but nonetheless encountered resistance in reference to his other English interests as his father “was trying to convince me that the English major wasn’t applicable”.

Paul’s experiences with choosing a major and his summary of the influences that steered him in the direction he took stand out as an outlier in this study. While my own experiences led me to investigate if this was in fact the norm on Cannon’s campus, the interview process in its entirety showed this to instead be a singular occurrence. However the misunderstanding that Paul’s father expressed about the liberal arts program is an additional avenue that was explored in this study.

Daniel: “I kind of knew that most liberal arts colleges had the humanities and the sciences”

From the review of the literature it is clear that a gap exists in research that evaluates students’ understanding of the structure of a liberal arts curriculum prior to the start of their undergraduate education. As is noted in Cannon University’s faculty guide to academic advising, during the summer of transition between high school and college students receive a plethora of course-related materials that they are largely left on their own to discern through. However a pre-first-year academic advisor is available to assist with questions, although this guidance is done through either telephone conversation or e-mail. The student and parents themselves do the initial course selection process on their own, and are then offered more personal advising through the First-year Seminar Program upon their arrival as first year students. Looking to explore the major selection process in an all-encompassing major, I then sought to explore whether or not students understood what a liberal arts education meant in terms of academic offerings and requirements for graduation.

None of the students expressed that they were completely surprised by the structure of academic programs at Cannon University. Assistant Dean of Admissions, Kimberly Ringhart provided that “a lot of people who come visit are already self selecting whether they are looking for a school that has more vocationally geared majors or they really understand what liberal arts is all about.” In accordance with her remarks the students whom I interviewed reiterated this referenced understanding of the liberal arts curriculum, many saying that they only visited this type of college during the college selection process.
Mathematical Economics major Morgan said “Yeah, I wanted that. I knew about the CORE curriculum.” Cannon’s CORE set of courses consists of two specific required classes that students must take by the end of their second-year, in addition to one course in both the Scientific Perspective and the Culture areas.

Morgan was not alone in her understanding and contempt with the CORE requirements with several other students emphatically lauding the parameters. When comparing the liberal arts university to those without similar requisites, Kendra provided that “I knew about ours [CORE curriculum] at least…I think it’s a good idea, but I definitely think its better to have these than to have just general education requirements. I like what we have”. Also aware of the foundations of a liberal arts college, Paul said that he does not at all feel constrained by the requirements and that “I actually thought that the CORE requirements here [Cannon] were less strict than the other schools I looked at”. A clear understanding of a liberal arts education sheds light upon the general satisfaction that students express with the academic offerings at Cannon University, however this in it of itself is a significant finding given research that suggests students have little idea about what to do with a liberal arts degree (Jacobus & Pennsylvania State Dept, 1973). Students do in fact seem to have at the very least a basal idea of what to do with their liberal arts degree, and as some like Alexander noted, “majoring in the liberal arts gives you so many different classes that we all know a little about. It gives you everything”.

Candice: “I wasn’t looking for something specific to a certain vocational field. I’ll figure it out eventually.”

While it is expected that not all students have a concrete idea of what they want to do with their futures, several students expressed that they were pleased with the non-vocational link of Cannon’s major offerings. This comfort in uncertainty about in what direction to take future learning or by what career path to explore emerged as a theme from many of the interviews across all academic disciplines. Kendra explained that the undergraduate degree “primes you for what your interests are, what you’re going to focus on as an adult in your career”. Daniel echoed this point by saying that “the major is kind of a base”, as did Candice in saying that “I’m not sure what I want to do with my future”, and therefore does not view the major as a commitment to a certain job or future area of study.

Expressing a preference for the variety of majors that do not prepare students for one particular line of work, Morgan said that “I kind of like that. I don’t know what I want to do at this point so I find that it helps me to explore. I can go into more fields with economics rather than something more specific, and then only to find out that I actually don’t like it.” The value of this statement lies in the fact that her Mathematical Economics major is perhaps one of the more specialized offerings at Cannon, yet she still views it as a launch pad for a host of different careers. This response and others shows that the students at Cannon utilize the
school’s major offerings in a way that prepares them for any field of work, allows them the option to enter any number of graduate schools, and is not restricting in that it does not limit them early on for careers they are unsure of the specifics of.

Kimberly Ringhart: “having the Cannon degree is definitely a big factor for a lot of people out there in the work force.”

Internationally known as a leading liberal arts institutions that prides itself in its emphasis on undergraduate research opportunities, state of the art resources, and a hugely successfully alumni base; Cannon University students know that they are at an advantage when it comes to future aspirations. As Assistant Dean of Admissions Kimberly Ringhart attested to in the quote above, the Cannon University diploma does in fact weigh heavily in many hiring situations in the work force. What emerged as a theme was students relying on the importance and weight of the ‘Cannon diploma’, which in some cases neutralized the students’ concerns of future plans. When asked if not having a specific Business related major would impede her entrance into top Business schools, Morgan replied that “no, coming form Cannon I don’t think so. Having a Cannon degree matters more.”

With clearly defined plans to enter Medical school upon graduation, Neuroscience major Alexander happily noted that “the fact that you graduated from Cannon says a lot”. Paul not only laughed at the fact that he is hoping that the Cannon diploma will give him an edge over others when it comes time for graduate school applications, but also explained that “if I had gone to one of my safety schools, I would feel less pressure in order to go on to really make something of myself, or make as much money”. For students like Paul and Morgan, a balance is being maintained between being academically successful and relying on the prestige of their undergraduate education to advance them further in both academia and the professional world.

Morgan: “[going abroad] was my main motivation for the major.”

A completely unexpected finding that emerged from this study was the influence of study abroad course requirements on a student’s choice of major. With plans to attend Law School following graduation, French major Jessica provided that her choice of major was nearly entirely a result of her plans to study abroad. Her parents had strongly encouraged her to study oversees for her entire Junior year, just as they did, and therefore she says “I decided to major in French because I knew I was good at it and I knew I wanted to go abroad”. She also noted that having previous high school experience with French has aided her in receiving good grades in French, and also recognized that law schools look closely at academic performance when considering students for admissions.

Mathematical Economics major Morgan described that her changing from a German and Economics double major to one concentration in the latter field of study was solely based on her not
being accepted to a study abroad program. After taking several German courses, she viewed the major as the natural course of action to take, but “I’m not going abroad anymore... If I was going abroad I would only need two more classes for the major, so why not?” For both of these participants the study abroad programs that Cannon offers, an option that 68% of its students exercise, provided a form of motivation for them to pick a certain concentration and additionally served as a long-term advisor in that the programs dictate specifically which courses a student is required to take in order to be eligible for acceptance.

Amanda: “I can definitely see parts of it [major] in my everyday life.”

These findings suggest that students have a substantial understanding of what the liberal arts education entails and that they are not generally concerned about competing with student from more specialized universities. However there exists a lack of unity between students on the ability to, or level of understanding related to, applying one’s field of study to graduate education or the work force.

Sociology and Anthropology major Daniel said that while the specific major one chooses is not extremely crucial to their success, it differs by department:

“It depends on what kind of major you’re into. If you’re into like Biology or Chemistry or Pre-med stuff, you’re pretty much set on where to go. But others like humanities, like Education, you can do whatever”.

The physical science majors that Daniel are referring to affirm his presumption that they have a clear direction of where to go. Neuroscience major Alexander who told of life-long plans to be a doctor detailed clear plans of what courses he was going to take at Cannon in following with Medical school requirements, and also about hopes of becoming a neurosurgeon. He explained that his major was a natural fit because six out of the eight courses that Medical schools require undergraduates to take are included in the Neuroscience concentration. Shedding light upon his peers with less concrete future plans, Alexander answered the question of how important one’s choice of major is by saying:

“I don’t think its that important, well if your going to graduate school I don’t think it’s important at all. If you are not going to graduate school, then I guess it is more important because it shows what you are specializing in. But even though I don’t think any major looks bad”

With little direction in future plans and only the knowledge that she should “probably get [a] masters at the least”, Amanda’s also displayed a limited understanding of what role Geography would play in her job later on. While she did suggest, as quoted above that she can see her major playing a role in her everyday life, her understanding seemed to be a work in progress:

“I know I can take it into a million different direction if I want. But I still really haven’t given too much though about it, and no one really has told me what business there is for it, but I don’t know. All I know is that I’ve been told
“don’t worry, you’ll be fine,” and that’s enough for me to be “all right, ill choose this”.

Although these students were diverse in their thoughts of the level of importance of major by subject area and attendance in graduate schools, some participants were able to draw direct connections between their major and what they aspire to do in the future. Paul broke down his two majors: “I think they’re both helpful [with law school entrance]. English is thinking abstractedly, and applying knowledge in writing. And political science has to do with law on a larger scale.” Morgan was confident in her choice of Mathematical Economics for not only entrance into Business school, but also because “especially because of our current times, I think it’s really important and useful to understand what’s going on in the world”. While Morgan related her major to current events, Kendra specifically said that her switch from a Psychology major to Neuroscience “gives you a lot more opportunities to do different kinds of research and it opens more doors” based on the fact that “you get a lot more of the cellular and the scientific aspect…gives you a lot more opportunities”.

A lack of understanding persists amongst students regarding how or if their major will relate to their future job plans. While certain physical science majors are well on the path to Medical school, others are uncertain about in what direction to take their studies. The issues regarding the push towards graduate schools is expanded in this finding as students are unclear about if continuing onto higher degree programs is either connected to or necessitated by specific majors that these schools do or do not seek.

Kendra: “I have a good relationship with my advisor, he’s also my professors, I feel comfortable talking to him.”

As part of the interview process, students were asked to reflect upon the nature of academic advising that they have received thus far as a second-year student. All participants who were asked this question noted that they have a positive relationship with their academic advisor, and in many cases these faculty have encouraged them to go in specific directions when it comes time for course selection. It is clear from the interview data that the type of advising that occurred was all based on course selection, and not on career planning or exploration.

Paul reflected on a lasting impression left by his advisor who said that “if there’s an interesting course and taking that will stop me from fulfilling requirements for the second major, I should take the interesting course”. Both Amanda and Kendra saw their advisor as a tool for future job connections, recommendation writing and for the scholarly contributions to their field. Amanda elaborated on the advising process by saying that “at the end I need to have the advisor with the most prestige, because if it came to writing letters of recommendation or even for like hiring me, that definitely weighed in”.

The limited nature and productivity from the advising that occurs at Cannon University is a major
finding in that it helps to explain the wide variety of topics that were left open by students in this research inquiry. Uncertainty about the applicability of their majors, the type of graduate school they hope to attend, the integration of their major to different job fields, and options for employment immediately following graduation are all facets of the undergraduate education that if informed about, can help students start taking a more in-depth and educated look at their goals and aspirations.

In many aspects the findings closely mirror the overarching theme of the literature review: assortment. Just as scholars have provided numerous reasons and motivations for students choosing their major, my data also shows a wide variety of reasons that affect this choice. While the findings do differ from those of the scholarly research that has already been done, it is vital to consider the larger implications that result from students having such varied experiences.

**Conclusion**

**Discussion**

To fully understand and to grasp the importance of the findings of this study it is imperative that the context be brought back into the specific setting of the liberal arts university. The review of the literature frames the results of this qualitative study appropriately as it left me with many questions regarding the college major choice at a liberal arts college, and also eager to see if from the data there would emerge similar conclusions that the host of established educational researchers have found. Most probing was the conclusion made by Pascarella and Terenzini (2005) which stated that not only is the college major a crucial choice that students must make, but that it also plays a consistent role in one’s career path. In the specific language of Cannon University, I looked towards the school’s published literature for a more localized framework of the study using all of Cannon’s official documentation surrounding the undergraduate major. In summary from reviewing materials from both the Admissions office publications and Career Services booklets, it is factual to conclude with two findings: students at Cannon University are being prepared to enter graduate school and that ultimately, many of them are extremely successful in an outstanding array and plethora of careers and industries. It is in this context that the findings are discussed.

Leading back to the motivation for this research endeavor, I find it hugely significant that upon entering the university, students were all aware of the nature of the majors offered at Cannon. As opposed to the frustration I felt when looking to find a major that I could immediately see being useful in the job market, the student participants did not echo this feeling. Several even said that they enjoyed the non-vocational majors because it helped them to explore various fields of study. They felt that the 51 majors that are offered to students at Cannon have the ability to serve all students no matter their interests or career goals. The largest issues were not they could not find a major that suited their interests and expectations, rather that they could not say how or if the major was important to their overall success.
In relation to the literature that exists on student choice of major, these findings also hold sizable importance. The void that I noted which exists is in part filled by this study. None of the current research goes as far as to question if there is always a direct link between undergraduate major and career. However these findings prove that students at liberal arts colleges understand that they will not necessarily enter the work field in a position related to their major, and that as opposed to the reviewed literature, this does not decide in what direction their life will lead. The research surrounding gender is also challenged in this study given that neither males nor females cited advantages that their major holds for future career advancement opportunity as a significant motivating factor (Goyette & Mullen, 2006; Horn & Zahn, 2001; Leppel, 2001; Leppel et al., 2001). Connectedly it should be reiterated that most participants did not know the nature of the careers they are seeking.

There are several consistencies in the findings that highlight the influential factors for students choosing their major: hoping to enter graduate school upon graduation, influence and pressure from parents, and motivation by interest in the field of study. This alone is significant in that while they clearly stand out as significant findings due to the amount that students discussed them, none of the reviewed literature focused on such parameters. While this may be due to the fact that motivation through interest and parental influence seem like obvious influencing factors, they are important parts of the decision making process that have played a significant part in how and why students declare the major that they do.

The importance of the results lays in the variety of answers that I received from students on why they ultimately chose their major and what led them to this decision. The spread was huge: performance, vagueness of the major, applicability of the major, usefulness for research, law school admissions, medical school requirements, ability, study abroad requirements, the market value of the Cannon diploma, parents, advisors, faculty. The sheer number of factors that influence a student's choice is outstanding, as were their varying levels of understanding regarding key issues. Significant educational choices and life goals held hugely different importance for each student, as did their clarity of what they mean. While every student expressed interest in graduate school, the reasons for doing so spread from concrete life goals to vague perceptions of its importance. The assortment of responses that students provided is extremely telling as to how for many this is an extremely difficult decision that represents the culmination of countless aspects of their life-long educational experiences.

Just as the broad selection of motivating factors is significant, this entire study is important because it shows that most students have never been asked to reflect on the path that led them to their major. During the interview process I would often hear from my peers that “that’s a very interesting question” when I asked them to evaluate exactly how important the decision is to their education and to their career goals. Additionally, when
observing the student providing answers in the interviews it was evident that they were developing their answers as the interview went on. Several of them would think of additional comments to one question while in the process of answering a completely different one. Therefore it is my conclusion that the overwhelming importance of the findings is that there is a huge inconsistency in how students are being advised. They are told that the undergraduate major is important, but not told in what way or given concrete recommendations for evaluating their choices and decision.

Implications

As stated in the introduction, this qualitative study has not only the ability to inform educators, but also students. By reflecting on the major choice process that has evidently been influenced by a large number of angles in their lives, they can start to develop answers to larger question. It was clear that many students were left after the interview to begin to answer, for example, “why do I want to go to graduate school, and to study what?” Several participants approached me in passing days after the interview and told me that they thought our conversation reminded them to start thinking about summer internship plans, and to reach out to their advisors and career services about planning for the coming years. The findings are important as they closely and accurately depict the uncertainty that students have about their future plans, and about the role that their undergraduate education plays in achieving these goals.

College is a critical time for students, and a privilege that many students are not given the opportunity to experience. As a result it is expected that as high-achieving learners, we begin to forget about why we are in school. The findings show that many of us have only a faint idea of where we can and want to proceed academically and vocationally. While I am not suggesting that students have a firm idea at all times of what they want to do with their lives, I am suggesting that this type of conversation should be facilitated before senior year when interviews begin for jobs and applications are filled for graduate schools.

This therefore brings me to the overarching goal of this discussion. This research must be read by each of the individuals that students cited as people who led them to their choice. Professors should be informed that when they compliment a student on their performance in a class, they in some instances are encouraging them to major in that field. Conversely, when professors present material in entry-level courses that does not have even a basal connection to material covered in high school classes, they are discouraging students from proceeding further in that subject area. Administrators should and can be informed through this research that when they advertise Cannon University as a prestigious liberal arts college that serves to prepare students for graduate and professional studies, students are not given reasons as to why or in what fields they should continue their education. Lastly and most significantly, academic advisors must know that their role has the ability to
have an enormous influence and informative role in a student's choice of their undergraduate field of study. By not providing this role to students, they are in turn prohibiting their students from being told about certain key aspects of the liberal arts education that can make their major choice both easier and better informed.

Suggestions

“The academic adviser can help in the process of declaration by discussing with the students the relationship of the concentration program both to the Cannon curriculum as well as to the academic interests of the individual students.”

-Cannon University handbook to academic advising

As I think back upon how I switched from hoping to be a pre-med Biology major to an Educational Studies concentrator, I reflect on information that I was told along the way. In a career services workshop, I was told that graduates from Cannon University are prospering and succeeding in every job field and are highly valued for the rigorous education that they received as an undergraduate. During an Educational Studies informational luncheon, several faculty informed me that graduates from their department go on to not only be teachers, but have entered the Business field, financial services, health-care, and law professions to name only a few. At an alumni networking event I was told by several graduates that when it comes to graduate school applications, academic performance and grade point average are considered to be hugely more important to admissions officers than the particular major the student choice. These were all extremely crucial experiences that helped me realize that being an Educational Studies major did not guarantee that I would become a teacher, or prevent me from receiving a higher level of education in a different discipline. Central to reviewing these experiences is that none of this information came from my academic advisor.

The faculty advisor that students at liberal arts colleges are assigned to upon entering the university must begin to facilitate the type of informed discussions that occurred throughout this qualitative study. They should inform students that exploring different departments is a way of exploring and sparking one's interests. First-years should be afforded the knowledge early on that the undergraduate major does not define their career path, nor does it predetermine what type of graduate education they can pursue. Academic advisors should have more than one or two schedule appointments with each of their advisees in order to play a more useful and constructive role in their student’s academic lives. All of the conflicts that the participants in this study described could have been discussed and resolved in an educated manner with the help of their advisers. Career services events and department luncheons should not serve as the main arena for which students learn under which parameters and guidelines they should choose their major. The academic advisor is a universal tool that all
students are given, and specifically in the liberal arts setting, should be used to its fullest extent by actively exploring the ever-changing interests, thoughts, and questions that new college students have.

In order to substantiate this suggestion future research should be done to more closely examine the role that advisors play in informing students about their academic options. Specifically in the liberal arts context, this research can explore how important faculty feel their role as an advisor is, and to see if they understand the influence that they have upon students choosing their major. In doing so these faculty members can also be shown more evidence which necessitates that their role become more useful and informative for students. An additional avenue for future qualitative research is to explore students’ perceptions of their academic advisors. This can help inform administrators of whether or not the academic advisor is the most effective tool for students, and will perhaps facilitate discussions on suggestions for how the liberal arts university can better inform the student body about all aspects of their undergraduate majors.

Limitations

The most significant limitation of this research is its scope. By qualitatively examining more of the student body, some of the other aspects that emerged from the review of the literature could be reviewed to see if they hold applicability in the liberal arts context. Surveying students on a larger scale for trends in race, class, and gender could show if for example, the race related findings of Horn and Zahn (2001) or Goyette and Mullen (2006) still hold true at liberal arts colleges. Additionally limited by the size and scope of the survey was the opportunity to test Holland’s theory of personality-fit. As Porter (2006) explored the link between six personality types and the majors that those students choose, without more time and resources this project could not fully investigate this theory’s applicability to institutions like Cannon University.
Bibliography


Black Identity: the Road to Emancipation and the Formation of a Black Culture within Upstate New York

By Bianca Gross, Class of 2011

The time period of the American Revolution, beginning in 1776, sparked an ideological awakening within the British colonies of America. “The struggle for liberty, Adams suggested to Jefferson, 'was in the Minds of the People, and this was effected, from 1760 to 1775, in the course of fifteen Years before a drop of blood was drawn at Lexington.’”

In the strokes of Thomas Jefferson’s pen, this founding father put into words the political ideology that had been on the minds of the American people for decades. As stated in the Declaration of Independence, the American colonists desired to become their own separate nation apart from the monarchical authority of Great Britain. In the Declaration of Independence, Jefferson articulated the concerns of the American people by stating that “all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty, and the pursuit of Happiness.”

Jefferson continued by stating that the English government had neglected to respect the unalienable rights of the colonists, and thus the American people were forced to sever ties with the English crown. Through his words, Jefferson was declaring that Americans were being denied their rights as English citizens. Therefore, the American colonists would build a new nation based on the ideals articulated in the Declaration of Independence. A common rhetoric used by colonists in order to proclaim their need for separation from the crown was that the Americans were slaves of the English monarch and needed to be free.

Despite this ideology of freedom and equality for all, slavery continued to thrive and was a crucial entity of the United States economy. This ideology, expressed by American colonists, was not lost on the blacks of America. Many blacks took up the call to fight for the Patriots or the British in order to obtain their freedom. In the years following the American Revolution, slaves attempted to establish their own identity and society in the midst of a world that subjugated them and deemed them inferior beings. Although the American Revolution ended in 1783, the battle for Americans, both black and white, to end slavery had just begun. The fight for blacks to establish a unified black identity continued up to the time of the Civil War and beyond.

Although the American Revolution did not free any black slaves, the War of Independence made Americans consciously consider the issue of slavery. “Jefferson’s Declaration—not only led

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many masters to question their ownership of slaves but also strengthened the hand of the enslaved themselves by creating an ideological context which they could advance their demands for freedom."  

Enslaved Americans had never accepted their condition, but now, with the stroke of Jefferson’s pen, slavery had become a national ideological issue. Blacks residing in the American colonies had never been passive participants in the slave system, and at times had revolted or preformed some form of behavior that went against the will of their masters. The War of Independence, as Douglas Egerton asserted, gave slaves both an ideological context but also a political forum to argue their desires for freedom. Through the propaganda of the Revolutionary War, white Americans had given their slaves a language of liberty that they simply could not ignore. Coupled with the formation of anti-slavery sentiments by white Americans during the War of Independence, the experiences of black slaves came to the forefront of American culture. The ideology of the evils of the slave society allowed Americans to view blacks as human beings and simply not as tools. In New York, black identity was in the early stages of its formation and was being expressed through newspaper articles and anti-slavery societies. Following the American Revolution, black slaves in New York began to forge their own culture separate from their white counterparts through the use of language, vocational skills, and family structure, despite their continued subjugation.

The anti-slavery movement spread throughout the United States in the years following the American Revolution due to the formation of an American ideology of freedom and equality. In the Northern region of the United States, white Americans were divided in regards to their beliefs on slavery. In New York State, slavery was an essential element of their economy. In contrast to the Southern states, slaves typically served as servants in the homes and farm hands on the land of Northern elites. Other male slaves, especially in urban, coastal areas such as New York City, worked in the harbor, handling goods delivered to these cities on ships. Due to the fact that black slaves were not working long hours of backbreaking labor on plantations, many Northerners created the master myth that slavery in the North was truly a positive entity in the lives of black slaves. “The myth functioned as a defense of the institution, deflecting the main thrust of antislavery criticism and almost certainly delayed the passage of an abolition bill."  

Through the creation of this myth, Northerner whites were given the privilege of condemning the institution of slavery in the South, while maintaining the presence of slaves within their own state. “Though the farmers, professionals, artisans, and merchants of this area were the heaviest users of slave labor in the North, New Yorkers simply

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133 Egerton, 43.
134 Egerton, 63.
could not see a connection between their own benevolent version of slavery and the institution excoriated in anti-slavery tracts.\textsuperscript{136} Although many New Yorkers would advocate ending slavery in the United States as a long-term goal, few desired to emancipate slavery within New York.

One of the most revealing areas concerning the anti-slavery sentiments of white New Yorkers can be seen in Albany, New York. The Albany area had a significant number of slaves working as both domestics in the home and as field hands. Along with this thriving slave society, individuals in this area, similar to other white Americans, were captivated by the anti-slavery sentiment expressed in the shadow of the American Revolution. Despite this anti-slavery sentiment, white individuals in Albany still desired to maintain the institution of slavery within their own community. This contradicting ideology can be in newspaper articles written in this area that stated the cruelty of slavery within the South, but also published runaway and for sale notices of black slaves. Therefore, the Albany area illustrated both the anti-slavery sentiments expressed by white Northerners as well as the desire of these Americans to maintain the institution of slavery within their own states. The emergence of an anti-slavery movement in Albany allowed for the beginnings of a black identity to be forged. As seen in the Albany newspaper advertisements, black slaves within this area had began to establish their own language, had a variety of vocational skills, and were establishing their own family structure. Therefore, the Albany area represented the contradictory nature of white anti-slavery sentiment in New York as well as illustrated the emergence of a black identity in America.

Anti-slavery sentiments and white sympathy for blacks in Albany was expressed towards slaves in the South within their newspaper articles. An article in the Albany Advertiser on December 11, 1816, articulated the cruelty that white slave hunters used in order to round up a band of runaway slaves in Pocosin Country, Virginia. The writer stated that dogs and guns were utilized in order to disband the Negro camps that had emerged within this area. The party of slave hunters claimed that these Negro runaways were working as farmers and placing a strain on the white yeoman farmers in order to justify their use of cruel treatment towards these runaway slaves.\textsuperscript{137} The writer described the cruelty used to disintegrate these Negro camps with horror but failed to see the connection between these Southern runaway slave hunters and the hundreds of runaway slave notices published by this writer’s paper. Another article published in the Albany Advertiser on August 8, 1816 spoke of the runaway slave notices printed in Baltimore, Maryland\textsuperscript{138}. This article condemned the way in which all blacks were being captured and imprisoned in the South for the crime of being runaways. The author believed it was a crime to imprison all blacks simply

\textsuperscript{136} White, 80.

\textsuperscript{137} “Edenton, (N.C.),” Albany Advertiser, December 11, 1816, News/Opinion, New York

because they could not prove the legitimacy of their freedom. Both of these articles all published in Albany truly illuminated the sentiment of white New Yorkers. Despite the fact that these newspapers published countless runaway slave notices and for sale notices, which illustrated the desire to preserve slavery within Albany, these writers openly expressed anti-slavery sentiments and condemned the institution of slavery in the South.

Although anti-slavery sentiments were expressed openly in newspaper articles and among some white individuals in New York, little effort was made within the state to eradicate the institution of slavery. The only white New Yorkers who truly attempted to improve the lives of blacks was the members of the New York Manumission Society. This society was formed in 1785 by the congregants of the Church of England and the Society of Friends. The New York Manumission society was largely organized by prominent white elites of New York such as John Jay, Judge James Duane, and Senator Rufus King. The society served several purposes which included attempting “to persuade slave owners of the ‘injustice and Cruelty of their former conduct’” and to articulate the virtues of the emancipation of slavery. The society also strived to pursue lawsuits against kidnappers of slaves and interfered with the selling and purchasing of slaves. The New York Manumission Society strived to advance the lives of enslaved and freed blacks due to their religious principles. These beliefs consisted of anti-slavery sentiments based on the biblical ideology that God created all men equally in his image and thus no human being should remain in chains. Therefore, the New York Manumission Society believed that slavery was an evil in American society and thus the emancipation of slavery should be undertaken. The New York Manumission Society improved the lives of freed blacks through the establishment of schools in order to integrate these individuals into the folds of the United States economic system and to make them productive members of American society. All blacks were allowed to attend these African schools and it was funded through the philanthropic contributions of the Manumission Society members. These African schools were extremely successful in educating blacks in specific trades such as carpentry, blacksmithing, etc. Due to the success of this vocational education, many of the black students were admitted into apprenticeships with various companies in New York City.


140 Hodges, 166.

141 “An Address delivered by a member of the manumission society” (Knoxville: Heiskell & Brown, 1817).


Despite the success of the New York Manumission Society in improving the lives of blacks, slavery continued to have a significant presence in New York. Many of the key members of the society owned slaves themselves and thus were hesitant to call for the immediate emancipation of slavery. As Shane White articulated, “from its inception the society backed away from confronting the institution head on in New York, being content instead to try and improve the lot of New York free blacks and of slaves within the existing system.” The official goals of the society, which included eliminating the cruelty of slavery, improving the socioeconomic status of freed slaves, and to interfere in the kidnapping and selling of slaves, illustrated the true intentions of the New York Manumission Society. These goals were concerned with improving the nature of slavery itself and were not concerned with eliminating slavery. Coupled with the fact that many society members owned slaves themselves, it can be asserted that the New York Manumission Society viewed the emancipation of slavery as a long term goal for America as a whole. These members had no desire to immediately end slavery within New York rather they desired to improve the lives of slaves within their subjugation. Thus, the New York Manumission society illustrated the contradictory nature of anti-slavery sentiment in New York during this time period. Similar to other New Yorkers, the society condemned the cruel nature of slavery but had no desire to eliminate the institution of slavery completely within New York State. Therefore, this society dedicated to the emancipation of slavery did not attempt to immediately emancipate the institution of slavery within New York.

On March 31, 1817, blacks won a small victory on the road to the emancipation of slavery within the United States when the Congress of New York issued a decree of Gradual Manumission. The Congress of the United States had enacted a law in 1784 which stated that no slavery or involuntary slavery was to continue in the thirteen colonies after 1800. Despite this legislative action, many states chose to ignore this document and continued participating in the practice of slavery on the basis that the Federal Government did not have the right to dictate the actions of the states. Due to the failure of the United States Government to eliminate slavery within the thirteen colonies, many states chose to write their own policy of manumission including New York. Adopted in 1817, the “Act relative to slaves and servants” stated that after July, 4, 1799, all black slaves born in the United States shall be bound to their master till they complete their term of service. For males, the age of completion was twenty-eight, and for females, twenty-five. This act also stated that slaves taken by masters to oversee the needs of the master’s child would be bound to that child till they reached the age of eighteen. According to this law, the slave trade was banned in New York; however, this did not mean the end of slavery in New York. Slaves were still bound to their masters and could not leave without permission. The New York Manumission Society worked to improve the lives of slaves within the existing system, but their efforts were limited by the fact that many of their members owned slaves themselves.

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144 White, 81.

however slave masters were allowed to travel freely with their slaves within New York State\(^{147}\). Although the “Act relative to slaves and servants” was created in order to free slaves, this gradual manumission had little effect in freeing blacks immediately. Slaves were still legally bound to serve their master till they completed their term of service and any slave born prior to July 4, 1799 only gained freedom based on the graces of their master. The Gradual Manumission illuminated the contrasting nature of New York anti-slavery sentiments. By limiting the amount of slaves that could actually obtain freedom, New Yorkers were legally permitted to maintain the institute of slavery. New Yorkers criticized Southern states for their cruel treatment of slaves and their continuation of this American evil. However, very few New Yorkers were willing to give up their own slaves.

Based on both the sentiment of white New Yorkers and the legal documents published by the New York Congress, blacks within the state had few civil liberties. Due to the fact that most blacks were working as slaves within the homes of white New Yorkers, most slaves had little to no contact with other members of their race and thus were unable to form a strong black identity. “The small holdings and familial nature of slavery- combined to fragment the slave family and to hinder the development of a slave culture.”\(^{148}\) Slaves were encouraged to become more Americanized and more like their white counterparts. By fostering an American identity, black slaves had a difficult time establishing their own identity within New York\(^{149}\). In general, freed blacks relied on the goodwill of white New Yorkers such as the New York Manumission Society, in order to better their lives and to increase their socioeconomic status. By relying on white elites, blacks were hindering the establishment of strong community bonds within their own race and becoming more integrated within the American culture. The majority of information that can be found concerning black identity was located within runaway notices. These notices illuminated a black culture that was beginning to develop in upstate New York as seen in the diversity of language, family units, vocational skills, etc that blacks established despite their subjugation.

One of the means in which black slaves formed their own identity was through language. As Shane White wrote, “the state of New York, however, was noted for its ethnic diversity and particularly for the large Dutch component in its population.”\(^{150}\) Due to this large Dutch speaking population within New York, blacks could speak both Dutch and English and formed their own dialectic; a mixture of both languages. The linguistic capabilities of blacks were highlighted in some runaway notices. Although the only evidence of their linguistic skills comes from

\(^{147}\) Legislature of New York, “Act relative to slaves and servants in Laws of the State of New York, 40\(^{th}\) session (Albany, 1817).

\(^{148}\) White, 88.


\(^{150}\) White, 189.
runaway notices, it can be assumed that many slaves within the upstate New York area were influenced by the wide diversity of languages within this region and that slaves developed their own unique form of language. An advertisement in the September 6, 1814 issue of the Albany Argus stated that a runaway slave named London Derry could speak English, Low Dutch, and High Dutch. This advertisement illustrated the linguistic skills of black slaves in upstate New York. Many slaves within this region learned to speak both the formal and informal language of the European descendents living within upstate New York. The mastering of English, Low and High Dutch can be seen in a variety of runaway notices mainly published in the Albany Gazette. Another runaway notice from the Albany Gazette, October 4, 1813, stated that a runaway named Tom, 22, spoke both Dutch and broken English. This advertisement illustrated the diversity of black language but also the cultivation of a language separate from their white masters. Due to the fact that this slave spoke broken English, it can be assumed that this slave had integrated both Dutch and English into his speech. Therefore, this advertisement served as an example of the black language emerging within upstate New York during the early nineteenth century. Although the prevalence of the Dutch language within upstate New York caused many black slaves to speak both the native language of the European descendents in Albany and English, some runaway slave notices illuminated that the linguistic capabilities of blacks were far vaster. Some blacks in the region had an even more diverse linguistic background and could speak three or more different languages. In an advertisement in the Albany Gazette published on March 6, 1815, a runaway slave named Philip, 28 spoke German, Low Dutch, and English. This advertisement illustrated the linguistic abilities of blacks and the various languages that these blacks encountered living in upstate New York. An advertisement found in the Albany Gazette on May 29, 1820 stated that a runaway slave named Edmund, 22, had the ability to speak English, German, and Low Dutch, similar to Philip. Both of these advertisements illustrated the depth of the linguistic skills that black slaves possessed. Although some slaves were able to master a variety of languages, other slaves were more limited and could only speak one language. As stated in an advertisement in the August 15, 1815 edition of the Albany Argus, a runaway black slave named Jack, 19, only had the ability to speak Dutch. This advertisement illustrated the heavy influence of the Dutch language in the upstate New York region due to the fact that this slave had not learned to speak the language of the American nation.

151 “Fifteen Dollars Reward,” Albany Argus, September 6, 1814, Advertisements, New York.
Based on the information provided by these runaway slave notices, blacks within the Albany area had diverse linguistic skills and possessed a mastery of many languages, most commonly English and Dutch. The prevalence of this language diversity was in large part due to the Dutch culture that emerged among the white colonists of New York, which spread to their black slaves. Through the use of these multiple languages, black slaves were beginning to forge their own identity by creating their own language. The creation of their own language, a mixture of Dutch and English, allowed for a strong connection to be made among members of the black community within the upstate New York region. Although the formation of a black language was beneficial to the black slaves of New York, it caused these blacks to become isolated from others of their race. Black slaves in other states did not have the strong influence of the Dutch culture on their lives and languages, which caused a gap in communication between blacks from New York and blacks in other areas of the United States. Thus, this new black language both served to unify black slaves in New York but also hindered their communication with blacks from other states.

Coupled with the variety of languages that blacks in upstate New York spoke, blacks of this region also altered the way in which they pronounced words in order to further separate their means of communication from white Americans. This separate means of pronunciation was often identified as a speech impediment within runaway slave notices. An example of this can be seen in a runaway slave notice published in the Northern Whig on July 18, 1815. This advertisement stated that two slaves named Mink, 22 and described as having a yellowish complexion with a stout build, and Caesar, 19 and described as having a black complexion, ran away from their master together. The slave named Caesar was also identified as speaking with a speech impediment. Although Caesar was described as having a speech impediment, truly this altering of language was a conscious decision made by this individual and many other slaves within New York State. This speech impediment became characteristic of many black slaves and illustrated the desire of slaves to create their own distinct culture separate from their white masters. Another advertisement illustrating the diversity in the way black slave spoke was seen in the Northern Whig on August 6, 1816. This advertisement stated that a runaway slave named Joe, 22, spoke with a small speech impediment and also spoke quickly.

This unique way of speaking was used by slaves to establish their own unique way of speaking in comparison to white Americans and to foster a linguistic connection among blacks. This linguistic connection among blacks of New York, which included the creation of their own language and their own pronunciation of words, allowed for the beginnings of a black identity and culture to form in this region.

Along with creating their own diverse language and creating their own way of speaking, blacks also attempted to forge strong family and personal connections among other slaves. Runaway notices in Albany illustrated the desire of slaves to runaway in groups or family units. Through the creation of these families and runaway slave groups, slaves could establish strong black community ties. These black community ties allowed blacks to create their own identity and culture separate from their white American counterparts. The beginnings of these community ties are seen within the runaway notices in New York, which stated that some slaves ran away with other slaves or members of their family. An example of a vast number of black families running away from their masters can be seen in the runaway directory known as The Black Loyalist Directory. Compiled in 1783 by Sir Guy Carleton, a British commander, this directory illustrated the extent to which runaway slaves fled in search of freedom with their family members. This list was comprised of 3,000 black runaway slaves who took refuge in New York City and attempted to join the British army during the American Revolution. Although many of these black slaves were not originally from New York, this directory served as important insight into the lives of blacks and the family ties they established as early as 1776.

The importance of the family structure in the lives of slaves can be seen in the runaway advertisements published in upstate New York during the period following the American Revolution. These runaway notices illustrated that many slaves fled from subjugation with members of their family in order to preserve the connection between their kin. An advertisement seen in the Albany Gazette published on October 13, 1820 stated that a husband and wife named Lew and Dine, 21, ran away from their master accompanied by another slave named Ben, 18. Another advertisement published in the Northern Whig on August 16, 1816 highlighted a similar situation in which another husband and wife named Simon and Peggy fled to freedom together. These advertisements served as an example of the family structure that slaves created, despite their subjugation. Through the creation and preservation of these families, blacks forged their own racial identity and culture. Families were essential to the continuation of black culture. These families would pass on their traditions, beliefs, and culture to future generations, which allowed a distinct black identity to remain within black communities. Due to the importance of the family, many slaves ran away with their children to ensure the preservation of black culture and to provide a life free from enslavement for their offspring. An advertisement in the Albany Register published on January 8, 1813 stated that a mother named Fan, 30

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ran away from her master with her nine month old daughter, Diana, when this slave went on a trip to Schoharie County to visit her family and never returned.\footnote{161} Several advertisements in the Long Island Star reflected the prevalence of slaves to run away with their children. An advertisement published on November 25, 1812 stated that a black woman ran away with her son.\footnote{162} Another advertisement in the Long Island Star published on September 13, 1820 articulated that a black male slave ran away with his three sons from his master’s home.\footnote{163} A final advertisement published in the Long Island Star on December 27, 1820 stated that a father fled from his master’s home with his three children, their ages ranging from 6-12 years old.\footnote{164} All of these runaway advertisements signified the strength and importance of family bonds within the lives of slaves. These slave families gave blacks the power to define their racial identity and culture and to ensure that their traditions would continue for generations to come.

The bonds between slaves were not only seen among family members but were also seen among other slaves. Many runaway notices published in upstate New York illustrated that slaves not only ran away in family units, but also fled from their masters in the company of other slaves, who they worked with. This shared suffering allowed slaves to form a connection among other members of their race, which can be seen in the choice of many slaves to flee with non-familial companions. Several advertisements in the Albany Gazette brought to light this bond that black slaves were beginning to form. A slave runaway notice published in the Albany Gazette on February 5, 1810 stated that a black boy named Sam, 8-9 years old, ran away with a man named Tom. This particular runaway group was captured in Albany and had been taken to the Albany Watch-House.\footnote{165} Another advertisement published in the Albany Gazette on July 13, 1812 entitled “One Hundred Dollar Reward” stated that two runaway black men named Anthony, 20, and Price, 18, ran away from their master together. The advertisement continued by stating that these slaves could speak both High and Low Dutch and that both slaves fled away with valuables owned by their master.\footnote{166} This advertisement not only illustrated the cultural bonds that slaves had but also the linguistic skills of the slaves in the Albany area. The final advertisement in the Albany Gazette entitled “Ninety Dollar Reward” published on May 4, 1815 stated that three slaves ran away together. The first slave named Harman, 22, was described as being well built and having fled with several articles of clothing from his master. The second slave, Yat, 18, spoke

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\begin{itemize}
\item \footnote{161} “Ran away,” The Albany Register, January 8, 1813, Advertisements, New York.
\item \footnote{162} “Runaway,” Long-Island Star, November 25, 1812, Advertisements, Brooklyn, New York.
\item \footnote{163} “Six Cents Reward,” Long-Island Star, September 13, 1820, Advertisements, Brooklyn, New York.
\item \footnote{164} “Six Cents Reward,” Long-Island Star, December 27, 1820, Advertisements, Brooklyn, New York.
\item \footnote{165} “A Negro Boy,” The Albany Gazette, February 5, 1810, Advertisements, New York.
\item \footnote{166} “One Hundred Dollars Reward,” Albany Gazette, July, 13, 1812, Advertisements, New York.
\end{itemize}
both broken English and Low Dutch. The final slave named Peet, 21, spoke Low Dutch and English.\(^{167}\) This advertisement highlighted both the prevalence of black runaways to flee in groups and also another cultural bond formed among many blacks in this region, linguistic diversity. These slave advertisements published in the Albany Gazette illustrated the cultural bonds that blacks formed with one and another outside of the familial ties. This bond with non-family members was pivotal in the formation of a black identity, a racial connection, and a unified culture.

Black identity was not only wrapped up in their language capabilities and their familial/ cultural ties but their identity was also defined by what they could contribute to American society. Vocational skills were essential in establishing black culture, giving them significance in the world and in the United States. Black slaves held a variety of jobs and skills, which allowed them to contribute to the socioeconomic system of America. As described in a For Sale notice in The Albany Gazette published on December 19, 1811, a slave, 23, was defined as possessing excellent skills as a house servant and an understanding of the farming business.\(^{168}\) Another advertisement published in the Daily Advertiser in New York City on February 10, 1798 illustrated the diversity of black skills. This advertisement stated that this particular slave worked as a housekeeper, a servant in the kitchen, and generally was proficient in domestic duties.\(^{169}\)

These two advertisements illustrated that black slaves held a variety of jobs within the slave system and were capable of performing many household and farming tasks. These particular skills not only made slaves desirable to white masters but also allowed blacks to contribute to the American lifestyle. These skills set blacks apart from their white counterparts, largely due to the fact that white individuals refused to perform such menial labor. However, these distinct vocational capabilities contributed to the creation of a black culture within upstate New York.

As illustrated in runaway slave notices published in newspapers in the Albany area, blacks were also hired as apprentices and indentured servants. By serving as indentured servants and apprentices, slaves were given the opportunity to learn skills that they could not normally obtain while serving in the typical slave role as a house servant or a farm hand. Through this education, slaves were given the power to transfer this knowledge to fellow members of their race and future generations. By passing on these skills to other blacks and their children, blacks were establishing traditions and skills that would make their presence vital in America separate from performing manual labor. Indicated in several runaway notices, some slaves served as indentured servants for white masters. In two advertisements published in 1816, one in the Saratoga Journal\(^{170}\), Ballston


Spa, New York, and the other in the Ostego Herald\textsuperscript{171}, Cooperstown, New York, two boys named Matthew and Sam Cooly served as indentured servants for their masters. Both boys were only nineteen, which thus illustrated that young males were used as indentured servants rather than older slaves. A runaway advertisement published in The Albany Register on July 14, 1812 stated that an indentured servant named Richard Hamilton ran away from his master.\textsuperscript{172} Two final advertisements published in 1820 in the Albany Argus\textsuperscript{173} and The Bee\textsuperscript{174}, Hudson New York, stated that two slaves were serving as indentured servants. Both slaves fled from their masters and it is believed that they may have run away on ships. By serving as indentured servants, these blacks were learning skills which established their presence within the socioeconomic system of America.

Besides serving as indentured servants, blacks also served as apprentices. By serving as apprentices, slaves were being taught a specific skill that could be marketable in America as a whole. Thus, slaves were given skills that gave their race significance outside of manual labor and allowed slaves to succeed in the economic system of the United States. Newspapers in the Albany area highlighted the running away of John King, 18, who was serving as an apprentice.\textsuperscript{175} A final advertisement published in the Albany area in The Albany Gazette on December 10, 1812 highlighted the running away of John Aumock, 19, a runaway slave named Elanson Mead, 19, ran away from his master after serving as an apprentice.\textsuperscript{176} All of these runaway advertisements articulated the number of slaves serving as apprentices to a variety of businesses. By serving as apprentices, slaves were gaining the opportunity to learn marketable skills that would be passed onto other slaves and to future generations. This variety in black occupation allowed slaves to be implemented within the economic system and illustrated the importance of black vocational skills within America as a whole. Blacks were not simply tools to be used in manual labor, but human beings that could benefit the economy and society of the United States.

Through linguistic skills, vocational skills, and family ties, black slaves forged their own culture separate from white America despite their subjugation. In an effort to form this black culture and identity, blacks also revolted and stole clothes from their

\textsuperscript{172} “Six Cents Reward,” The Albany Register, July 14, 1812, Advertisements, New York.
\textsuperscript{173} “Three Cents Reward,” Albany Argus, August 22, 1820, Advertisements, New York.
\textsuperscript{174} “Three Cents Reward,” The Bee, August 29, 1820, Advertisements, Hudson, New York.
\textsuperscript{175} “Take Notice,” The Bee, October 3, 1809, Advertisements, Hudson, New York.
\textsuperscript{176} “Ran away,” Albany Gazette, December 10, 1812, Advertisements, New York.
master upon fleeing in order to rebel against the white New Yorkers that enslaved them. Three slaves in the Albany area rebelled against their enslavement by setting Albany on fire. These three slaves, Pompey, Bet, and Dean, launched a plan to set fire to Albany in November 1793 in order to show their disapproval with the state of black servitude. Although these three slaves did successfully set fire to the city of Albany, all three blacks were arrested and executed.\textsuperscript{177} Through this act of rebellion, these black slaves caused the conditions for all slaves to worsen in Albany due to the fear that white New Yorkers had of slave rebellions in the future. This fear caused white individuals to keep blacks enslaved in order to protect their communities from the perceived dangerous nature of freed blacks. Despite their good intentions, this fire in Albany only strengthened the legitimacy that New Yorkers had in regards to their fear of slaves. An article published in the Albany Argus on September 12, 1820 also illustrated that black slave revolts were not simply a rare occurrence in this region. This article stated that a black runaway slave encountered a white man within the woods. When the white man attempted to capture this runaway, this slave attacked the white man. In the midst of fight, the white man killed the runaway slave.\textsuperscript{178} This article highlighted both the extent to which slaves will go to maintain their freedom but also that black slaves truly did revolt against their white New Yorkers who attempted to keep them in chains. Finally, black revolt was seen within New York City as described in Graham Hodges novel, Slavery, Freedom, and Culture among Early American workers. In one of Hodges’ essay, he highlighted the work of the Black Brigade and the Black Pioneers, who took up arms in the American Revolution for their freedom from 1775-1783.\textsuperscript{179} Although this revolt did not occur within the Albany area, the work of these black organizations to obtain their freedom through revolt was still significant in the formation of black culture within New York as a whole.

Black slaves also revolted against their masters by running away with their master’s property. Although this form of rebellion against their masters was not as brutal as taking up arms against them, by stealing their master’s property, slaves were disrespecting their master’s authority. Three advertisements published in the Albany Gazette, two on July 20, 1812\textsuperscript{180} and one on September 14, 1815\textsuperscript{182} illustrated the number of slaves that stole clothes from their masters. All of these runaway slaves stole articles of clothing from their masters and one slave named David Lord, 33, stole five horses and $500 worth of laundry from his master. Two advertisements published in the Northern Whig in


\textsuperscript{178} “Lynchburg, September 1,” Albany Argus, September 12, 1820, News/Opinion, New York.

\textsuperscript{179} Graham Russell Hodges, Slavery, Freedom, & Culture among Early American workers (Armonk: M.E. Sharpe, 1998).

\textsuperscript{180} “Fifty Dollars Reward,” Albany Gazette, July 20, 1812, Advertisement, New York.

\textsuperscript{181} “Twenty Dollars Reward,” Albany Gazette, July 20, 1812, Advertisements, New York.

\textsuperscript{182} “Two Cent Reward,” Albany Gazette, September 14, 1815, Advertisements, New York.
Hudson, New York on July 12, 1811\textsuperscript{183} and on June 25, 1816\textsuperscript{184} stated that two runaway slaves stole several items of clothing from their master including pants, vests, and shirts. In an advertisement in the Albany Register published on April 4, 1815 stated that a slave girl named Flora, 22, ran away with a Black Muslim gown, a hat, boots, and a bear skin muff.\textsuperscript{185} These runaway notices all illustrated the prevalence of slaves running away and stealing articles of their master's property. This form of mild revolt not only disrespected their master's authority but also served as rebellion against the slave system that they hated.

In conclusion, black slaves formed their own culture separate from the white community through their language and vocational skills, familial units, and rebellion. By utilizing these tools, slaves were given the power to establish their own identity and culture. These slaves were also given the power to firmly cement their presence within America. Forming a diverse and rich culture allowed black slaves to be seen as significant to the society of New York but also significant to America as a whole. Blacks would continue to forge their own culture\textsuperscript{186} and identity through religion, which helped blacks to have a unified culture in America. The formation of such churches as The African Methodist Episcopal Church\textsuperscript{187} in New York City allowed blacks to use the factor of religion to unify their culture. Therefore, in the years following the American Revolution, blacks utilized several factors such as language, diversity, family, technical skill, revolt, and religion to forge their own identity and culture within New York in the years following the American Revolution.

\textsuperscript{183}“Twenty-Five Dollars Reward,” Northern Whig, July 12, 1811, Advertisements, Hudson, New York.
\textsuperscript{184}“Stop the runaways,” Northern Whig, June 25, 1816, Advertisements, Hudson, New York.
\textsuperscript{185}“Five Dollars Reward,” The Albany Register, April 4, 1815, Advertisements, New York.
\textsuperscript{187}Richard Allen and Jacob Tapsico, The Doctrine and Discipline of the African Methodist Episcopal Church (Philadelphia, John II. Cunnigham, 1817.)
Tizayuca: A Case Study of Embedded Stones
By Samantha Newmark, Class of 2010

“Oh God, O father in heaven, you glorify this multitude of flowers.
Only in Your shadow, yonder only, can there be a shelter.”
-Cantares Mexicanos 189

Introduction:

The church of La Transfiguración Tizayuca in the state of Hidalgo, Mexico, is one of many examples of churches built in the sixteenth century containing pre-Columbian or early colonial carved stones embedded in the walls. Wake, who has done most of the research on embedded stones, defines them as “small, single stones bearing a carved motif or design,” “embedded into the exterior walls of many sixteenth-century churches and monastery buildings” (Wake 247). It is believed that a large majority of these stones were taken from pre-Conquest structures and placed, often with considerable care in the Colonial buildings, perhaps in an attempt to maintain the imagery of the pre-Colonial period (Wake in press). As can be seen on Mexican buildings such as the Templo Mayor, the embedded stones decorated temples and other edifices before the coming of the Spaniards.

Most of the embedded stones found on the churches depict pre-Colonial symbols of the Aztecs and surrounding peoples, a majority of which appear linked to water or fertility (Wake 250-251), an idea which is supported by flower motifs on the church at Tizayuca. Tizayuca is an important example because of both the number of visible stones and the clarity of those stones – only one of nineteen is eroded to the point of hindering identification. There are other stones, however, of distinctly post-Conquest origin (Wake 250-251). For more information on embedded stones in general and the history surrounding the current research, see Wake’s book, Framing the Sacred (in press).

This study focuses on the stones found on the walls of the church at Tizayuca. I will first discuss their iconography. I believe I have identified Mexican flowers directly tied to two of the stones. This will lead to a discussion of the flower gods and flower-related festivals. Next, I shall enumerate the ways in which the stones and the church may be connected to celestial constructs. Finally, I shall draw conclusions regarding the placement and function of the stones based on the flower symbolism and celestial correlations.

Basic Data:

There are nineteen embedded stones on the walls of the church at Tizayuca (Table 1). They appear on the walls faces as well as on pillasters and other architectural structures jutting out
from the walls thereby allowing for differing directional alignments on each wall. The designs carved on the stones are also varied. Flowers are the predominant motif by far, with fourteen of the stones depicting floral symbolism. Within this broader category, there is also much variation. The most prevalent stone is a five-petaled flower with a well-defined ridge on the petals (For details, see Figure 4). It also bears a carved central circle. This particular form of flower is found six times on the church, and all examples are located on corners, either of the body of the church itself, or on rectangular pillars jutting out from the main façade. There is also a single six-petaled flower, with six undecorated, overlapping petals, and a carved central circle. There are three eight-petaled flowers as well (Fig 4). These have a defined center and a depressed line at the center of each pointed petal. They are also unusual in that they are all portrayed as split in two. Interestingly, bifurcated symbols are common in the codices. Two of the three stones have both pieces portrayed, with each piece on the opposite side of the stone than where it should fall were it whole. They are not split into equal halves, but instead two pieces of different sizes that vary among the examples. Though split, they are obviously not damaged, with the two parts depicted on opposite sides of a single stone. One of these can be found on a basin apart from the wall, which can be discounted from analysis due to obviously modern placement. The other entire flower appears on the western façade. The last is only half of the motif, on one of the sides of the irregular pillar on the east wall.

Another floral design found on the church is that of the xochimecatl, or flower-rope (Figure 1). There are three such forms on the church clustered near the center of the north wall, appearing as woven ropes interspersed with four-petaled flowers. There is one stone located very high on the northern wall that may be a more modern carving. It is a seven-petaled, etched flower with the stem depicted along with the blossom. Because of the disparity in graphic elements, and more importantly because it is cut almost in the manner of graffiti, it is not included in the list of Colonial embedded stones. There are other examples of modern carved ‘graffiti,’ some of which were located very high on the walls as well. The last stone is eroded and its motif is unclear. It sits on the western wall, and seems to be a flower because of the clearly defined central ring some remaining visible impressions that appear to be petals forming an outer ring.

There are also five stones at Tizayuca that do not follow the overall flower motif. One of these stones may be related to the flowers, though it does not appear to directly display one (Fig. 2). The stone itself is triangular, and appears to depict a tripod vessel portrayed in the manner of the foaming pulque vessels of the Mixtec codices. That it may be a pulque vessel is supported by its presence on the northern wall near the xochimecatl, which were also used in ceremonial settings.

Another set of stones which does not portray flowers are “studs,” as Wake (p.c.) calls them, on the irregularly angled buttress at the southeast corner of the church. There are three such
embedded stones, two depicting one stud and the third with two studs. These studs appear as carved knobs within a carved depression. Their meaning eludes me and I have found no pictorial evidence of decorations in this style in the codices, on buildings, or anywhere else. They could represent a count, but this does not seem likely due to the low numeration (one or two) and their placement. The last stone is one of obvious post-Conquest origin. It depicts the Keys of St. Peter crossed behind a papal miter. The stone is located on the western façade near the northern corner, facing west.

Flower Symbolism:

One goal of this study is to identify the floral symbols through the use of native documents and texts on Mexican botany. In Nahua thought, flowers were laden with multiple meanings. They represented fertility and sexuality, beauty and social status (Miller 213). They served as a link between humans and the gods: “The Giver of Life invents them, he has sent them down” (León-Portilla, 98). Additionally, they evoked ideas regarding the brevity and preciousness of human life, as in the statement “the body makes a few flowers/and drops away withered somewhere” (Kissam and Schmidt 47). Finally, flowers were seen as a symbol of blood spilled on the battlefield (Miller 213). In the Florentine Codex of Sahagún, statements and pictures regarding flowers are scattered throughout the pages, and a large section of Book 11 is dedicated to descriptions of various types of flowers and flowering plants. For example, one warrior (Sahagún 1590,103) bears an eight-petaled flower on his shield which looks very much like the eight-petaled flowers of Tizayuca, except that the flower is whole rather than split. In the Vienna Codex, the xochimécatl is depicted (Fig 1), portrayed in a similar way to that on the church, though the Vienna rope is coiled (38).

The symbol of the xochimécatl (Fig 1) was important in Nahua thought. Woven cords were thought of as symbolic for the fusing of opposing concepts, such as night and day, time and space, end and beginning, and death and birth (Klein 15). It was also believed that ropes connected the world and the heavens. Klein remarks that: “The nexus of the universe is often described as a flowering tree of abundance where, according to one Aztec poet, ‘there interlocks the thread of our life”’ (17).

Flower Identification:

As one might expect, there appear to be real models for the flowers portrayed in stone at Tizayuca. The five-petaled flower could be the Turbina corymbosa, or morning glory (Fig 3). This flower was depicted on a statue of Xochipilli, the Flower Prince (Schultes, Evans, Hofmann, and Rätsch 62-63). While the flower on Xochipilli and that on the church are not identical, they do have several distinct similarities such as the five clearly-defined, rounded petals and the circular center. Both also have other elements on the petals (Fig. 3). The Tizayuca carving displays rims around the petals and the statue exhibits a ridge in the center of each petal. The
morning glory was significant to the Mesoamerican peoples because the seeds were used as a hallucinogen known as Ololiuqui (Schultes, Evans, Hofmann, and Rätsch 170, Heyden 22).

Two other possible identifications for the flowers can be derived from Sahagún’s description of the ceremony of Tlaxochimaco (Sahagún 1982, 108). He lists the many flowers which the people would find before the festival day. Sahagún says that the people would find dahlias, hummingbird flowers, tagetes, ranunculus, bocconias, tiger lilies, plumerias, didymeas, forest magnolias, talaumas, earth plumerias, lobelias, water lilies, and castalians (Sahagún 1982, 108). One of these is the five-petaled flower Plumeria acutifolia, called the earth plumeria by Sahagún. This flower has petals of a similar shape to the five-petaled stones on Tizayuca and a yellow inner ring (Figure 3). The color change from yellow on the inside to white on the outer petal appears to be represented stylistically in the carved rim on the Tizayuca stones, which defined rim is lacking in the flower itself.

The other flower of interest in this listing is the Dahlia cocinea which has eight petals (Figure 4). This flower is almost identical to the bifurcated flowers on the church, with its eight pointed petals ribbed in the middle. It also has a defined circular center as does the flower on the church. Dahlias are native to Mexico and widespread, particularly in the mountainous regions.

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188 These names are Dibbles and Andersons’ translations of the original Nahuatl flower names.

Flower Deities:

The Aztecs of Tenochtitlan also tied flowers to their rituals and religion in more direct ways. Two of their major deities, the twins Xochipilli and Xochiquetzal, were associated with flowers. They had several festival days which were specifically dedicated to either of these gods. On those days and most other festivals, flowers were used in a variety of ways, from garlands to part of the sacrifice itself.

Xochipilli, the Flower Prince, is the god of the fertilizing sun, the arts, dancing, feasting, flowers, and pleasure. He punishes those participating in sexual excesses with hemorrhoids and sexually transmitted diseases (Aguilar-Moreno 152). His demesne overlaps with that of Macuilxochitl, Five Flower, and they are frequently treated as the same entity. Macuilxochitl is one of the Ahuiateteo, the Gods of Pleasure who represented the dangers of excessive debauchery. The number five was associated with all of these pleasure deities because it was the symbolic number of excess (Aguilar-Moreno, 147). Macuilxochitl is associated with flowers, and is the patron of gambling and games. The name Macuilxochitl was also used to refer to the sunflower (Heyden 16). He punished wrong-doers in the same manner as Xochipilli (Aguilar-Moreno, 149). Macuilxochitl, along with the other Ahuiateteo, is associated with the south (Aguilar-Moreno 147). Thus, he is shown as the deity of the south in the quadripartite world diagram in the Borgia Codex (Durán 243, footnote 4).

These associations between Xochipilli/Macuilxochitl and the flowers
bring up an interesting possibility regarding the meaning of the embedded stones on the church walls at Tizayuca. There are many connections between this double-aspected god and the five-petaled flower. First, the stone flower may represent the same morning glory blossom portrayed on the statue of Xochipilli. Here might be a native ceremonial element adorning the walls of Christian ceremonial space, as the figure in the statue of Xochipilli is identified as being in a shamanic trance (Aguilar-Moreno 195). Another detail relating the aforementioned flower on Tizayuca to the Flower Prince is that the carved flower itself has five petals, the number of excess which is also in Macuilxochitl's name. Finally, and again concerning directionality, it is important to note that all of the five-petaled flowers were found on the north-south axis of the church, with most pointing towards the south. This could be related to Macuilxochitl's association with the south. Thus, it seems as though apart from the obvious association of flowers being related to the Flower Prince, there is strong evidence to link the flowers of Tizayuca, and particularly the five-petaled flower, with Xochipilli, his alternate identity Macuilxochitl, and all that they represent.

The second deity associated with flowers in the Aztec pantheon is Xochiquetzal, or Flower Feather. Xochiquetzal is the twin sister of Xochipilli. She represents feminine crafts and holds sway over fertility. She also is a patron of the arts, and physical pleasure. She is the goddess of sexual love and the female sexual power, of childbirth and young mothers (Aguilar-Moreno 152). Several festivals were associated with her, and she was considered to be one of the mother goddesses of the Aztec pantheon, as well as being the patroness of weavers (Klein 1), which may tie her to the xochimecatl rope on the northern façade of Tizayuca. There is a six-petaled flower portrayed on a statue of Xochiquetzal (Solis 188), similar to the one on the church at Tizayuca.

Flower Festivals

The two flower deities, Xochipilli and Xochiquetzal, offer a gateway to investigating flower-related rituals. While most ceremonies used flowers in some aspect of the rites, several of them specifically honored flowers or the gods dedicated to them. Given the dates of these flowery festivals, one can attempt to connect the embedded stones to the natural world by examining alignments of the church to the movements of the sun and other celestial bodies. Eight feast days, each attached to an eponymous month, could be tied to flowers: Tititl, Xiutzitzquilo, Tlacaxipehualiztli, Toçoztontli, Tecuilhuitontli, Tlaxochimaco, Ochpaniztli, and Tepeilhuitl.189

Tititl took place between January 23 and February 12.190 It was the “run for the flowers,” mentioned in Book Two of

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189 All of the dates given in this section are in the Gregorian system, although they were converted to the Julian system for precision in Colgate University’s Ho Tung Visualization Lab. Dates are based on modern correlations by scholars such as Aveni.

190 I’ve chosen to organize the festivals based on placement in the European calendar for the original ease of changing the date in the Visualization Lab.
the Florentine Codex (157). On this festival, flowers were placed on the tops of pyramid-platforms, and the impersonators of gods would race to attain them. It was also a festival associated with the weavers, possibly tying it to the xochimecatl as well as the other flowers on the church (Sahagún 157).

Xiutzitzquilo took place between February 12 and March 4. Durán gave the date as March 1. This festival was the first of the year, and Durán defined it as “Taking the Year in One’s Hand” (412). One custom practiced on this day was to touch bouquets: “Old and young men and women would sally forth to the country... to touch with their hands the herbs and plants born on the new year” (Durán 413).

Tlacaxipehualiztli, the “Flaying of Men” took place March 4 through 24. This festival was celebrated to honor Xipe Totec, the Flayed One, who was a god of vegetation and the sun (Aguilar-Moreno 295). It was more generally a rite celebrating the renewal of the earth.

Interestingly, this festival date has also been tied to the orientation of the Templo Mayor (Aveni 191). Toçoztontli took place between March 24 and April 12. It was also called Xochimanaloya, the offering of flowers (Aguilar-Moreno, 295). On this day, the first flowers of the year were offered. Sahagún describes a prohibition regarding flowers thus: “And before they had offered them, none dared to smell a flower” (Sahagún 1982, 5). The flowers that were collected were woven together in a chain.

Tecuilhuitontli was celebrated from June 12 through July 2. This “Small Festival of the Lords” honored Xochipilli (Aguilar-Moreno 296). On this occasion, there was great ceremonial drunkenness, and dancers were joined together with xochimecatl (Sahagún 1982 13, 93). Flowers were also painted onto the body of one of the impersonators, and held aloft during the ceremonies by commoners (Sahagún 1982, 92-93).

Regarding it with seeming unimportance, Durán says that the day was “just an occasion for enjoying the flowers which abounded in that season” (434). Probably, the festival was not so minor given the deep-seated attachment the native peoples felt for flowers. Durán conflated this ceremony with another important flower festival, Tlaxochimaco (434).

Tlaxochimaco marks the “Birth of Flowers” (Aguilar-Moreno 296), or the “Distribution of Flowers” (Durán 434). It took place from August 11 through August 31. Flowers were given to Huitzilopochtli on this day, and they were used to decorate effigies of the god (Sahagún 1982, 13). The people also went out several days ahead of time to gather flowers to string into garlands. These
garlands were then treated with the utmost reverence until they were actually offered to the god. Included within the flowers gathered by the people were the dahlia and plumeria acutifolia (Sahagún 1982, 108) that are likely portrayed on the church at Tizayuca.

Celebrated from September 20 through October 10 was Ochpaniztli, identified by Durán as the Feast of Xochiquetzal or Xochilhuitl, the Feast of Flowers (Durán 238-239). This was a celebration of the last flowers of the year. The people would smell the flowers as a remembrance of the fruitful season (Durán 238). There was much dancing on this festival day, and it was said of the dancers that “they went in various rows as hath been said; they moved like flowers. They indeed went in glory” (Sahagún 1982, 123). Durán describes the way in which the people would smell the last blossoms, saying that “They find the smelling of flowers so comforting that they even stave off and manage to survive hunger by smelling them” (Durán 238).

The final flower-related ceremony is Tepēilhuitl. It took place from October 30 through November 11. This festival, dedicated to mountains, honored Xochiquetzal. An impersonator of Mayahuel was sacrificed, were deities known as Xochtecatl and Tepexoch. (Sahagún 1982,132). While I am unsure of who the latter gods are, their names both include “xoch,” which means flower. Also honored on this day were two other pulque deities, Tepictoton and Octli (Aguilar-Moreno 297).

Flowers and the Sky: Some Possible Celestial Correlations:

Very little was written on the cosmos by the chroniclers, despite the apparent attention paid to it by the natives. Sahagún displays panels depicting Aztec constellations. However, he did not set them within the larger context of where they appeared in the sky nor did he attempt to relate them to religious rites. No chronicler has definitively mapped out the Aztec sky, either in its own context or in comparison to the European constellations. Some work has been attempted nevertheless (Aveni, Coe, Seler). I have used this material together with my own observations as a basis for assigning importance to various stars and constellations as they relate to flower festivals.

Having found connections between the native festivals and flowers, I examined possible related astronomical events in the Colgate University Ho Tung Visualization Lab. My examination, using a planetarium that offers the ability to examine celestial objects in any time period, in this case AD 1500, and as viewed from any location (20° N latitude), turned up several interesting alignments. Admittedly, some of the alignments may be merely coincidental.

To better judge this potential, I specifically sought any stars or constellations that underwent heliacal risings or settings on the important festival dates. There are four possible heliacal events for stars. A star can rise in dawn’s first light, approximately 45 minutes before the sun is visible, which marks the first time it will be visible in
the early morning hours. A star setting opposite the sunrise in the same time frame will be in its last morning appearance. At night, a star may rise approximately 45 minutes after sunset, marking its first nighttime appearance. The last nighttime appearance is when it is visible for only a few minutes after true dusk. In all of these cases, the sun will be approximately ten degrees below the horizon. Along with the festival days enumerated above, data was also gathered for dates of possible importance, such as the solstices, equinoxes, zenith passages, and the Catholic festival of the Transfiguration of Christ, to which the church was dedicated. The purpose of examining solar and heliacal rises and sets on these days was to see if there was any correlation of the church’s alignments with them. Sunrise and sunset were marked at the point at which the sun is first visible or last seen above the horizon (Fig. 5).

While we do not know all of the constellations identified by the Aztecs, we do have hints of some, gleaned from a diagram in Sahagún’s Florentine Codex. One constellation, called Tianquiztli or the marketplace, is almost definitely the Pleiades (Aveni 33). The Western constellation of Orion’s Belt is most likely Mamalhuaztli, the Fire Drill (Aveni 35). Another constellation, Xonecuilli, might be either the Big or the Little Dipper. It is also possible that it could have been associated with the Southern Cross (Aveni 36-37). Citlalcolotl, the Scorpion, may actually have been the same constellation as our Western Scorpio, though Coe points out that this association could have been due to the blending of information from after the conquest (cited by Aveni 37). In addition, it is likely that they also recognized other bright stars, though this is not corroborated by the ethnohistoric record.

Because of the presence of the keys depicted in a colonial embedded stone on the western façade of the church at Tizayuca, I have added to this list of observed constellations the European asterism, the Keys of St. Peter. The stone depicting the Keys of St. Peter lies on the north-west corner, facing west (Figure 5). Along with being an emblematic Catholic design, the Keys of St. Peter was a medieval constellation connected to the larger constellation of St. Peter himself. There is some controversy as to where the Keys actually lie in the heavens. Coe cites the Keys as being analogous to the Western constellation of the belt and sword of Orion, which was also the native Fire Drill (26). Other scholars, however, such as Eduard Seler, give a different location for the Keys of St. Peter. He places Keys of St. Peter within c Muscae and α and β Arietis (Seler 357). He argues that this constellation was also recognized by the Aztecs, who called it “the bringer of the night” or “the lord of the night” (Seler 357). Another possible situation of the Keys of St. Peter in the sky is 35, 39, 41 Arietis and 12, 13 Trianguli (Aveni 35). This was the location observed in the Visualization Lab, and not too far from Seler’s placement (Figure 6).

The Keys of St. Peter have been an important symbol of the Papacy dating back at least as far as the 12th century (Levillain, 689). The Keys might appear portrayed in many ways, including with a
papal tiara, as they are shown on the stone at Tizayuca. They came into use as a symbol because of a line from Matthew 16:19: “I give you the keys to the Kingdom of Heaven” (Fleming, 205). Only one key was shown in early iconography. By the Middle Ages, however, the convention was to show two keys, usually one of gold and one of iron. As Milton later wrote of the keys in “Lycidas,” “Two massy Keys he bore of metals twain/(The Golden opes, the Iron shuts amain)” (Milton p. 123, ll. 110-111). While as mentioned above, they usually symbolized the Papacy, they were also used elsewhere in Christianity, as in the Puritan Milton’s writings (Fleming 205-206).

Interpretation:

Several of the stars and constellations undergo heliacal events that correspond to the dates of the flower festivals and other significant days in the environment of Tizayuca; these events would have been recognized by the colonial Aztecs. Orion’s Belt and Sword (the Firedrill) rises between the two prominent hills of the East before the sun on the Tecuilhuitontli festival. Castor and Pollux also appeared frequently at Tizayuca in heliacal events. Finally, the natives of this period would have likely seen the Keys of St. Peter, or at least the Spaniards commanding the building of the church would have been aware of them.

How frequently the star events occurred is another concern. Three stars matched three of the possible four heliacal events within the relevant festival and calendrical days. Regulus, Arcturus, and Castor and Pollux (counted as one due to proximity) all had three heliacal events on these days. One, Denebola, even went through all four. See Table 2 for details.

Five of the seven flower ceremonies had at least one event involving the major four stars identified above. All of the six other calendrical days had at least one of these events. It is notable that Castor and Pollux may have been part of the native Ballcourt constellation. This raises the likelihood that the Aztecs would have recognized the stars as significant. Though the other stars are not noted in the ethnohistoric record, their frequency of alignment and prominence in the sky suggests that the correlations may not be merely accidental.

Finally, given the prevalence of astronomically aligned pre-Columbian architecture in Central Mexico, I examined whether the rise and set positions had a connection to the orientation of the church. The four walls of the church are aligned to 18° north, 108° east, 198° south, and 288° west. The door is on the western façade. There are several instances in which an astronomical event occurred within only a few degrees of the east-west axis, and a couple of other events that had other significance.

The sunrise on the festival of Tititl, at 105°, occurred along the axis of the church, at the apse end. On the winter solstice, sunrise was at 116°, also very close by. Sunset on the zenith passages occurred at 290°, which would

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192 All degree measurements are using the azimuth scale, where north on the horizon is marked as zero, east is 90, and so on. This system notes both the church directions and the positions of the stars.
have resulted in the setting sun being visible in an almost direct line from the doorway.

Several stars also set almost exactly along the western axis of the church, close to \(288^\circ\). Interestingly, these aligned stars overlapped with the stars of the greatest frequency: Regulus set at \(284^\circ\), Denebola set at \(287^\circ\), and Arcturus at \(292^\circ\). This again suggests that the alignment was more than coincidence. The Keys of St. Peter set at \(298^\circ\), within \(10^\circ\) of the axis of the church. The stone depicting the Keys of St. Peter, however, is closer to the northwestern corner of the church, putting it almost directly in line with the setting of its celestial likeness. Regulus also rose at \(78^\circ\), which fell very close to the northeastern corner.

Also of note is the alignment on the Christian festival of the Transfiguration of Christ. The constellation of the Keys of St. Peter can be seen at the zenith (the highest point in the sky) immediately before sunrise. Perhaps this gives some insight into why the church was dedicated to the Transfiguration, and why the symbol of the keys is so central.

The various astronomical alignments occurred on four of the seven flower festivals, all of which also had a frequent star event. In terms of the calendrical events, the alignments occurred on the winter solstice and the two zenith passages.

Conclusions:

The object of this research was to identify the symbolism used in the embedded stones, and finally to ascertain whether or not the embedded stones had a significant placement on the church.

The first conclusion is that the embedded stones on the church are related to the flower gods and their seasonal feasts. As I have shown, there is a relationship between the five-petaled flower, the most frequently-occurring motif on the church, and Xochipilli/Macuilxochitl. All of the flower motifs can also be related to the festivals themselves. Both the five-petaled and eight-petaled examples can be identified as native species used in rituals. In addition, pulque vessels were also ceremonial in nature.

The astronomical evidence further links the flower rites to the church. It is also significant that the people of the region recognized at least one of the constellations identified. In respect to both alignments and star event frequency, over half of the flower rituals produced positive results, and there was significant overlap between the frequently-occurring stars and those we know were recognized by the indigenous people.

The second conclusion is that the church itself was aligned in a significant way. Many stars and solar events are in line with the major axis of the church as enumerated above. However, one cannot determine exactly which celestial body or bodies determined the alignment. Perhaps the fact that all four setting events (Denebola, Castor and Pollux, Regulus, and Arcturus) occurred close enough together to use as a marker, rather than a single event being used.

The third conclusion is that the stone depicting the Keys of St. Peter and its celestial counterpart do appear to
have been intentionally aligned. They are aligned about ten degrees off of the western axis of the church when they set, pointing almost directly at the eponymous constellation. There is always the possibility that this could have happened by chance, but the convergence of a symbol in stone, an astronomical tradition, and an alignment with a constellation seems too perfect for mere coincidence. Its intentional placement is also supported by the fact that it appears to be a commemorative stone from an earlier colonial building, and then transferred to the present church. Of all the possible locations on the large church at Tizayuca, it ended up aligned with a constellation which represents the same idea as the stone. At another church, that of San Bartolo Tenayuca, both the church itself and a stone depicting the Keys of St. Peter are aligned to 294.3°, fewer than five degrees away from the azimuth of the star. San Andrés Mixquic, also adorned on the western side with the Keys, is aligned to 280°: still fairly close to the setting point of the celestial Keys.

The fourth and final conclusion of this investigation is that the precise placement of the stones shows no intentionality, with the one exception of the Keys of St. Peter. The biggest piece of evidence against any correlation is the northern façade. With seven stones, it has the most carvings on a single surface at Tizayuca. However, nearly all of the stars visible in the north are circumpolar, or at least don’t have obviously significant instances of rising and setting events. Likewise, there were no major features in the landscape within a reasonable distance toward which lines extended from these northern embedded stones could have pointed. This suggests that the stones on the northern wall point towards nothing in particular.

Likewise, there was no outstanding feature in the celestial or nearby geographical south towards which the four south-facing five-petaled flowers could have pointed. The intercardinal stones and the floral stone pointing east likewise do not appear to align with anything. Finally, on the western side, there are two stones other than the one depicting the Keys of St. Peter in approximately the same area of the wall. One, an eight-petaled flower, could be discounted from pointing to any of the sunset alignments, because there are two more instances of the same pattern pointing to intercardinal directions which do not appear to have any astronomical significance. If the last stone in the west is indeed a flower as imperfect photographs have implied, this would suggest that it does not have a particular alignment. There is no reason for one flower among fourteen to have an astronomical alignment when the other thirteen do not.

Who directed the creation and placement of the embedded stones? The pre-Hispanic symbolism and style of the majority of the stones might indicate that they were a native attempt to preserve their religion in their new sacred space. The connections to the floral festivals and deities enumerated above support this idea. However, there is also the possibility that the Spanish commanded these symbols to be placed there in an attempt to make the new religion more acceptable to the natives. That would explain why the most
detailed stone is the carved Keys of St. Peter: the conquerors would desire to see their own symbolism displayed prominently, though not necessarily to the exclusion of native motifs. If they commanded its placement rather than that of the other stones, this theory could also explain why that is the only stone with an astronomical alignment. Certainly, much more research needs to be carried out in the incredibly rich interdisciplinary field of embedded stones so that my findings may be compared to other, similar churches in Mexico.
Works Cited:


Nuttall Codex.


Vindobonesis Codex.

Corruption in the Caribbean
By Dena Robinson, Class of 2012

Over time, have the corruption cases of Jamaica, Trinidad and Tobago, and Guyana become similar or different? And have they changed in regards to their amount or type? This question is significant because to liberal affluent democracies, the corruption cases of Jamaica, Trinidad and Tobago, and Guyana may appear strikingly similar on the surface. This paper will seek to examine the differences and similarities of these countries and will also seek to refute the notions that all Caribbean countries suffer from the same type of corruption.

H0: The corruption cases of Jamaica, Trinidad and Tobago, and Guyana have not changed and are still similar.

H1: The corruption cases of Jamaica, Trinidad and Tobago, and Guyana have become different in amounts/seriousness of corruption but not in type.

H2. The corruption cases of Jamaica, Trinidad and Tobago, and Guyana have changed in types of corruption, but not in terms of amounts.

H3. The corruption cases of Jamaica, Trinidad and Tobago, and Guyana have changed in terms of both amount and type.

Brief History of Jamaica, Trinidad and Tobago, and Guyana:

Jamaica, a country plagued with drug and gang-based violence finds the root of its problems in its colonisation. Jamaica gained independence from Britain in 1962. Since then, political power in the country has alternated between the socially-democratic People’s National Party and the conservative Jamaica Labour Party. Elections in Jamaica have almost always been tarnished by violence but their results have always been accepted and political institutions have maintained their legitimacy. Although Jamaica has been a reputed tourist destination, densely-populated, impoverished ghettos remain scattered throughout the country. Jamaica, alongside South Africa and Colombia, has one of the world’s highest murder rates. In 2006, there were more than 1,300 reported murders and there have been accusations of extrajudicial killings by law enforcers. The fact that Jamaica is a hotbed transit site for cocaine has added to the notions that it is also a country filled with endemic police corruption.

Trinidad and Tobago was settled by the Spanish before being taken by the British in 1797. The country gained independence in 1962 alongside Jamaica. Ever since gaining independence, Trinidad has maintained a major dependence on oil. This dependence led
to a large foreign debt, unemployment, and labour unrest when oil prices fell during the 1980s and early 1990s. Like its Jamaican neighbour, Trinidad and Tobago is a major transit site for cocaine. It has become ridden with drug and gang-related violence which, in turn, has fueled a high murder rate and the endemic corruption within the police force.

Guyana, culturally a Caribbean country but geographically a Latin American country gained independence in 1966. One-third of the Guyanese population descended from African slaves who were imported by the Dutch to labour on sugar plantations. Half of the population descended from indentured Indian agricultural workers brought by the British after the abolition of slavery. The two main political parties of Guyana are ethnically based, which has sometimes led to violence in the face of elections. Before the late 1990s, more than 80% of the industries in Guyana were state-owned, leading to mismanagement, decreasing commodity prices, and increasing fuels costs. This fueled major economic problems that led to a decrease in already-low living standards. The government of Guyana is now facing problems with environmental threats, poverty, and increases in crime (fueled by the drug trade).

Hypothesis 0:

The corruption cases of Jamaica, Trinidad and Tobago, and Guyana have not changed and are still similar. Commonly, there has always been a notion that countries in the Caribbean, if corrupt, faced the same types and amounts of corruption—this paper seeks to refute that. Paolo Mauro suggests that corruption mostly occurs in developing or transitioning countries and that many are governed or were governed by socialist governments; and most corrupt countries are considered closed economies (Mauro 24). Jamaica’s governmental body is a parliamentary democracy and constitutional monarchy led by a Governor-General. Queen Elizabeth, the head of state, visits the country and performs duties overseas on Jamaica’s behalf. Jamaica, coincidentally, has never been governed by a socialist government and isn’t currently in the process of transitioning or developing, however, Jamaica still suffers from corruption. What does this say about Mauro’s argument? It displays that there are loopholes in his argument and that perhaps his ideas on corruption are not ones that can be applied to Caribbean countries. Mauro holds other notions of corruption that are invalidated by Jamaica’s status. He states that, “…all of the most corrupt are considered closed economies” (Mauro 24). Yet, Jamaica is a mixed economy which has regularly been involved in international trade. Moving onward from political systems and Jamaica’s economy, it is widely known that Jamaica has one of the highest murder rates in the world. In a BBC news article it was stated that an investigation was being prompted by the then Prime Minister PJ Patterson after the shooting of a high-ranking police official. The official had been leading an investigation into accusations of illegal wire-tapping by corrupt members of the police force. Allegedly, PJ Patterson was one of the public officials who may have had his
conversations intercepted by corrupt members of the police force. Also, police officials in Jamaica have been accused of allowing the country to be used as a transit site for cocaine-smuggling in exchange for multi-million dollar payments (BBC News 2000). According to the Four Syndromes of Corruption hand-out given in class, Jamaica would be considered an Influence Market. The country is partly a democracy and has competition in regards to political groups. Traditionally, the country has had a two-party system with political power alternating between the People’s National Party (PNP) and the Jamaica Labour Party (JLP). However, over the past decade a new political party called the National Democratic Movement (NDM) has emerged attempting to challenge this traditional two-party system. This validates that although political competition had not always been present; the political scene in Jamaica was changing and establishing itself as an Influence Market. Economically, Jamaica also reflects an Influence Market. Like an Influence Market, Jamaica has open and steady competition- there is established international trade with other countries, and the economy is mixed with public and private sectors of business.

Trinidad and Tobago is governed by a Republic with a two-party system and a bicameral parliamentary system. Based on the notions of Mauro stated above, Trinidad and Tobago should not be a country plagued by corruption. Also, Trinidad’s economy is extremely open with more than steady competition. The economy is heavily influenced by the petroleum industry with the local economy being greatly stimulated by tourism and manufacturing. The country has earned a reputation for being an excellent investment site for international businesses and has one of the highest growth rates and per capita incomes of any Latin American country. Trinidad and Tobago used to be an oil-based economy but has since transitioned to a natural gas based economy. With high standards of living and high literacy rates, the country has extensive state/society capacities. Using the Four Syndromes of Corruption handout, it is clear to see that Jamaica and Trinidad and Tobago are very similar. According to a BBC news article, Trinidad and Tobago is currently plagued by a high murder rate and endemic corruption of the police force (BBC Country Profile: Trinidad and Tobago). This article highlights the similarities between the types of corruption Jamaica and Trinidad and Tobago are currently facing.

Guyana, now governed by a Democratic Republic was once an authoritarian form of government; and made its transition to democratic politics in 1992 (Griffith 267). The Presidential and Parliamentary elections are combined under the electoral system. Guyana’s economy is weak, with it being one of the poorest countries in the Western Hemisphere. The most important economic activities in Guyana are agriculture and mining, but there is a steady decline in the workers being employed in these sectors. With the World Bank and the International Monetary Fund, the Economic Recovery Program of 1989 decreased the government’s role in the economy and
encouraged foreign investment. Guyana has had an extremely high debt with foreign creditors and this has led to a decrease in foreign exchange and trade. Corruption in Guyana seems to be endemic within the customs department. An Article in the Miami Herald states that, “...Guyana says a task force is probing widespread allegations that smuggling is flourishing at the impoverished South American’s country’s ports” (Miami Herald 2009). The article goes on to suggest that corruption in Guyana has been fueled by the drug trade, like Trinidad and Tobago and Jamaica, but corruption in Guyana has been limited to port workers as opposed to the police force.

This information suggests that although the corruption cases of Jamaica, Trinidad and Tobago, and Guyana seem similar they are minutely different. The corruption of all three countries stems from drug based violence, but in Jamaica and Trinidad and Tobago the corruption is endemic within the police force. However, in Guyana the corruption appears to be endemic within the customs department and port officials. From personal knowledge it is known that the endemic police force corruption in Trinidad and Tobago and Jamaica has only increased over time. The same can also be said for Guyana’s corruption in the customs department. As the drug trade has become more exacerbated for Caribbean countries, corruption has increased in the three targeted countries. Therefore, the notion that the corruption cases of the three countries have become similar is invalid, as well as the notion that they have changed based on their type. The only validated idea is the one that the corruption in all three countries has increased.

**Hypothesis 1:**

The corruption cases of Jamaica, Trinidad and Tobago, and Guyana have become different in amounts/seriousness of corruption but not in type. Over time, Jamaica has suffered from an endemic amount of corruption within their police force. As the drug trade was exacerbated throughout the Caribbean, police corruption in Jamaica increased. In Trinidad and Tobago the corruption in the police force seems to have relatively remained the same. In the 2003 Corruption Perception Index report by Transparency International, Trinidad and Tobago received a score of 4.6. In 2004, the country received a score of 4.2 (Transparency International 2003 and 2004). This displays that the amounts of corruption have relatively remained the same. The same report gave Jamaica a score of 3.8. A year later Jamaica’s score was 3.3 (Transparency International 2003 and 2004). This also displays that the corruption in Jamaica had relatively hovered around the same numbers. In Guyana, corruption used to be endemic within the police force, but has since become a problem within the customs department as well. An article in the Miami Herald states that the government was going to begin probing accusations of corruption at the ports by customs officials (Miami Herald 2009). An article published a month later in the Stabroek News states that the government was going to lead an investigation into the corruption that had begun to invade the police force (Stabroek News 2009). These
two articles suggest that although corruption in Guyana did not change in amounts/seriousness, it became different in regards to its type. Therefore, the notion that the corruption cases of the three countries has diverged in amounts/seriousness is invalid. Also invalidated is the notion that any of them have undergone a change in the type of corruption.

**Hypothesis 2:**

The corruption cases of Jamaica, Trinidad and Tobago, and Guyana have changed in type, but not in amount. In Jamaica, the corruption of the police force has always been the only type of corruption. In 2006 there were more than 1,300 reported murders and there have been accusations of extrajudicial killings by law enforcers (BBC Country Profile 2009). As the years have progressed the corruption in Jamaica’s police force has become endemic and continues to be the major problem that the government is dealing with. As reported above, the Transparency International Corruption Perception Index shows that from 2003-2004, corruption in Jamaica increased by .5 (Transparency International 2003 and 2004). In Trinidad and Tobago the issue is the same- the government continues to deal with corruption within its police force. In Trinidad and Tobago, according to Transparency International's Corruption Perception Index, from 2003-2004, Trinidad and Tobago's corruption score increased by .4 (Transparency International 2003 and 2004). As one can see, the corruption of Jamaica and Trinidad and Tobago has increased in regards to amount according to the Corruption Perception Indexes for 2003 and 2004. In Guyana the type of corruption has consistently been one endemic to port and customs officials. Although there was once corruption within the police, over time the corruption in Guyana has been restricted to the former. According to the TI Corruption Perception Index of 2005, Guyana received a score of 2.5 (Transparency International 2005). A year later Guyana received the same score (Transparency International 2006). This displays that for Guyana the amount of corruption remained stagnant and has not changed. This data shows that the hypotheses stated above is invalid and doesn’t apply to the three countries.

**Hypothesis 3:**

The corruption cases of Jamaica, Trinidad and Tobago, and Guyana have changed in terms of both amount and type. Although it is not known when drug trafficking in Jamaica began, it seems to have steadily increased since 2005 (Council on Hemispheric Affairs 2007). The corruption in Jamaica has always been a serious problem since the government has been analyzing ways to reform it, and it has also always remained at the forefront of Jamaica's problems. In Jamaica, as the drug trade has increased, so has the amount of corruption. Using that point of view, corruption in Jamaica hasn’t really changed in regards to amount at all. In the 2002 Corruption Perception Index, Trinidad and Tobago had a score of 4.9. In 2004 the score had dropped to 4.2 (Transparency International 2002 and
2004). This displays that although there was a decrease in the score, indicating an increase in corruption, the score remained relatively the same. In the 2005 Corruption Perception Index Guyana received a score of 2.5, and in 2006 received the same score (Transparency International 2005 and 2006). Out of the other two countries, Guyana effectively displays that its corruption had not changed in regards to amount. In regards to type, corruption in all three countries has remained the same. Corruption in the police force has always been endemic within Jamaica’s police force, and in Trinidad and Tobago the same holds true. In Guyana, the corruption of customs and ports officials has remained endemic throughout most of the years since corruption has been discovered. The evidence displayed shows that the notion implied above is false.

**Analysis:**

Analysing the evidence presented throughout this paper will shed light on loopholes and debunk myths about corruption in the Caribbean. Corruption in Jamaica seems to have found its roots in slavery. The economy remained static from the end of slavery until the 1930s because it was based upon a system of slave labour and sugar crops; it wasn’t conducive to economic growth. In the 1930s rapid economic growth began with an increase in nationalism, changes in colonial policies and self-government among other things. With the end of slavery, England deserted mercantilism for a laissez-faire approach, which was in turn detrimental to Jamaica’s economy. The British colonial policy that had been enforced was to maintain law and order; it didn’t allow for any economic development and it did not encourage private capital and private enterprise (Knowles 134). In my personal opinion, the loss of an opportunity for economic development from the slavery period led to the need of people in later years to find economic opportunities elsewhere. The drug trade boomed, and a new economic stimulant was found for certain citizens of Jamaica. In Jamaica corruption has increased largely and rapidly. In 1999 according to the TI Corruption Perceptions Index, Jamaica received a score of 3.8. Five years later in 2004 Jamaica received a score of 3.3. This indicates an increase in the corruption of the police force in Jamaica. A BBC article from 2000 references probes into illegal wire-tapping and corrupt elements in the police force (BBC News 2000). An Economist article from 2008 states that, rooting out corruption was on the forefront of Bruce Golding’s (Jamaica Labour Party) agenda when he ran for election against the People’s National Party that year. It goes on to describe the murder of Douggie Chambers, the chairman of the Jamaica Urban Transit Company. Why was he murdered? He was an accountant and a specialist fraud investigator brought in by Golding to reform the transit company. Apparently, the company was losing over $25 million a year due to petty scams. The article states that, “The government is trying to clean up the customs, a ‘hotbed of corruption’ involving private companies and officials, according to the finance minister, Audley Shaw. It is also reforming the National Housing Trust, which provides cheap mortgages”
An analysis of this information shows that not only has corruption in Jamaica become more prevalent, but that it has changed in regards to type. Corruption in Jamaica used to be solely endemic within the police force but has since begun to disintegrate customs, transit, and housing. I believe that in Trinidad and Tobago and Guyana the pattern holds true.

Trinidad and Tobago has been another Caribbean country that has been suffering from endemic police corruption and a high murder rate (on account of the drug trade). In 2001 Trinidad and Tobago received a corruption score of 5.3. In 2008 Trinidad and Tobago received a score of 3.6. This shift indicates that over a period of seven years, corruption in Trinidad and Tobago has increased dramatically. A 2005 article from the Caribbean Net News indicated that both public and private sector officials in the country had become more corrupt within the past year (Caribbean Net News). An analysis of this presented information shows that corruption in Trinidad and Tobago has increased in amount, but the type of corruption has remained the same.

In Guyana corruption has mainly been confined to port and customs officials. An increase in the drug trade and smuggling aided in the corruption that Guyana is currently facing. Apparently, inspectors in Guyana were investigating whether customs department officials were conspiring with shipping agents to clear containers without charging taxes, etc (Miami Herald 2009). A later article indicates that, “The administration must also improve police conditions of service in order to control corruption which is also a significant cause of loss of personnel” (Stabroek 2009). An analysis of these articles display that the type of corruption in Guyana has changed over time- it has evolved from port and customs officials to the police force, yet the two together still plague the impoverished country. Lastly, TI Corruption Perceptions Indexes display that corruption in Guyana remained stagnant in the years 2005 and 2006- Guyana received a corruption score of 2.5 (TI 2005 and 2006). Armed with this knowledge one can say that corruption in Guyana, for those two years, shows that it remained stagnant. Therefore, corruption in Guyana has changed in type, but not in amount.

In conclusion, based on my analysis of the statistics used, I believe it’s safe to say that different hypotheses are valid for the three countries. Hypotheses 2 and 3 apply to Jamaica, partly. And hypothesis 1 applies to Trinidad. Lastly, hypothesis 2 applies to Guyana. This effectively displays that Western notions of corruption in the Caribbean can often be misleading, as they were for me as an observer.

Real Conclusion:

In writing this paper I have come to the conclusion that there are many loopholes when it comes to the research of foreign countries, how they battle corruption, and how Western affluent nations view their corruption problems. In the beginning of my paper I sought to determine how the corruption cases of Jamaica, Trinidad and Tobago, and
Guyana had become similar or different, and the ways in which they appeared to Western affluent democracies. The conclusion I came to surprised me. On the surface the three countries appeared to be facing similar types of corruption, but I found that they were in fact facing different types and that those types had changed over time. I also discovered that although there were different types of corruption, mostly their amounts and seriousness had increased in all three countries. The roots of the corruption lay in the drug trade and the use of the countries as transshipment sites for cocaine, but they are very different substantively.

With the research I conducted I believe that more time should be taken by Western researchers to possibly identify the ways in which different countries in the Caribbean are handling their corruption issues. I’d also hope to see less of Western researchers pushing Western ideas about corruption onto Caribbean countries. Perhaps they could do more groundwork to get better ideas of what is going wrong in these countries. And perhaps more Caribbean-based researchers could conduct this important research. It would do wonders for Caribbean history and people of the Caribbean. I wish to see more information on how the corruption escalated to this point and the solutions researchers and experts have for Caribbean-styled corruption. It is clear that corruption in the Caribbean is overwhelmingly different from Western corruption, and it would have been nice to see some journals from experts based within the Caribbean. I also would have liked to see more current journals, but unfortunately I found few. With all these thoughts in mind, I hope the next time a student seeks to study corruption in the Caribbean; they can cast away their Western perspective to see the differences between the corruptions that Caribbean countries are facing and see how it colours their view of Caribbean-styled corruption so that they can be able to effectively propose solutions.

**Bibliography**


“Country Profile: Jamaica.” *BBC News*. 4
24 April 2009.

24 April 2009.


Mauro, Paolo. “Corruption and Growth.”


Corruption Perceptions Index (CPI).”


Afghanistan: NATO’s Dilemma
By Safwan Shabab, Class of 2010

We must not - we cannot - become a two-tiered alliance of those who are willing to fight and those who are not. Such a development, with all its implications for collective security, would effectively destroy the Alliance. - US Defense Secretary Robert Gates speaking on NATO in Afghanistan at the 2008 Munich Security Conference

INTRODUCTION

On the 60th year of the North Atlantic Treaty Organization’s founding, Afghanistan provides a unique opportunity for the alliance to demonstrate its credibility as a ‘new NATO’. In its first real ‘out-of-area’ operation, NATO has a chance to prove its strength to operate beyond Europe and combat global security threats from terrorism and instability. But despite proving its early critics such as John Mearsheimer wrong during the 1990s, NATO’s credibility is once again on the line – Afghanistan is proving to be a difficult test of the alliance’s political will and military capabilities. NATO’s mission – the International Security Assistance Force (ISAF) - has been marred by a lack of collective action amongst its 28 member states and led new critics to claim that NATO has been ‘pushed to the edge of collapse’ in yet another crisis. Analysts have pointed out to the stark disparity in ISAF troop contribution and financial commitment amongst member states as illustrative of the uneven burden sharing and proof of a lack of collective effort in stabilizing Afghanistan. In this paper, I will ask the question: why does the NATO face a problem of weak collective action in Afghanistan? In answering my own query, I will argue that the weakness of collective action in Afghanistan arises from NATO’s failure to develop specific assets to deal with the unique security challenges it faces in Afghanistan. In particular, I will show that strategic ambiguity over mission objectives, a divided military command, absence of uniform funding channels and problematic civilian assets combine to raise costs without tangible benefits for

2 Article 6 of the Charter applies NATO’s collective defense to territories of ‘the Parties in Europe or North America…to the islands under the jurisdiction of any Party in the North Atlantic area north of Tropic of Cancer’; what lies beyond the confines of this definition ‘out-of-area operation’. Afghanistan falls into this latter category.
3 Writing in 1990, John Mearsheimer had predicted that ‘without a common Soviet threat or an American night watchman’, a transatlantic institution such as the NATO would lose its raison-d’être and dissolve. John Mearsheimer, “Why We Will Soon Miss the Cold War,” in Richard Betts, ed., Conflict After the Cold War, (New York: Pearson Longman, 2008), 22.
4 Mark Webber and James Sperling, “NATO: from Kosovo to Kabul,” in International Affairs 85:3 (2009), 491.
contributing members and impedes collective action within NATO in the ISAF mission.

**Free-Riding: Evidence from the Ground**

It is important to recognize that in spite of two waves of expansion and a changing security environment, the notion of shared risk and responsibility remains a ‘founding principle of the Alliance.’ And yet the ISAF mission presents a classic case of collective action problem for the alliance. This problem is best viewed in the context of burden-sharing which Peter Forster and Steven Cimbala define as “the distribution of costs and risks among members of a group in the process of accomplishing a common goal.” Mark Webber and James Sperling show that in 2008, the United States provided 44 percent, United Kingdom 17 percent and Netherlands 4 percent of total troops to the ISAF mission in Afghanistan, while others such as Norway (0.9 percent), Belgium (0.8 percent) and Portugal (0.1 percent) fell short of their share of contribution, creating a case of ‘asymmetrical burden sharing’. This disparity is true for multilateral aid contribution to Afghanistan too: while Netherlands contributed nearly 12 percent of total financial assistance between 2002 and 2008, France shared less than 2 percent of the aid commitment.

Such disparities reflect a choice of ‘selective commitment’ by certain member states. Joel Hillison highlights such behavior - the inadequate contribution to attainment of the common goal - as evidence of free riding by NATO member states such as Norway and Belgium amongst others. The interdependency of military operations in Afghanistan with civilian tasks of policing and economic reconstruction requires financial and logistical contribution along with military assets; as not all member states contribute in these areas towards NATO’s goal of stabilization and reconstruction, free-riding by some proves costly for the alliance as a whole. 

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10 It is important to note that this uneven burden sharing is not so much a transatlantic issue but rather an intra-European problem – along with the United States, several European states have been engaging in high risk and high cost missions as part of the ISAF but another set of European states opt out of their commitment in Afghanistan. Regardless, such a ‘two-tiered’ status of the Afghanistan mission is highly problematic, especially in context of the growing Taliban insurgency and a severe crisis of confidence in the Kabul government. Stanley McChrystal, “Commander’s Initial Assessment”, International Security Assistance Force Headquarters – Afghanistan, August 2009.
Assets and Collective Action

Mancur Olson, in examining collective action, argues that in a group setting “unless the number of individuals in a group is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, rational, self-interested individuals will not act to achieve their common or group interests.” 11 Despite its current size (with 28 member states), NATO does not appear to be facing institutional problems typically associated with a large scale; Celeste Wallander attributes this to the presence of ‘general assets’ within the alliance. 12 These include the formal bodies such as North Atlantic Council (NAC), Supreme Headquarters Allied Powers Europe (SHAPE) as well as the civilian staff, communication channels and a common economic infrastructure: for Wallander, these assets facilitate communication, coordination and eventually consensus building and in the process, lower costs of transaction on security issues for each member state. 13

13 Alternatively, constructivists such as Emmanuel Adler and Michael Barnet, in understanding collective action, posit that member states in an alliance like NATO need to view security as a function of community - states have to share a common identity and perceive common meaning in operational missions if they are to act collectively. Deductively, the absence of these common perceptions gives rise to uneven commitment to alliance operations. However, I argue that, for ISAF, NATO member states readily share a common understanding of the serious threat from an unstable Afghanistan. This is hence, what Olson refers to as the ‘other special device’ is the remaining factor which can explain collective action – or the lack thereof - within the NATO’s mission in Afghanistan. Wallander labels these devices as ‘specific assets’ which “facilitate particular transactions and confer efficiency gains.” 14 She argues that in dealing with different sources of instability and threats, alliances need targeted institutional principles, practices and procedures to enable member states to mitigate the security concern. A military threat needs to be addressed with assets that allow the alliance to mount credible defense and if needed, combat capabilities; dealing with political instability requires assets for mediation and engagement while peacekeeping requires mobile ground forces, multinational command and police-like rules of engagement. 15 For ISAF, it currently faces all of these challenges in Afghanistan: there is an acute security threat from the Taliban insurgency, a challenge of reconstructing the weak Afghan economy and it needs to be able to secure a stable and transparent government. As Wallander argues, a responsive institution ensures collective action by addressing these diverse mission needs through constant adaptation and development of new specific assets. I will illustrate that in the

manifested at two levels: (i) member states’ unanimous support for institutional declarations such as the Berlin Accord 2004, the Riga Declaration 2006 and the new Strategic Vision at Bucharest 2009 and (ii) commitment under Article 4 of the NATO charter that seeks to promote peace, stability and rule of law amongst states and now to its out-of area operations which includes Afghanistan.

14 Wallander, 707.
15 Wallander, 710.
context of Afghanistan, NATO has failed to develop such a range of specific assets; its repertoire of general assets facilitate necessary cooperation in Brussels but are not sufficient to address the unique security demands in Kabul. The absence of specific instruments and mechanisms - namely strategic ambiguity, a divided military command, absence of an uniform funding structure and problematic civilian assets – limit the scope and raise costs of contribution to ISAF (such as exposure to combat risks and uncertainty in planning for long term objectives) without providing any discernible and immediate benefit to each member state. As a result, member states such as Belgium and Norway are disincentivized to contribute to the mission objectives which in turn lead to a complex collective action problem.

The Case of ISAF

Wallander shows that with out-of-area missions, NATO’s “mission-specific command structure needs to be as mobile as its forces.” For the ISAF, the failure to develop the specific assets in security and reconstruction operations means that such a responsive structure has not materialized across its five phases of operations since 2001.

Strategic Ambiguity

ISAF was originally created by UN Security Council Resolution 1386 in December 2001 with military responsibilities limited to Kabul. In 2003, it assumed full command of ISAF in Afghanistan from the US and by 2008, it was responsible for (i) providing law and order, (ii) promoting governance and development, (iii) helping reform the justice system and (iv) training an Afghan police force and army under UNSCR 1883. Within the alliance, NATO has attempted to adapt and internalize these evolving responsibilities by adopting new strategies and declarations: in the 2004 Berlin Agreement, NATO committed itself to 'sufficiently constitute and (make) operational' Afghan security forces while the 2008 Strategic Vision confirmed NATO's 'long term commitment’ to Afghanistan and shift to a ‘comprehensive civilian-military

16 Well-developed specific assets have been attributed for NATO’s success in previous missions. The creation of a new planning staff at SHAPE and a Crisis Coordination Center in Brussels in 1994 allowed for a planned and swift deployment of a joint task force in Kosovo as the crisis there escalated in 1999. Wallander, 718.
17 Wallander, 719.
18 NATO planned that ISAF operations in Afghanistan would have five phases. The first phase was “assessment and preparation”, including initial

19 The fast changing environment in Afghanistan requires ISAF to cope with threats that arise from well organized militants, drug lords as well as splinter local groups and governance challenges require balancing local loya jirgas and national government agencies. To that end, specific assets pose a dilemma for ISAF; once developed and utilized successfully, the specific assets lose their usefulness and operational mobility necessitates new specific assets to be deployed.
20 Belkin and Morelli, 1.
approach’ while increasingly engaging with neighbors, ‘especially Pakistan.’

The problem with the ISAF strategy papers is that these represent mostly ‘consensus documents’ and lack detailed expectations or commitment pledges for each member state (or the means of following up on these). Julianne Smith and Michael Williams label this as NATO’s ‘lack of a roadmap’. Institutional ambiguity about the scope and objective of the ISAF mission, most importantly at the tactical level, reflects failure on NATO’s part to develop a specific asset that can continually define its mission statement. This infuses uncertainty for each member state, making it difficult to plan for long term military and financial contributions and raises the opportunity cost of commitment. For instance, shortly after the 2004 Berlin Agreement, when the US requested ISAF members to assume selected counter-insurgency responsibilities [originally conducted as part of Operation Enduring Freedom (OEF)], some NATO states balked and cited that, despite their Berlin commitments, combat operations were the purview of the US-led OEF and the preceding UN Resolution required ISAF to engage in stabilization operations only. With mission statements lacking clarity and defined responsibilities for contributing states, NATO members have no incentive to engage in riskier operations of counter-insurgency and are rather incentivized to free-ride in the complex security environment.

Similarly, a 2008 NATO Parliamentary Report cited that several nation states, including Italy and Spain, hold strong to the belief that “the formal responsibilities of the Alliance itself have always centered almost exclusively on one area: the provision of a safe and secure environment.” The report continues to state that these states feel that NATO should not have the lead in providing for democratic development, agricultural reform, or literacy programs, which “more appropriately fall under the responsibility of other organizations and agencies.” The German Defense Minister went as far as asserting that, “(Even) this (counter-insurgency) is not what the NATO is supposed to do.” This is problematic in the context of the challenges faced in Afghanistan: stabilization efforts need to be preceded by mitigation of threats from the Taliban insurgency and specific assets, in this case institutional guidelines, are necessary to motivate states to engage in the mission in a comprehensive manner, instead of making ‘selective commitments’.

Perhaps one of the most detrimental outcomes of this strategic ambiguity are the national caveats. As of 2008, there were as many as 62 caveats in place for the ISAF mission, which had a ‘direct negative impact’ on mission goals in Afghanistan.

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23 Belkin and Morelli, 16.
25 Belkin and Morelli, 17.
26 As described by Commander of NATO’s Joint Forces Command Brunssum. Webber and Sperling, 509.
forces in ISAF have some form of caveats. These include ban on night-time operations, consultation with national governments, exclusion of specific operations (notably, counter insurgency) and even ban on fighting after a snowfall. The lack of a specific institutional guideline (that systematically outlines expectation from member states) means that ISAF ground commanders have had to shape and compromise their conduct of missions to fit the caveats of national troops - instead of member forces adapting to mission-specific requirements mandated by a clear strategy paper. For instance, Germany provides a large number of troops to stabilization efforts (nearly 9 percent), but imposes restrictions on where German troops can be deployed and on rules of engagement. In 2006, this led Germany to refuse requests by the US to redeploy to the unstable south-eastern region: absence of a well-developed strategic statement as a specific asset means that member states can opt for self-designed restrictions and consequently hamper the operational effectiveness of ISAF. National caveats forfeit NATO's inherent advantage over any adversary in Afghanistan through ISAF’s intelligence, speed, firepower, and other attributes, and therefore put NATO soldiers at higher risk and impose additional costs on contributing members, creating disincentives from acting collectively. 27

Absence of Centralized ISAF Budget

Despite possessing effective general assets, NATO’s budget rules appear to perpetuate the inequity in burden sharing, more acutely in high cost and long-term missions such as the one in Afghanistan. When a member state agrees to deploy troops to a NATO operation, that nation is obligated to pay the costs associated with that deployment. Thus there is a built in disincentive for nations to agree to commit troops to a mission or increase the size of forces already deployed. This complicates efforts for ISAF, especially as additional costs have to be borne to counter the current Taliban offensive and the urgency to secure areas for civilian reconstruction projects to start. For many member states, this budgetary obligation imposes significant domestic opportunity costs: one, they have to allocate portions of their national budget towards ISAF and two, leaders of fragile governments or coalition governments often have to expend serious efforts to convince their legislatures and publics to support deployment and the associated costs. A specific asset – in this case, a common operational funding system – could have otherwise minimized the burden on certain member states with unique domestic political (and economic) conditions; reluctant states could have still committed troops while leaving costs of deployment to be funded by a commonly pooled budget.

Smith and Williams labels the approach of the current funding system as one based on ‘costs lie where they

27 Belkin and Morelli, 22.
fall’. This system deters nations from going ‘first in’ for a given operation since they have to bear the high costs of establishing the very facilities to start up in a new theater. For Latvia and Estonia amongst other smaller member states, this is particularly problematic: these start-up expenses are prohibitively high and despite their political willingness to contribute, they are disincentivized to take the lead on establishing new mission bases. During Phases I and II, this left the larger member states with the burden of setting up most facilities as ISAF expanded geographically through Afghanistan. Additionally, these ‘entry costs’ (even if borne by a willing ‘first in’ member state) arguably leads to reluctance by states to redeploy to a different theater as they become unwilling to leave behind the facilities they originally funded and constructed, often tailored to specific requirement of their national forces.  

This may partly explain the long time hesitance of Germany to redeploy part of its 3000-member troop contingent to southern Afghanistan despite continued requests by the US and the UK. Having established facilities in northern Afghanistan since the early stages of the ISAF, Germany had no incentive to volunteer or accept request by allies to undertake new operations in the more volatile areas, which could have otherwise benefitted from efforts of a well trained and experienced German contingent. Hence, the absence of common ISAF funding means that states are likely to decide on commitments unilaterally and complicate opportunities to act collectively.

**Problematic Military Assets**

A major challenge facing the ISAF in Phase III, Stabilization, has been the inadequate military assets in place, namely a divided military command, a problematic troop rotation system and lack of mission-specific military hardware. The absence or poor quality of specific military assets on the ground in Afghanistan means that contributing member states such as Spain and Portugal, weary of domestic public backlash, have weak incentives to opt into military deployment in high-risk areas while others such as the US and the UK are left exposed to casualties in the unstable south-eastern regions. In other words, the inadequate military assets raise opportunity costs for contributing member states and force them to contemplate alternative strategies – ones with restricted commitments.  

The absence of an integrated military command can be best seen in the relationship between ISAF headquarters and the Regional Commands. For instance, in RC-South the major troop contributors – the UK, Canada, the Netherlands – are strong partners relatively unconstrained by caveats. But as ISAF officials note, RC-South effectively includes “four provincially-based national campaigns – Dutch, British, Canadian, and U.S. – based on the provinces in which their

30 Smith and Williams, 5.

32 An example of a successful military asset developed by NATO was in Bosnia in 1994 when the ACE Rapid Reaction Corps (ARRC) was formed as the combined joint task force to manage peacekeeping efforts. Wallander, 726.
Respective troops are deployed. Each of these ISAF countries, in turn, tends to lobby the relevant Afghan Ministers in Kabul for assistance to “its” province. This arguably raise the costs of implementing a security project as each NATO member state, instead of coordinating, expends efforts to work through individual connections and end up competing for the same resources instead of pooling these. This problem of an inadequately integrated military command is complicated by the problematic information flow among ISAF participants. In a Congressional Report on the ISAF mission, Catherine Dale presents evidence that senior U.S. officials at the mission HQ in Kabul have “a much clearer operational picture of eastern and southern Afghanistan”, that is regions where most U.S. forces operate, than of northern and western Afghanistan. Varied communications channels, linguistic barriers, and often reluctance on part of some countries to share information represent constraints on information flow, both at a national and NATO level. In a volatile security environment where coordination and timely information is key to combat insurgents, such inadequate military communication assets can – and does - lead to tactical errors and expose troops to fatal risks that could be avoided otherwise.

Secondly, ISAF has failed to develop an effective and uniform troop rotation system – a specific military asset that could have otherwise distributed the cost of troop deployment amongst member states and allowed for a more equitable sharing of the military burden. In the context of Afghanistan, a mission which requires close cooperation with local Afghans as part of a larger military strategy, troops need at least four to five months to build necessary relationships with local forces and knowledge of the terrain in order to be effective. However, NATO member states have varied deployment schedules, anywhere between 4 and 6 months which leave little time for troops to acclimatize to their environment and start undertaking operations. Analysts have suggested that a rotation of 12-15 months is necessary to let troops function effectively on the ground; in the absence of such an uniform rotation system, ISAF is left with a high turnover of personnel who do not retain any operational experience or knowledge and each member state has to bear the additional cost of training and adapting a new unit at every cycle of deployment.

Finally, the lack of adequate military hardware for ISAF troops once again reflects on the failure to develop specific military assets, particularly important for the rugged terrain and challenging conditions of fighting in Afghanistan. The NATO Parliamentary Report 2008 explains that the absence of aviation assets such as strategic lift to get to the battlefield, helicopter suited to perform in demanding terrain and unmanned aerial vehicles (UAVs) which can provide critical battlefield intelligence, are critically impeding ISAF’s ability to deploy troops.

34 Dale, 15.

multilaterally equipped with mission-specific hardware. 36 Added to this, the absence of an ISAF rapid response force means that soldiers and civilian personnel cannot be fast evacuated when under fire, as witnessed during a 2006 deadly attack on a Norwegian Provincial Reconstruction Team (PRT). 37 As rational actors, faced with the prospect of incurring casualties in combat operations while equipped with ineffective hardware or backup support, member states are motivated to limit contribution to the mission, especially for counter-insurgency efforts.

**Inadequate Civilian Assets**

In a multidimensional security environment where civilian reconstruction efforts are as critical as military successes, especially during the stabilization and transitional phases, ISAF’s difficulties have been complicated by the poor quality of civilian assets at its disposal. Perhaps the most notable civilian asset developed by the ISAF is its PRTs: these are civilian-military units assigned to work with Afghan provincial-level officials to provide and promote governance, development and security. And yet, owing to their structures, these PRTs face serious challenges, deterring many member states from contributing to PRT-based operations. A total of 26 PRTs are in place led by 14 different nations, each run using an unique national approach. 38 Officially, the military component of each PRT falls under ISAF command; however, there is no established modus operandi (or overall concept of operations), many are dominated by military forces rather than civilian technicians and prefer reporting directly to their national representatives than the ISAF Headquarters. 39 As a result, there is little coordination amongst the PRTs and no scope for exchanging information on best practices. For instance, the Netherlands channels funding for PRTs directly to the Afghan government instead of through the ISAF mission as it deems that the latter must take responsibility for planning and implementation of projects. In contrast, the US government controls the funds for PRTs itself but for the very opposite reason: it is apprehensive of corrupt Afghan officials misusing the funds and prefers to exercise direct overview of its PRTs. 40 Without a uniform ISAF approach for the PRTs, each member state operate these teams at will, perceive the effectiveness of these civilian assets differently and hence contribute in varying scale and in the process frustrates Afghan, UN and other partners in their efforts to apply resources strategically and effectively.

In addition, some states such as Germany are weary that in some areas, civilian relief organizations should not be too closely associated with the military forces assigned to the PRTs since they feel that “their own security and perceived neutrality is endangered.” 41 As a result, many European member states do not provide for an optimum number of civilian and military personnel in their

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37 Belkin and Morelli, 22.
39 Belkin and Morelli, 14.
40 Belkin and Morelli, 13.
41 Belkin and Morelli, 12.
respective PRTs (in addition to being minimally funded, as shown in the Netherlands case) and are hesitant to engage with the Afghan population. Some states, notably France, have even refused to lead a PRT and questioned the NATO’s role in operating these reconstruction teams. For what could have been an impactful civilian asset as part of the ISAF’s comprehensive civilian-military approach in Afghanistan, the PRTs have been marred by operational deficiencies and differences and limit the channels for member states to contribute through.

It is important to note the ISAF has witnessed the positive impact of an effective civilian asset in another instrument it has developed for itself since Phase III, albeit on a minimal scale: the Operational Mentoring Liaison Teams (OMLTs). These are teams which support the Afghan National Army (ANA) deployments and coordinate between ISAF and ANA to provide critical Allied support such as medical evacuation. While OMLTs may not be a purely civilian asset, there is much that the ISAF can learn from the OMLT structure to strengthen its repertoire of assets in Afghanistan. These teams are comprised of 12-19 personnel, a small size that ensures mobility and are deployed for at least six months in each theater to build strong relationships with the ANA and maximize mentoring effort. Moreover, there are specific objectives that each OMLT is assigned with along with a tactical guideline that allows for incorporation of feedback from local Afghan units – such strategic clarity combined with flexibility have allowed the OMLTs to concentrate on training ANA forces on the ground while fostering strong connections with Afghans, in this case ANA soldiers. While France has largely led the OMLT-based efforts and there is still a shortfall of the recommended 59 units till date, the OMLTs provide example of a well-developed asset that the ISAF can emulate. The OMLT model - with institutionalized guidelines, responsiveness to changing security needs and an optimum size that facilitates close interaction with locals – allows for an asset to be effective in achieving specific security or reconstruction goals. Such assets in turn provide a channel for NATO member states to contribute into the ISAF mission, especially for those who opt to support reconstruction efforts and avoid military engagement, either due to logistical inability or a lack of political willingness.

CONCLUSION

Ivo Daalder and James Goldgeier had suggested that NATO should be expanded to include partners outside Europe in a bid to become a ‘global NATO’. And yet those aspirations seem premature before the alliance completes its mission in Afghanistan – and does so successfully. The multidimensional challenges in Afghanistan raise questions whether NATO is capable of redefining itself as a security alliance capable of committing beyond Europe. However, despite these current shortcomings, it is


43 Ivo Daalder and James Goldgeier, “Global NATO,” in Foreign Affairs. 85.5, 2006.
important to remember this is not the first time that the NATO has faced such a challenge. Similar critiques were put forth at the end of the Cold War but NATO successfully proved its worth by engaging in Bosnia and Kosovo during the 1990s. Success there was largely attributable to its ability to develop specific assets to address the unique security needs of the operations. And if the alliance is to stabilize Afghanistan, it needs to do the same. That is the only way NATO can draw equitable military and financial commitment from its member states and sustain the collective action that is an absolute necessity in winning the complex war in Afghanistan.

**Bibliography**


Daalder, Ivo and Goldgeier, James, “Global NATO,” in Foreign Affairs 85,5, 2006.


Suhrke, Astri. “A Contradictory Mission?


Webber, Mark and Sperling, James, “NATO: from Kosovo to Kabul,” in International Affairs 85:3, 2009.
The Shift from State Partnerships to Technological Solutions: Comparing Two Generations of Chinese NGOs

By Yuzhou Jiang, Class of 2012

Prior to the 1980s, the nongovernmental sector (Salamon and Anheier 1997) essentially did not exist in the People’s Republic of China. Even as late as 1996, scholars reported that China had almost no NGOs working in the areas of social welfare, development, or environmental protection (Howell 1996). However, in the last two decades, the PRC has witnessed an explosion of NGOs. Although there are no reliable numbers available, it is probable that tens of thousands of Chinese NGOs now exist, with poverty alleviation, educational equality, the environment, and healthcare as the most popular areas of focus (Ma 2006; Spires 2007). Despite the relatively brief history of Chinese NGOs, recently there have been signs of the beginnings of an institutional transformation in the sector. The first generation of Chinese NGOs (started in the 1980s, 1990s, in the early part of the century) were mostly found and led by people who are middle-aged or older and who had previously worked in the Chinese party-state bureaucracy and had little to no experience of NGOs. In contrast, in the last several years, more and more NGOs have been founded by very young people (in their teens and twenties) from China’s newly enriched middle-class, including recent graduates, college students, and even high school students. Although this new trend predates May, 2008, the devastating earthquake in Sichuan province led to a precipitous increase in second-generation NGO activity.

This article uses an organizational approach to compare and contrast first- and second-generation Chinese NGOs. According to resource dependency and institutionalist theories, organizations need to secure an adequate flow of resources (Friedland and Alford 1991; Hsu 2006) and to establish legitimacy in order to survive. Their strategies for achieving these goals will be shaped by the institutional experiences of the social actors involved (Clemens 1997; DiMaggio and Powell 1991; Kogut and Zander 1992). When we examine the first generation of Chinese NGOs, we find that their strategies let them to create entangling alliances with party-state agencies and actors. However, the new second generation NGO founders and members had much less institutional experience with the state and instead turned to strategies based on new Internet-based technologies, including social networking, blogs, and Skype. As a result, some of these new organizations are significantly disconnected from physical place, joining people from many cities and nations in a virtual location.
This article draws upon participant-observation and interview research conducted from 2004-2009 at 26 NGOs working in China. (A complete list of organizations and characteristics is available in the Appendix.) Please note that the definition of a "Chinese NGO" is debatable. All of the organizations in our sample conduct their work in the People's Republic of China, but four of them are Chinese branches of established Western NGOs (WWF, Roots&Shoots, Aide et Action, and AIESEC). One organization, Hua-Dan, was established by a Caucasian woman, a British citizen who grew up in Hong Kong. A number of the second-generation NGOs are led and staffed by Chinese (and even non-Chinese) students studying abroad. In this paper, we will focus on five organizations. Three of these we categorize as first-generation NGOs; CYDF/Project Hope improves educational access in impoverished rural areas, Golden Key serves blind and visually impaired peasant children, and Global Environmental Institute/GEI develops market savvy environmental solutions. We also examine two second-generation NGOs. The first is called AND\(^1\) and plans to aid women and children in remote rural areas. The second is an organization that is still so new that it does not have an official name yet. Its goal is to create an Internet-based system to match up volunteers with NGOs. Because it is modeling its site on the CommonApp (Education) used to apply for US colleges, we will refer to this latter organization as “NGO CommonApp”.

The Rise of Chinese NGOs

The rise in indigenous Chinese NGOs has drawn considerable scholarly attention in part because China has very little tradition of these types of organizations (Hsu 2008). Prior to the 1949 communist revolution, social welfare tended to fall primarily under the purview of kinship-based organizations or state intervention (Smith 1998). In times of natural disasters, analogous to the 2008 earthquake, when normal institutions of social welfare would be overwhelmed, the government was expected to provide aid to affected populations. In these endeavors, local elites were often asked (with very degrees of pressure) to help the state in its welfare efforts (Shue 1998). For example, during famines, wealthy elites would set up gruel kitchens in response to requests from local officials (Smith 1998). Yet with few exceptions charitable efforts to serve non-kin were temporary activities responding to atypical, rather than long-term institutionalized organizations like contemporary NGOs.

There were brief periods when civic organizations flourished (Brook 1997; Rankin 1993; Smith 1987), but non-kin-based autonomous organizations were never a dominant feature of Chinese society before 1949, and they disappeared almost completely from the 1950’s until the 1980’s. Under Mao Zedong, organizations which had been independent prior to the revolution, including political, social and religious groups, were either absorbed into the government or disbanded. No new

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\(^{1}\) AND actually combines two organizations: Alphabetum, an organization for females, and Numeralis, a club for males. It has two presidents, one for each side. In practice, AND appears to function as a single organization.
autonomous organizations were permitted to form during this time period.

In lieu of private social groups, the government and the Chinese Communist Party (CCP) established organizations that were to serve various segments of society, such as the Women’s Federation and the Youth League. Most analysts do not classify these organizations as NGOs, but instead give them the oxymoronic label of “government-organized NGO”, or GONGO. Fortunately for Chinese citizens, the Maoist regime saw social welfare services as central to its political legitimacy. In the 1950s, 60s, and 70s, the party-state was highly successful in providing primary education and basic healthcare to an impressively large portion of its citizens, especially given China’s poverty at the time (Whyte and Parish 1984).

The market reforms, which began in 1979, undermined the socialist welfare system from several different directions. Decollectivization in the countryside and the rise of private businesses in urban areas meant that a growing portion of the population no longer accessed social welfare benefits through collectives and party-state work units, but instead formed a potential customer base for market-based goods and services. In the 1980s and 90s, China’s economy grew enormously, but unequally, as the eastern and southern coasts boomed but the rest of the country was left behind. These inequities touched off enormous waves of migration as tens of millions of rural residents traveled to the cities. These changes shifted the burden of social welfare from the central government to the local government, local communities, and individual households (Adams and Hannum 2005; Davis 1989; Tsang 2001). (Ma 2006)The market reforms also made it possible for independent associations and organizations to emerge. Between 1978 and 1989, the government regulations for social organizations were relatively lax (Ma 2006:62). Students and intellectuals took advantage of these circumstances to form numerous associations. This flourishing of associational life contributed to the 1989 student protests centered at Beijing’s Tiananmen Square. After the student movement was violently suppressed, the Chinese party-state clamped down on citizen autonomy, implementing a series of new regulations for social organizations like NGOs, placing them under the authority of the Ministry of Civil Affairs (MOCA). The post-Tiananmen backlash drove most nascent NGOs out of existence and drove the remainder underground. Surveying the Chinese NGO scene in the early 1990s, Jude Howell reported the existence of GONGOs, popular membership organizations (calligraphy clubs, literary societies), and illegal dissident groups, but almost nothing in the field of development and social welfare (Howell 1996).

Regulations covering NGOs were confirmed and codified in 1996, and slightly revised in 2004. Currently, all NGOs are required to register with MOCA or one of its local bureaus. Since 1998, in order to register, an NGO must have a “supervisory agency,” a government institution or GONGO in the same field as the NGO (Ma 2006). According to government policy, supervisory agents exercise day-to-day
oversight over the NGO. In Chinese NGO slang, they are referred to as “mothers-in-law.” NGOs with more than three Communist Party members are required to establish a party cell (Spires 2007). Compliance with these regulations is highly uneven.

Although the 1989 student protests and the ensuing backlash against social organizations dealt a severe setback to China’s nascent NGO sector, the Chinese party-state continued to withdraw from its previously dominant role in social welfare services (and often neglected to step up its efforts in response to changing social conditions). More and more foreign and indigenous NGOs emerged to fill the gap. One decade into the 21st century, NGOs play significant roles in educational reform, poverty alleviation, and environmental protection in the PRC. But even in 2008, none of our rural interviewees were familiar with the term “NGO”, and the concept was not very well known even in cities. All of the NGO beneficiaries we interviewed in rural areas assumed that the organizations were state or party agencies. One employee at CYDF/Project Hope – probably the most famous NGO in China – ruefully admitted that neither her husband nor her close friends really understood what NGOs were. The very term “nongovernmental organization” (fei zhengfu zhuzhi) is awkward in Chinese because it could be easily translated as “anti-governmental organization.”

Yet despite these liabilities, more and more Chinese NGOs are being established. By 2008-9, NGOs had gained significant popularity among certain segments of the population, especially the urban educated elite. Professors at Beijing’s top universities reported that their students often discuss the possibilities of finding jobs in the NGO sector. Even before graduation, students would volunteer at NGOs. In just the first few weeks following the devastating May, 2008 Wenchuan earthquake, officials estimated that nearly 150,000 volunteers poured into the region, most of whom were Chinese citizens (Wang 2008). Some came with established organizations, but most were individuals willing to join or start projects on the fly. The earthquake and its aftermath have inspired many people in China to found their own NGOs.

Organizations and Resource Dependence

According to organizational theories, an organization’s primary task will always be to secure a constant supply of necessary resources for the firm to survive (Pfeffer and Salancik 1978). These include material/financial resources, but also the support of various social actors: investors/donors, partners, employees, clients, and people who have power at other organizations (including state agencies) which affect the focal organization. Our interviewees at Chinese NGOs spent most of their workdays on resources issues: managing fund-raising campaigns, giving presentations to potential donors, writing grant applications, attracting and deploying volunteers, and dealing with the perennial problem of high staff turnover.

Chinese NGOs face particular challenges in terms of securing
resources. NGOs are a new kind of organization in China, and the newer and more innovative an organization is, the greater the challenge it faces in establishing legitimacy and securing the flow of resources (Galaskiewicz and Bielefeld 1998; Hagar, Galaskiewicz, and Larson 2004; Hannan 1988; Stinchombe 1965). Although both first- and second-generation Chinese NGOs do seek private donations, their leaders complained that extracting these kinds of funds in the PRC is an uphill battle because the Chinese do not have a cultural tradition of donating to charities like Westerners do. Xu Yongguang, the founder of CYDF/Project Hope, quoted 2002 statistics to me – in the US, giving averaged $460/per person, in China about 12 cents (.92 yuan) per person. Despite China’s recent economic boom, it still is a poor country with a per capita income only a fraction of that in industrialized Western nations. Moreover, it lacks the institutionalized supports that exist in societies with a more established tradition of nonprofits and charities. Because China’s wealth is so new, there are no wealthy old families motivated by noblesse oblige to support charitable causes. Until recently, indigenous foundations and granting agencies did not exist.

This is not to say that Chinese people lack a tradition of giving generously to those in need. In the pre-modern era, escaping with generally channeled through kinship organizations {Dennerline, 1986 #5}. In both imperial China and under Mao Zedong’s socialist regime, the people were sometimes asked to help in times of great need such as natural disasters by donating money, materials, or labor to the state’s endeavors. However, there is very little precedent for donating money to a nonstate organization run by strangers to benefit other strangers, especially if there is no crisis at hand. As new and relatively unusual organizations, Chinese NGOs find it difficult to establish the necessary legitimacy to prove their trustworthiness to potential donors (Hsu 2008). There is some evidence that this is changing in China. In the first eight days following the May 12, 2008 earthquake, Chinese citizens donated over $500 million to state and nonstate agencies(Yardley and Barboza 2008). But for most Chinese NGOs in the last three decades, private donations were not a particularly reliable source of adequate funding.

The problems NGOs face in terms of attracting funding also affect their ability to obtain the skills and labor they need in terms of personnel. If Chinese people question whether NGOs are sufficiently trustworthy to deserve their donations, they are even less likely to believe that they are sufficiently trustworthy to be the source of their livelihoods. In very recent years, it has become rather trendy for upper-middle-class young people to volunteer at Chinese NGOs. Yet most of these young people, even those who found at NGOs themselves, admitted to us that they expected their forays into philanthropy to be temporary, and that they would eventually get a “real” job. According to interviewees, there were some people who plan to build their careers in the nonprofit sector, but most of these were hoping to eventually work for a high-profile international NGO and therefore
saw their time at Chinese NGOs as short-term stints for the sake of resume building. As a result, the Chinese NGOs we studied suffered from a chronic problem of high staff turnover.

Another problem facing Chinese NGOs is that their leaders and participants often have little to no experience with running NGOs. Because Chinese NGOs are such a new phenomenon, and because they were so rare until the last decade, very few Chinese people have experience working in an NGO. In fact, very few of our interviewees even had much experience working with NGOs prior to their current position. Many of the founders of first-generation Chinese NGOs start at their organizations before there were any other NGOs around. The founders of second-generation Chinese NGOs are so young that most of them lack work experience anywhere. For many of our interviewees, the only thing they knew about NGOs before they started their own organization was information they heard a conference or learned from a magazine article. Furthermore, because Chinese NGOs are such a recent phenomenon, there were very few role models to follow in founding and running this type of organization.

Given these daunting obstacles, what strategies do Chinese NGO leaders deploy to obtain the resources they need for their organizations to survive? Of course, many NGOs do not survive. But some do, and their strategies become institutional models for future organizations.

First Generation Chinese NGO’s: Strategies of State Partnership

Institutional Background: Experience in the State Sector

In constructing their strategies to secure resources, organizational actors will tend to replicate their own institutional experiences and the strategies commonly used by other organizations in their field (Clemens 1997; DiMaggio and Powell 1991). Different organizations facing ostensibly the same circumstances still choose different strategies (Boies and Prechel 2002). People become socialized in the practices of the organizations for which they work. Even after they leave the organization to work for or start up a new firm (such as an NGO), they carry a repertoire of skills, experiences, and expectations from the former organization with them. Also, if the new organization asks its people to move too far outside their repertoires of competency, it is more likely to fail (Haveman 1992). As a result, new organizations will tend to adopt (and adapt) the institutional practices with which their members are familiar.

The first generation of Chinese NGOs were founded between 1985 and the early years of this decade by people currently in their 40’s or older. These people generally had a great deal of institutional experience working with and through party-state agencies, but almost no experience working with non-state sources, such as private donors, foreign charities, or foundations. The earliest non-state Chinese NGOs in my sample were founded in 1985 (Golden Key and Amity Foundation), and most
Chinese NGOs are less than a decade old. As a result, almost none of the founders of first generation Chinese NGOs we interviewed had experience working in (or even with) an NGO before starting their own organization. Many of these leaders admitted to me that they did not even know what an NGO was when they founded their organizations.

Instead, their experience was in the state bureaucracy. Most of the founders of the first wave of Chinese NGOs had been former state or Communist Party cadres. After all, from the 1950s to the 1980s, all the mid- and upper-level positions in the Chinese occupational hierarchy involved working in the state bureaucracy, so any person above a certain age with a decent amount of education and ambition would have worked for the party-state. CYDF/Project Hope’s Xu Yongguang was a cadre in the Communist Youth League, Golden Key’s Peter Xu was an architect in a state enterprise before he lost his vision, and GEI’s Jin Jiaman was a scientist in a state research institute. Most of them also came from humble backgrounds, such as peasant families, and experienced upward mobility through education and careers in the state bureaucracy. They could rely on little social or economic capital from their families to help them out. (Peter Xu of Golden Key, whose father was a well-connected professor, is the exception to this trend.)

As people who had worked successfully for the party-state in a socialist, redistributive economy, these founders (and many of their employees) possessed highly developed repertoires of competency in negotiating government bureaucracy, building alliances with state agencies, and extracting state resources. These skills and techniques came so naturally to them that they often expressed bewilderment or even amusement at the bumbling behavior of foreign organizations. Jin Jiaman described a project where GEI partnered with a local government agency in Yunnan Province to set up an eco-tourism site, only to find that an American-based environmental NGO had already been working on a similar project for two years, but without consulting the government. The obvious result, she pointed out, was that the government ignored all of the Western NGO’s work. “If there are two versions of the project,” she explained, “the government is always going use its own version.” In this case, the state’s version was the one it collaborated with GEI to design. If the Western NGO had just collaborated with the government from the beginning, it could have prompted the state to invest in eco-tourism much sooner. But instead, “they used 400,000 [yuan] to do this, and it was a waste.”

In contrast, the founders and employees of first generation Chinese NGOs have little institutional experience dealing with foreign funding sources, such as Western foundations and charities. When organizations tapped foreign money, it was usually only through a very narrow range of sources which they learned about through personal connections. For example, the founders of Golden Key are Christians and have built relationships with the expatriate Christian community in Beijing. One expatriate church donates funds and sends volunteers to the NGO,
and has also introduced it to several European charitable foundations that have a mission to serve blind and visually impaired people. All of Golden Key’s foreign funding has come through these personal relationships.

The State as the Best Source of Resources

First-generation Chinese NGO leaders, drawing upon their institutional experiences, constructed strategies which depended on alliances with party-state actors and agencies. They then rationalize the strategies by insisting that these were the only rational actions for NGOs to take in the PRC. Although none of the Chinese NGOs I studied relied primarily on state sources for direct funding, all of their leaders insisted that cultivating good relationships with state agencies was the key strategy for securing organizational resources because of the state’s capacity to permit or constrain access to even non-state resources. They pointed out that the PRC is a “strong government nation”; despite the retreat of the state and the rise of the market in the post-Mao era, the Chinese state still maintained greater control than most other governments. For example, government regulations put strong constraints on Chinese NGOs in terms of what they were allowed to do to solicit private donations. However, these constraints could be loosened or waived for organizations with strong connections to influential government agencies. CYDF/ Project Hope, the organization that works in rural education, has such a close and entangling relationship with the Chinese Communist Youth League that scholars debate whether it should be classified as a GONGO or a "real" NGO (Hsu 2008; Ma 2006:101-2; Sun 2000; Frolic 1997:60). Since its inception in 1989, it has been allowed to conduct highly visible -- and highly successful -- fundraising campaigns using state-controlled media.

These first-generation NGO leaders also pointed out that the Chinese state controls NGO access to beneficiaries: to rural schools, disabled children, AIDS patients, environmentally vulnerable localities, and so on. In order to attract donations, grants, employees, and volunteers, NGOs must convince others of the organization’s "institutional account": an argument that the organization provides desirable, novel services, using methods which are innovative, reliable, and legitimate (DiMaggio 1988). The state has the power to undercut institutional accounts by preventing NGOs from providing effective services. An interview with Peter Xu, the head of Golden Key, an NGO that helps poor blind and visually impaired children have access to schooling, reveals the role of state agencies as gatekeepers to beneficiaries:

If the government said no, then there would be problems. At the present time, our relationship with the government is generally good. We can do what we want in a province as long as we get permission from the provincial Department of Education. We’ve been given permission to do whatever we want in Inner Mongolia, and that isn’t easy to get! We get the best treatment, although they don’t give us one cent.
They’ve never said no to us, and this is very difficult to achieve in China.

Although they all relied at least partially on non-state funding, first-generation NGO leaders focused on the limitations of these sources. Private donations were welcome, but most Chinese people were not willing to donate. Foreign sources of money, such as Western NGOs and foundations, were appealing to Chinese NGOs because they were perceived to be incredibly wealthy. But most first-generation Chinese NGO leaders complained that they did not know how to gain access to this money. In fact, the head of the Heilongjiang provincial branch of Project Hope asked me to give a workshop to his employees on how to access and apply for Western grants, since no one in his organization had any idea how to do it. Those who did obtain foreign funding expressed their own frustrations. Jin Jiaman, the head of GEI (Global Environmental Institute) complained, “All these international NGOs have their own goals... but the methods and goals are not suitable for the development of Chinese society.” Projects which did not fit Western preconceptions were difficult to fund, even if they offered innovative and locally appropriate solutions.

As a result, my Chinese interviewees from first-generation Chinese NGOs were convinced that it was impossible to scale up their impact past a certain point without working through state agencies. When NGOs partner with state agencies, they can gain permission to try out their strategies on a relatively small scale. If enough small scale projects are shown to be successful, the state agency can then adopt the NGO’s methods and implement them on a much larger scale. In essence, this allows the NGO to use state resources to serve their constituents. Jin Jiaman of GEI explained:

If you really want to publicize and promote something and implement it all over China, you have to push the government to formulate and enact new laws, regulations and policies to implement your idea. So from my two year's experience, I feel that what Chinese NGO can do is come up with a new concept or a new idea, and you want to apply that locally. You can first make a demonstration. You do it on a small scale. When you have enough experience and get it to work well, you tell the government, and make the government something to copy and paste. So when at last the government is doing this copying and promotion, their effect is great, especially in China because here the government has tremendous power.

The Role of the State in Social Welfare

Ideologically, our interviewees from first-generation Chinese NGOs rationalized their state alliances by insisting that social welfare should primarily be the responsibility of the state, not the private sector or the NGO sector. Peter Xu of Golden Key stated,
“Our work is to promote the cause of the government ... it’s the government’s responsibility, not mine to provide nine years of compulsory education [to these children].” At CYDF/Project Hope’s Beijing offices, an administrator named Wang also agreed that it was the state which should be providing social welfare to all of China’s children: “We are doing now what should be done well by the government.”

According to first-generation NGO leader, the role of NGOs is to help the state to fill its social welfare obligations to its citizens. In the words of Wang, at CYDF’s Beijing office:

That’s why the Project Hope came into being. It helps to fill in the gaps that the government neglects. So many kids don’t get education and we are so in need of schools. Project Hope answers the call. In future, we’ll continue to play the role of a helping hand to the government. The government focuses on big issues. We’ll help with those things the government can’t really do or sometimes neglects.

Even though the founders and employees of Chinese NGOs generally believed that social welfare was primarily the responsibility of the state, they still insisted that the state needed NGO help to fill its responsibilities. Part of the reason was the sheer scope and scale of social problems in China. But a bigger problem was a ponderous and conservative nature of the Chinese state bureaucracy. Both Xu Yongguan (CYDF/Project Hope) and Jin Jiaman (GEI) explained that they left their party-state positions to start their NGOs because they were convinced that they would never be able implement their innovative ideas within the party-state bureaucracy. Jin had worked for a national research academy in the area of environmental science, but she explained:

... there are various regulations and there are position ranks and levels and all of these will control what you want to do. So actually, if you have some ideas and you want to implement, it is almost impossible. It’s very hard, and it’s even harder than it is for us now as an NGO to push the government to do something. Because you, you have an idea here and you can do it. But [there] you cannot decide these things at all.

The top-down, hierarchical nature of state bureaucracies not only prevented officials from carrying out innovative ideas, but it also taught them to be risk-averse. Jin Jiaman pointed out that at least 50% of the ideas GEI tried had failed. As the head of an NGO, she found that a completely reasonable rate given her desire to find truly innovative and effective solutions. But such a rate of failure would be completely unacceptable for a state agency.

Indeed, many of the founders of first-generation Chinese NGOs were inspired to start their organizations because they worked in party-state agencies that were supposed to be addressing social problems, but were in
actuality limited in their ability to make a difference. CYDF/Project Hope's Xu Yongguang discovered that poor rural children were dropping out of school because of excessive fees and dilapidated infrastructure when he was a cadre in the Communist Youth League sent on fact-finding missions into impoverished areas. Jin Jiaman was a research scientist in a state institute for environmental problems. Their experience in party-state both made them aware of social issues that inspired their passionate concern, but it also revealed the limitations of working in the party-state. Starting an NGO but savvily deploying their knowledge of (and connections with) party-state agencies and state actors was their way to gain flexibility and autonomy while still deploying state resources.

Second-Generation Chinese NGOs: Technology, Networking, and Globalization

In the last several years, and especially since the Wenchuan earthquake, there has been a substantial rise in new NGOs in China. Despite the increasing popularity of NGOs in the PRC, these second-generation NGOs face many of the same problems as their predecessors. As organizations, these NGOs still need to secure a flow of resources, including funding, personnel, materials and infrastructure, and clients. As new and unknown organizations in a relatively new and unknown sector, they face the problem of establishing legitimacy, name recognition, and trustworthiness. Despite China's increasing wealth, they still need to deal with a relatively poor populace that is mostly unfamiliar with the practice of charitable giving. Like the founders of first-generation Chinese NGOs, these new leaders have minimal experience working in the NGO sector.

Despite the similarity of their problems, however, the strategies developed by second-generation NGO leaders are very different than those used by those are the first generation. Unlike first-generation Chinese NGO founders, the second-generation leaders rarely talk about the state as a source of resources. Instead, they see it as a source of interference. Wang Xuan, the former head of YinuanZhonghua (China Shelter), an organization for helping orphans, complained that the government prevented his organization from implementing a project funded by Google Philanthropy.

[Paraphrase] I knew a bunch of people in [an earthquake relief NGO called HopeChina] when earthquake happened. It was established by several doctors, teachers and grassroots volunteers in response to the great earthquake. Initially government didn't support it at all and HopeChina had to survive by itself. But as it grew bigger, government felt its influence and wanted to take it over or simply controlled it. It is true that government could inject significant amount of money and resources for this organization, but the organization became semi-government, semi-grassroots, which really frustrated the
participants. I heard that all the founders of HopeChina left [the organization]. Is that still a non-government organization? I doubt it...

Therefore, even though I can start a grassroots NGO, I'm pretty sure that it will eventually be controlled by the government. None of the Chinese non-governmental organizations can escape this fate. I really felt upset at the stories I learned in Sichuan Province, and under such circumstances, I would rather go back to college and try to become a doctor in the future. I will not get involved in non-profits any more before I graduate.

Neither AND nor NGO CommonApp is officially registered in China yet, and in interviews their members complained that the PRC is NGO regulations were overly constricting. Both are toying with the idea of registering in the United States instead.

Instead of utilizing state-based resources, second-generation NGOs build strategies that rely on new Internet-based technologies. Given that they faced the same institutional obstacles as first-generation Chinese NGOs, why do they come up with such different strategies?

Institutional Background: family privilege and school organizations

Second-generation NGO leaders have very different repertoires of institutional experiences to draw upon compared to their first generation counterparts. Many second-generation Chinese NGOs are being founded by very young people in their teens and 20s, ranging from high school students to recent college graduates. Whereas first-generation Chinese NGO leaders tend to come from humble backgrounds and experience mobility in adulthood through careers in the state bureaucracy, second-generation leaders often come from families of privilege. Their parents were the ones who moved out of the peasantry or the urban lower classes and into China's new urban middle class either through starting their own businesses or as white-collar professionals. For example, Chen Wang, the co-President of NGO CommonApp, explained that both of his parents used to be peasants. But, unlike their siblings, they were able to go to college (his father eventually earning a Masters’ Degree), and now his father manages a factory while his mother is an accountant at a university. The parents of Xueqing Zhao, an officer at AND, were once peasant farmers, but moved up into the middle class after they started a successful dumpling restaurant. The president of the male side of AND, Albus Yu, has a similar story. When he was a young child, his parents opened up printing factory and became rich.

Because their parents were only allowed to have one child, they never even had to share their families’ growing wealth with siblings. As a result, many second-generation NGO founders grew up with a degree of wealth and
opportunity previously unknown in the PRC. Chen Wang of NGO CommonAPP is now a sophomore at UC Berkeley. AND's Xueqing Zhao is a freshman at Mount Holyoke, and Albus Yu is at USC. Because of their youth and their family wealth, most second-generation Chinese NGO leaders have no work experience anywhere. This means that they did not only lack institutional experience with NGOs, but also with state organizations. Whereas first-generation NGO leaders escaped their relative poverty and low status by learning how to extract resources from party-state sources, most second-generation NGO leaders have never had a reason to gain these kinds of skills. Indeed, many of them still have never experienced providing for themselves.

Without work experience, second-generation Chinese NGO leaders gained their leadership skills from running school clubs and student organizations. Such organizations are a relatively new phenomenon in the PRC, where until recently extracurricular activities were limited and schools exerted strong control over student organizations. (In the 1989 Tiananmen Protest, one of the initial reasons why college students marched to Tiananmen Square was to demand the right to organize autonomous student organizations.) A number of second-generation Chinese NGO founders come from China’s top high school and colleges, and they are known for their leadership roles as students.

For example, Chen Wang of NGO CommonAPP is a graduate of Guangdong Zhixin High School, one of China’s most nationally renowned secondary schools. At Zhixin, Wang was the President of the Student Union for two years. In his interview, he emphasized the fact that the Zhixin High School Student Union is totally independent from the school administration:

> There are 11 departments in the Student Union. We emphasize democratic ideology in internal management. Therefore, even the school administrators have no authority to interfere with the Student Union. Most importantly, we are financially independent from the school administration. We raise funds for the Student Union programs, and we are completely responsible for the financing…. I am pretty sure it is one of the most mature, professional student unions in a Chinese high school.

By working through the Student Union’s Volunteering Department, Chen learned the importance of helping the needy, as well as gaining vital experience in coordinating projects with several NGOs. He also discovered certain weaknesses in the NGOs; he believed that they were not using Internet technology as effectively as they should. Realizing that this was a problem he could address, he was inspired to start NGO CommonApp. He explained, “I think my experience in the Student Union prepared me for [NGO CommonApp], both intellectually and experientially.”
And they could even turn to their parents for funds for their nascent NGOs. Because many of their parents achieved upward mobility through entrepreneurship, a number of them are willing to support the entrepreneurial efforts of their offspring, at least to some degree.

Family Money and Technological Solutions

Given their institutional backgrounds, it is not surprising that second-generation NGO leaders rarely turn to the Chinese party-state for resources. However, their nascent organizations still need to secure those resources. What strategies do they use instead?

First, second-generation Chinese NGOs are much more likely than first-generation Chinese NGOs to draw upon the personal wealth (or, more accurately, the parental wealth) of their founders and staff members. For example, Albus Yu's parents donated 5000 yuan (about $700) to AND in February, 2009. In addition to direct donations, second-generation Chinese NGO members draw upon family money or connections to obtain or access resources. Staff members are expected to pay their own way in terms of transportation, and to have easy access to the latest computer and cell phone technology and access to high-speed Internet connections. The organizations do not provide equipment to reimburse costs; it is assumed that staff members have access to these resources through their families.

One of AND's programs was to conduct free Study Abroad Information Sessions in July and August, 2009, for Chinese students interested in going overseas. The Information Session were essentially a marketing ploy; their real goal was to raise money for a project helping rural school children in Yunnan and to spread the word about Chinese NGOs. People were invited to seven different locations across the PRC and one in Taiwan to hear a slate of Chinese students studying at prestigious American universities (Yale, Harvard, UVA, Dartmouth, Smith, UNC, and so on) addressing them virtually over the Internet. All of the speakers volunteered to participate for free, and they used their own computer technology and Internet connections (or facilities available at their universities) at no cost of AND. The project also required AND to have access to sizeable conference rooms in each city that were equipped for Internet videoconferencing. By utilizing family connections, they were able to get access to appropriately-equipped conference rooms in schools, universities and companies for free.

However, the family funds can only get second-generation Chinese NGO so far. What makes it possible for them to operate is that their members utilize the Internet technologies available to them in savvy and innovative ways. Of course first-generation Chinese NGO leaders also utilize technological solutions, and their offices all have computers and their organizations have websites. But the second-generation grew up on the Internet and are highly adept at negotiating the Web 2.0 technologies: social networking sites, blogging, Skype, and so on. They use these technologies to drastically reduce the costs of communication and
transportation, making it possible to access talents and resources worldwide spending very little money. By using Skype and Internet videoconferencing technology, AND was able to bring in high-status speakers from the other side of the world for their Study Abroad Information Session/fundraiser without incurring any costs for airline flights, hotels, restaurants.

These technologies make it possible for these organizations to be disconnected from any specific physical locale. Members can remain involved even when they are scattered all over the world. AND’s 35 members in the PRC, Taiwan, Hong Kong, the United States, Britain, Australia and Canada. Similarly, NGO CommonApp involves 38 students located at UC Berkeley and multiple Chinese universities. Meetings are held virtually using low cost Internet-based telephone and online chat services, such as Skype, MSN Messenger, and QQ (a Chinese service). In the words of Albus Yu:

Since everyone lives in different areas, our communication is solely based on the Internet. It looks good that we have our own forums; we have weekly meetings on MSN and Skype. We make phone calls. We send emails. We implement programs via long-distance communication.

Second-generation Chinese NGOs also use social networking sites such as Facebook and RenRen (the Chinese site very similar to Facebook) for disseminating information and recruiting members. According to interviewees, one of the benefits of recruiting through social networking sites is that it was easy to verify information about candidates through their profiles. For example, Ayaka Minamoto used Facebook to post a recruiting ad for Alphabetum (the female club that makes up half of AND). Here are excerpts from the post:

Alphabetum Needs YOU
Girls CAN and WILL change the WORLD!

Who Are We
Alphabetum is a non-profit organization formed by three girls, Ayaka Minamoto, Coco Rao and Daisy Wang, in 2008. We are here to raise funds, create awareness, and advocate with the United Nations and Chinese government on humanitarian concerns.

If you are:
1. A girl
2. A student (high school and above)
3. Willing to help others and not going to quit at midway
4. Optimistic, initiative, ambitious and proactive
5. Good at working with someone you don't like, and willing to listen to others’ suggestions

! PLEASE JOIN US , and SHARE YOUR LOVE!

When Chen Wang of NGO CommonApp encountered local NGOs as a high school student, he felt that they were not taking sufficient advantage of Internet technologies to scale up their organizations. Along with several
friends, he decided the best way to serve Chinese NGOs would be to help them recruit qualified members in a more rationalized manner. As students who had experienced the CommonApp (Education) when applying for schools in the United States, this seems like a reasonable model to use for Chinese NGOs. CommonApp (Education) creates a uniform application form for college students to file in online. This common application includes basic personal information, prior extracurricular experience, academic credential, personal statement and recommendations. However, each university/college can create a supplementary form for particular selective criteria, either supplementary essay or survey questions. In the same way, they envision that NGO Common will have a common application covering basic personal information, prior extracurricular experience, academic credential, personal statement and recommendations as well. Applicants will be expected to give evidence of their academic prowess and leadership skills, state their commitment to philanthropy, and explain sense of social responsibility. Each distinctive NGO can also generate a supplementary application form for better understanding of the applicants.

According to the members of NGO CommonApp, the technology platform of CommonApp (Education) is "static and simple" -- based on easy-to-use Web 2.0 technology. Therefore, even a undergraduate team would be able replicate this platform within a relatively short amount of time. Every NGO CommonApp user will have a particular ID account and a particular user homepage. On their page, they will be able to perform a menu of functions, such as reviewing past activity, uploading pictures/videos, and updating status and messages. Their hope is that this system will make it easier and more appealing for Chinese college students to apply for nonprofit opportunities, and for NGOs to select applicants that fit their needs. If successful, they will help Chinese NGOs reduce their need for resources for recruiting and hiring.

Second-generation NGOs not only use technology to replace aspects of the organization, but in some cases to replace the organization altogether. An online group of Chinese backpackers set up the “1kg Project” – backpackers heading toward impoverished areas would add 1 kg of supplies to give to the local residents, such as books, school supplies, food, or books. The website allows backpackers to find out which communities are seeking what kind of supplies. After visiting the communities and dropping off their 1kg of supplies, the same backpackers can update the communities’ needs list on the website. The NGO is managed by volunteers, but in many ways runs itself. No office or employees are needed (Zhang 2007).

The Implications of Changing NGO Strategies in China

It is not yet clear what the implications will be, if any, of the institutional shift in strategies with the rise of second-generation Chinese NGOs. NGOs in China are still a relatively new phenomenon, and most of the ones that are of any significant size at all still follow the first-generational model. Second-generation Chinese NGOs are, by
definition, new and relatively untried. It is unclear whether or not their strategies will prove successful enough for the organizations to survive more than briefly. Even in our sample, we found evidence of the challenges that second-generation Chinese NGOs face. AND planned to conduct a medical relief project at a village in Sichuan in the summer of 2009, sending one doctor and two nurses along with supplies. As Xueqing Zhang explained,

We failed to implement this rural area project because we didn't get any financial resource from the outside. We picked a poor village in Sichuan Province and decided to do this. Our President Ayaka Minamoto also tried to seek financial support from a Boston church. However, that church thought the village we picked was not so poor, so they decided not to support our project financially.

In other words, the only project AND has successfully implemented so far is one which required no funds from outside the group members themselves: the Study Abroad Information Sessions.

Second-generation NGO members also complained about the liabilities of long-distance communication, especially in terms of building a community spirit and maintaining discipline. AND’s Albus Yu noted:

We have problems with some coordination, and we do not know how to supervise other teammates. Some members may only be passionate for a short time, but they don't persevere in their work. E-mail is not powerful enough to really gather everyone together... we thought we would just bring people together who at the same motivation and ambition, and then brainstorm ideas. However, it's just too common to encounter insufficient responsibility and a lack of contribution from people. These last six months have helped us figure out who is really in and who's not. Some group members will soon be fired.

Indeed, some of the most successful new Chinese NGOs exhibit first-generation strategies of state partnership, even though they have second-generation characteristics in terms of their members. For example, Shanghai JUCCCE (Joint US-China Cooperation on Clean Energy) was founded in 2007 by a recent MIT graduate, Peggy Liu. It now has a very nice office building, runs many programs, and lists hundreds of partners and special advisers. It is also known for operating as a hub between government agencies and officials, businesses, and NGOs.

On the other hand, second-generation technology-based strategies are not limited to the young. Zhang Junfeng is in his 50’s and runs in Beijing North Canal Water keeper. Every Saturday, for the last three years, he hosts full day walk along a river for a couple dozen participants, most of whom apparently find out about the program through word-of-mouth. Ostensibly, the purpose of the walk is to gather data for records about the environment, but
Zhang uses the opportunity to teach people extensive environmental knowledge. At the end of the walk, participants are invited to upload videos, photos, and journal descriptions of the trip onto a public blog online. Zhang has no staff or organization per se, but instead relies on Internet technology and information sharing to protect these specific ecosystems and to increase general environmental awareness.

The institutional field of Chinese NGOs is still emerging and unstable. The institutional models are not yet set. As Chinese NGOs continue to evolve over time, we will be able to see which institutional models eventually become established, and which strategies become the norm.

Appendix: List of Organizations

1. Organization: 1 KG (多背一公斤)
Description: a non-profit organization, founded in 2004, for both traveling and aid-education. Backpackers access a site to find out what communities along their hikes need, and pack 1kg of those supplies in their packs.

2. Organization: 512 Disaster Relief Center 512民间救助中心
Description: a non-profit, grassroots organization founded by 40 Chinese grassroots NGOs in May 2008, in response to the Great Sichuan Earthquake. It is a joint effort in Chinese non-profit world, serving as an information center for post-quake relief projects.

3. Organization: AiBai 爱白
Description: A non-profit grassroots organization founded in 1999, dedicated to homosexual awareness in China.

4. Organization: Aide et Action, Chengdu Office 助学行动，成都办公室
Description: a global non-profit organization based in France. Chengdu Office was founded in 2003, focused on aid-education in Sichuan area. It is implementing post-quake aid-education programs in disaster-hit areas.

5. Organization: AIESEC Fudan University
Description: largest youth non-profit organization for career and intern opportunities, founded at Fudan University in 2003

6. Organization: AiSiChuangXin 爱思创新
Description: a non-profit grassroots organization in Beijing founded in 2007, devoted to community development and participatory governance. It serves as a financial management agency for CCPG, a NGO network in China committed to developing communities.
7. Organization: Amity Foundation
Description: The Amity Foundation, an independent Chinese voluntary organization, was created in 1985 on the initiative of Chinese Christians to promote education, social services, health, and rural development from China’s coastal provinces in the east to the minority areas of the west.

8. Organization: AND
Description: a non-profit organization initiated by a diversified group of Chinese high school and undergraduate students in Oct, 2008. It is dedicated to aid-education, infrastructure, medical care and study abroad.

Description: a non-profit, grassroots organization founded in 1996, dedicated to environmental education with 15 full-time employees and hundreds of registered volunteers

10. Organization: Beijing North Canal Waterkeeper
Description: run an individual who joined Waterkeeper in 2007, a global water-protection non-profit organization. He is responsible to raise awareness of river protection in Beijing areas. Part-time job.

11. Organization: CAI (China Arts Initiative)
Description: Founded in 2006 by a woman of Chinese descent who grew up in the US, this organization provides arts programming for migrant schools in the Beijing area.

12. Organization: Chengdu Urban River Association (CURA) 成都城市河流研究协会
Description: CURA is a non-profit, grassroots NGO founded in 2003, dedicated to improving river quality of Chengdu area as a research center. Over 100 professors are registered as official member of CURA

13. Organization: CYDF (China Youth Development Foundation)/Project Hope
Description: Founded in 1989, CYDF has many programs, but the most famous is Project Hope, which serves rural children by helping them stay in school through sponsorship programs. Project Hope also builds, renovates, and repairs dilapidates rural school facilities.

14. Organization: Golden Key
Description: Founded in 1985 by a man who is visually impaired himself, this organization helps blind and visually impaired children in rural areas stay in school and gain self-supporting skills.
15. Organization: Global Environmental Institute 全球环境研究所


16. Organization: Hua-Dan

Description: Founded by a White British woman who grew up in Hong Kong, this organization serves migrant children in the Beijing area through drama-based programs.

17. Organization: Huizeren (To Benefit People)

Description: a non-profit grassroots organization in Beijing, founded in 2003, dedicated to volunteer capacity building in other organizations.

18. Organization: iCET (The Innovation Center for Energy and Transportation)

Description: Founded in 2004, this organization's core mission is to mitigate climate change through the promotion of clean, low carbon and energy efficient policies and technologies in China.

19. Organization: JUCCCE (Joint US-China Cooperation on Clean Energy), Shanghai Office

Full Name: Joint US-China Cooperation on Clean Energy

Description: a non-profit organization focused on clean energy in China, founded in 2007.

20. Organization: LiangShuMing Village Construction Center 梁漱溟乡村建设中心

Description: A non-profit grassroots organization founded in 2006, dedicated to village construction/productivity and human rights.


Description: a non-profit organization initiated by a diversified group of Chinese college students. It is dedicated to starting up an online platform Web 2.0 for both volunteer match (CommonApp) and non-profit social network service. Marketing Team is based in Mainland China, and Technology Team is based in University of California, Berkeley.

22. Organization: Roots and Shoots, Shanghai Office

Description: one of the largest worldwide non-profit organizations for environmental protection; Shanghai Office was founded in 2000, officially registered under Shanghai City Government. At least 12 full-time employees and several interns.
23. Organization: Wave5 Foundation, Ltd 伍涛基金会

Description: It is a post-quake NGO founded in 2009 and based in Hong Kong. It is implementing programs in Sichuan Province, ranging from mental health to economic development via social enterprise model.

24. Organization: WWF, Changsha Office

Description: one of the largest global non-profit organizations for animal and ecology conservation. Changsha Office was founded 1999, focused on Dongting Lake and Boyang Lake conservation project. 6 full-time employees

25. Organization: Yale Outreach Trip to Sichuan

Description: Yale University 2009 Spring Break Trip to Sichuan Province for post-quake aid-education, organized by three Yale Chinese students.

26. Organization: Yinuanzhonghua (Shelter China)

Description: currently defunct, this organization set up to take care of the psychological and material needs of orphans.

References


Abstract

The potential effects of self-regulated study and memory retrieval on learning were investigated in a 2 x 2 within-subjects design. Participants studied and later were asked to recall Swahili-English word pairs in a cued-recall paradigm. The independent variables were Self-Regulation (whether participants could drop a word pair from the study list) and Memory Recall (whether participants were asked to generate the second member of a word pair during study). There was a main effect of Self-Regulation (learning increased when participants were unable to discard word pairs), no main effect for Memory Recall, and no significant interaction. The lack of a statistically significant result in the Memory Recall condition perhaps was due to inadvertent recall during the recognition task. Implications and future directions will be discussed.

The ability to navigate the world effectively is crucial to the survival of human beings. A key component of this navigation is the ability to learn about the environment, and subsequently apply this learned knowledge in the future. Further, humans most efficient at this task are better equipped to face challenges and steer their worlds successfully. Thus, it is crucial to know as much as possible regarding how human beings learn most effectively and efficiently. The current research provides insight into how human beings learn, errors they make in their learning, and potential methods to combat these errors.

More specifically, in an academic setting, the current research has both pedagogical implications as well as suggestions for self-regulatory methods. From an educational perspective, insight regarding the most effective means of information presentation could aid in course design, presentation of material to be learned, testing frequency as well as testing design itself. From a learner perspective, a considerable component of an education occurs when one is self-regulating their own study away from the learning environment. Findings that provide insight into how learners regulate their study, mistakes they may make, and factors that aid self-regulation could prove to be extremely important in the educational realm. In order to investigate this vital issue, the current study was designed to further explore phenomena associated with self-regulated study and a finding known as the testing effect.

Testing Effect

The present study ties together two interesting and pragmatic issues regarding the educational arena. First, is
the idea known as the testing effect. In an attempt to maximize learner capacity and instruction potential of educational facilities, studies have been conducted exploring various aspects and effects of testing. Testing has been shown to improve retention of material superior to that of additional study time; this phenomenon has become known as the testing effect (McDaniel, Anderson, Derbish, & Morriseette 2007; McDaniel, Roediger III, & McDermott, 2007; Roediger III & Karpicke, 2006). In general, the testing effect is the consequence that direct learning has on a person’s memory; the act of taking a test itself enhances memory through direct processes and not as a result of further steps taken to learn after the testing occurs (McDaniel, Anderson, Derbish, & Morriseette 2007; McDaniel, Roediger III, & McDermott, 2007; Roediger III & Karpicke, 2006). In other words, when participants are required to recall the material on a test and subsequently produce it (short answer), retention is superior to when participants choose answers they believe to be correct (multiple choice). Further, this enhanced learning based on previous testing has been shown to extend to final test performances in the long term (McDaniel, Anderson, Derbish, & Morriseette 2007).

Feedback has been shown to effect testing paradigms (McDaniel, Anderson, Derbish, & Morriseette 2007; McDaniel, Roediger III, & McDermott, 2007; Metcalfe & Kornell, 2007). Specifically, feedback was shown to positively effect performance and when it was not given, incorrect responses went unchanged (Metcalfe & Kornell, 2007). Some studies suggest this helpful effect of feedback can only be seen in short answer paradigms (McDaniel, Anderson, Derbish, & Morriseette 2007). However, others argue that feedback positively effects many different learning situations, with the most positive results seen in short answer paradigms (McDaniel, Roediger III, & McDermott, 2007). Overall, it is clear from this data that feedback positively supplements the effects of the testing effect.

The testing effect has powerful implications for learning and pedagogy. After reviewing literature, we have found there to be robust evidence for a testing effect. Further, previous studies suggest that there is an interaction of between material retention and self-regulated study (Kornell & Bjork, 2007; Metcalfe & Kornell, 2007; Roediger III & Karpicke, 2006). This brings us to a discussion of another important phenomenon regarding the educational arena: self-regulated study.

Self-Regulated Study

Recent investigations on learning have suggested an effect of self-regulation on material retention (Kornell & Bjork, 2007; Kornell & Bjork, 2008). In many of these studies, participants are given control of when to stop studying...
material (Drop condition). Alternatively, other participants are not given this control and required to study all material to be tested (No Drop condition). Kornell and Bjork (2008) chose to test self-regulated study specifically regarding the decision to drop flashcards that contained content to be tested. Materials to be studied were Swahili-English word pairings from Nelson and Dunlosky (1994). If participants chose to drop a flashcard, the word pair was removed from the electronic cycling of material. A robust finding was seen in Experiment 1, where allowing participants to drop flashcards was detrimental to learning. This implies that learners are not properly regulating their study habits, reflecting findings of Kornell and Bjork’s (2007) review.

Kornell and Bjork (2007) suggest that participants do not make choices that maximize learning. They argue that participants decide to stop studying material in either of two situations. The first is when they judge they have mastered the material, and the second is when they judge that they will not be able to master the material. Further, participants select easiest to-be-learned material when allowed to restudy previously presented material; they do not focus on the more difficult material they do not yet know. Lastly, participants seem to improperly judge their retention ability; participants drop items they may know in the short term, not taking into account their loss of memory over time. Many participants did not believe testing was a chance to learn (only 18% surveyed believed it to be; Kornell & Bjork, 2007). If participants can harness proper self-regulatory mechanisms when learning, the improvement in retention could be substantial. Alternatively, if certain factors are found to mediate the effects of self-regulation, perhaps improved retention could be achieved.

Experiment 4 of Kornell and Bjork (2008) failed to reproduce a difference between No Drop and Drop conditions that was present in Experiment 1. A key difference between these experiments concerns whether participants were required to produce the answer during study. When participants did not produce answers during learning, greater differences between self-regulation conditions (Drop and No Drop) are seen. This begs the question of why there was considerably less of a difference between Drop and No Drop conditions in Experiment 4 (where material was produced during learning) than in Experiment 1 (where material was reread)? Two possible explanations include: (i) metacognitively, participants are judging their learning more accurately because they are abruptly made aware of their lacking knowledge if they are not able to produce the material, or (ii) a memory-based explanation suggests learning is more effective due to material production, which reflects the idea of the testing effect (McDaniel, Anderson, Derbish, & Morrisette 2007; McDaniel, Roediger III, & McDermott, 2007; Roediger III & Karpicke, 2006). More simply, did production of answers during learning cause participants in Kornell and Bjork’s (2008) study to actually learn better (implying the testing effect) or are they simply deciding how well they know the material more accurately?
Looking more closely at this finding, it is necessary to note another aspect of Kornell and Bjork's (2008) study. In Experiment 4, Kornell and Bjork placed participants into three conditions requiring either the user to decide when to drop word-pairs (User), the computer to drop pairs after one correct answer (Autodrop 1), or the computer to drop pairs after two correct answers (Autodrop 2). Each of these conditions (User, Autodrop 1, Autodrop 2) had a No Drop condition associated with it, in which the participant was required to continue studying all of the material the entire study period. Oddly, there were major differences between the No Drop conditions despite being the same procedurally (the only difference was which Drop condition (User, Autodrop 1, Autodrop 2) the No Drop condition was paired with). The experimenters did not address this finding in their paper, but it is worthy of note and further investigation. To explore the main question regarding the possible mediation of generation on self-regulated study, it is important to replicate the differences between Experiments 1 and 4 of Kornell and Bjork (2008) in a single paradigm. These differences suggest an interaction between retrieval type and self-regulated study but are complicated by the varied No Drop results described above.

**Experiment 1**

This experiment was designed to: (i) replicate the testing effect findings and self-regulation data in a single testing paradigm, (ii) gain an early sense of possible interactions occurring between these two variables, and (iii) gain insight as to why differences were seen among the No Drop conditions in Kornell and Bjork’s (2008) Experiment 4.

**Methods**

Participants. 20 undergraduates participated in one 50-min session as part of a requirement for an introductory psychology course. All participants reported being native English speakers with no experience with Swahili.

Stimuli and Procedure. The experiment performed was a 2 x 2 within-subjects design where participants studied and later recalled Swahili-English word pairs using a cued-recall paradigm. One hundred Swahili-English pairs formed the stimulus set, with pairs selected randomly by participant and condition (Nelson & Dunlosky, 1994).

The independent variables were Self-Regulation (whether participants could drop a word pair from the study list) and Memory Recall (whether participants were asked to generate the second member of a word pair during study). A computer with a standard LCD monitor was used for stimulus presentation and data collection. Stimuli were presented in text mode in a simulated “flash card” situation, where one word was presented on the screen at a time.

The experiment was blocked, with each block representing a condition (Drop-Generate, Drop-No Generate, No Drop-Generate, and No Drop-No Generate). The order of blocks was randomized for each participant. Before the main experiment began, participants had a practice block in which data were
not recorded. The inter-block interval (time between blocks) was 10 seconds.

Blocks consisted of 10 to-be-remembered word pairs. Each block had two phases (initial presentation and study). The initial presentation was the same for all blocks, and the study phase varied by condition. In the initial presentation the pairs were presented (one word at a time), with the Swahili word presented for 3 seconds, the English word presented for 3 seconds and a 1 second inter-trial interval (time between each pair). After this initial presentation, the study phase sequence varied by condition (see below). In all conditions, there were 7.5 minutes allocated to study time with a countdown timer presented on the computer screen indicating time left for the block. Participants were informed that all 7.5 minutes would need to be utilized before the computer would allow them to continue to the test phase. After all blocks were completed, a cued-recall test was performed for all 40 word pairs, presented in random order.

The study phase varied by condition. In the Generate conditions, participants were required to type in the English word that they believed corresponded to the Swahili cue word, followed by a presentation of the correct English word. In the No Generate conditions, participants simply looked at the correct translation after viewing the Swahili cue word (similar to the study phase). In the Drop conditions, participants were able to control when to stop studying a pair by dropping it from rotation after the Generate or No Generate aspect of the study phase. In the No Drop conditions, all pairs were presented in rotation and participants did not have the choice of dropping them.

Final testing presented the Swahili cue words in random order and participants were asked to type in the corresponding English word. The Swahili cue was shown and participants were urged to hurry if they took longer then 12 seconds to produce the English response.

Results

The average number of correct responses from the test phase are presented in Table 1 and Figure 1. The number correct in the test phase were subjected to a two-way, repeated measures Analysis of Variance (ANOVA), with Self Regulation (Drop or No Drop) and Memory Recall (Generate or No Generate) as the independent variables. There was a significant main effect for Self Regulation (F=5.830, p=.026), with participants demonstrating better learning when they were not allowed to control their study. This result replicates previous findings and is consistent with the idea that there are discrepancies between metacognitive control and ideal learning (e.g., Kornell & Bjork, 2008; Kornell & Bjork, 2007). There was no main effect of Memory Recall (F= <1), nor an interaction between Self Regulation and Memory Recall (F= <1).

Discussion

The main effect seen for Self Regulation shows that the ability to control ones studying is detrimental to material retention. Mean correct responses for final testing were
significantly lower when participants were in the Drop condition. This replicates those of previous studies further suggesting that self regulation is vigorously harmful to material retention (Kornell & Bjork, 2008). Further, this finding suggests participants are consistently making decisions to stop studying material that results in lower material retention.

There was no significant main effect found for Memory Recall. In the Generate condition participants were meant to actively recall the corresponding English word pair. Participants in the No Generate condition were meant to simply reread the English word, without internally recalling what they believed to be the corresponding answer. It is possible that participants in the No Generate condition (in which they were supposed to reread the English word) were in fact recalling English word pairs when presented with the Swahili cue words prior to seeing the English word presentation.

In order to ameliorate this potential confound, future work will utilize a two-alternative forced-choice paradigm. In this paradigm, participants would be presented with the Swahili cue word and then presented with two possible English word answers (one correct, one incorrect). This two-alternative forced-choice paradigm was shown in a previous study to be less effective in enhancing memory than a recall paradigm (McDaniel & Masson, 1985). Therefore, it is hopeful that this paradigm will enhance the manipulation difference between the Memory Recall conditions (Generate and No Generate).

In addition to this adjustment, it may be most effective to present Swahili cue words for a shorter period of time (1.5s as in Kornell and Bjork (2008) Experiment 1) or at the same time as the two English choices are presented. This would further eliminate any possibility that participants would internally recall when they were meant to simply recognize. In the Generate condition, participants would be presented with the Swahili cue word and then provided a blank space to type in their presumed answer.

There was evidence (though not statistically significant) of an interaction between Self Regulation and Memory Recall. Specifically, a greater improvement in mean correct responses was seen when participants were required to produce answers in the Drop conditions than in the No Drop conditions. In other words, when participants were able to control when they dropped material, generating answers made more of a difference in their learning then when they were unable to drop material. This has important implications for the main question of a possible interaction between self regulation and production of answers causing the differences seen between Kornell and Bjork’s (2008) Experiment 1 and Experiment 4.

Lastly, the current study showed evidence of ceiling effects. Increasing the amount of words per block from ten to twelve (adjusting the time per block accordingly) might assure participants are sufficiently challenged. This adjustment, along with the other proposed changes, may allow a more definitive exploration of the two alternative explanations detailed above.
Concluding Remarks

The issues of self-regulated study and the testing effect are pragmatic and vital to gaining valuable insight into the realm of learning both within and beyond an educational setting. As stated above, future studies will further address the questions surrounding memorial and metacognitive issues involved in self-regulated study and the testing effect. The findings from this work will be of importance to both basic scientists and those interested in educational applications.

Acknowledgements

Dr. Douglas Johnson of Colgate University was, and continues to be, an integral part of the development and implementation of this study. Dr. Johnson played a central role in the extensive literature review, the proposal for research, the decision-making process regarding focus, protocol, and aims, development of the current study, creation of test protocol, data analysis, subsequent study adjustment and development of this paper. I am extraordinarily thankful for his involvement in this study and very much look forward to future endeavors.

References


Figure 1: Average Correct Responses per Block in Final Testing

Table 1: Average Correct Responses in Final Testing

<table>
<thead>
<tr>
<th></th>
<th>Drop</th>
<th>No Drop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generate</td>
<td>7.2</td>
<td>7.9</td>
</tr>
<tr>
<td>No Generate</td>
<td>6.7</td>
<td>7.8</td>
</tr>
</tbody>
</table>

Table 1: Average Correct Responses in Final Testing
Astronomers use pulsars as astronomical clocks to perform physical tests, such as in testing Einstein's Theory of General Relativity. As these tests require more precise clock time measurements, we run into problems associated with the pulses traveling through particles in space. Using data taken simultaneously at two radio telescopes, we looked to improve the precision of measurements taken of two pulsars. We looked for correlations between data sets using a variety of techniques to account for the error in our measurements. We report our results in the hopes that these methods can be used in future pulsar timings.

Introduction
Stars undergo a life cycle occurring over millions to billions of years with a variety of evolutionary tracks. At the end of their lives, stars become a new class of celestial object based upon their masses. An average mass star like our Sun will eventually become a Red Giant, expanding in size and shedding off its outer, gaseous layers, and leaving the burnt out core behind, forming what is known as a white dwarf. Larger mass stars between 1.4 and 2.0 times the mass of the Sun will form a Red Supergiant and eventually supernova. Left behind is what is called a neutron star. Much heavier stars will also supernova, the portion left behind collapsing under the force of gravity into a black hole. This paper will discuss the uses of a subset the middle class of stellar remnants: pulsars.

Neutron stars are composed of mostly neutrons surrounded in a thin shell of iron. Those that spin along a rotation axis are called pulsars. Pulsars viewed from Earth are analogous to cosmic lighthouses. Each has a magnetic axis offset from their rotation axis that shoots off radio beams. It is believed that all neutron stars that we see are pulsars since no non-rotating neutron stars have been discovered, though over the course of the age of the Universe many probably exist now. A similar offset phenomenon can be seen with Earth's axial tilt. Our rotation axis is offset from the plane of the solar system which causes seasons since once side of the Earth points directly toward the Sun on one side of its orbit (summer) and away on the other side (winter). Similarly, with pulsars, when the pulsar's radio beam sweeps along our line of sight we can see the radiation since it is pointing directly toward us. This happens.
regularly as the pulsar spins and is called a pulse. Each pulse from a standard pulsar, one set spinning as a result of the supernova, occurs on the order of once per second.

The pulsars studied here are known as millisecond pulsars (MSPs). These pulse several hundred times per second (once every few milliseconds, or one-millionth of a second) and are believed to be the result of a pulsar and another object, usually a star, in the same stellar system. Mass moves from the star to the pulsar, increasing the pulsar's spin rate (period) as angular momentum is moved. This period slows down as energy is lost through the beam, decreasing the angular momentum of the pulsar, but the effect is very small (on the order of less than a nanosecond, or one-billionth of a second, per year). Because MSPs rotate so rapidly, emit regular pulses, and do not slow down much, they are the most accurate astronomical clocks known. Using them, we can test properties of physics, specifically as the signal passes through space, changes in some way, and reaches Earth.

The long-term goal of this project is to use pulsars as clocks to directly detect a phenomenon predicted by Einstein’s Theory of General Relativity known as Gravitational Wave Radiation. General Relativity provides a geometric explanation for gravity in the context of space and time. Our universe contains three dimensions in space and one in time, interconnected in what is called spacetime. While we think of the universe as Euclidean in nature, that one can move straight in any six directions along three perpendicular axes (the x-y-z axes), spacetime is actually curved due to mass. In Figure 2, a mass is placed on a two dimensional analogy of our three spatial dimensions. The mass curves space and creates a gravitational potential well.

Figure 1: Pulsar Schematic

Figure 2: 2D Curved Space

Figure 3a shows the naïve view of space, without any mass, with straight lines connecting each of the points. Figure 3b adds a mass to the middle and shows how points in space curve towards it under its gravitational influence.

Figure 3a: 3D Flat Space
In 1974, Hulse and Taylor made the first indirect detection of this radiation using two pulsars orbiting each other. Figure 4 shows that as two massive objects orbit each other, gravitational waves are produced as a result of ripple-like disturbances in the curvature of spacetime. The two pulsars in the Hulse and Taylor experiment had orbits that showed a slight decay, the two pulsars rotating toward their common center, a consequence of gravitational waves consistent with General Relativity. Over the past decade, lasers have been used to attempt to directly detect gravitational radiation passing through the beams though so far this has been unsuccessful. Recently, efforts have been made to utilize pulsars to accomplish a direct detection. By measuring extremely small shifts in the frequency (rate) of pulses as a result of this radiation, gravitational waves passing between the signal and Earth should be possible to detect using a sensitive enough detector.

Currently, detectors are believed to be sensitive enough to detect these shifts but random scatter in the measurements (noise) are overwhelming the signal. Systematic effects contribute to errors in these measurements. One source of this error comes from the particles in space known as the interstellar medium (ISM). Space is not a perfect vacuum but is filled with gas and dust particles, though on a significantly lower level than found on Earth. Plasma, or ionized gas, moves around through space, creating screens of particles moving together. This turbulent plasma in the ISM distorts the path of the signal much like the path of starlight changes as it passes through the Earth's atmosphere, causing commonly seen twinkling. While part of this is due to changes in the human eye, the rest relies on changes in the path of light. Light travels along different paths through different mediums, as evidenced by sticking a pencil into water and watching it appear to bend. The particles in the atmosphere are moving chaotically and shift the path of light.

The accuracy in these timing measurements is therefore limited by the ISM. This scattering effect must be removed to reduce noise levels to the point where we can even begin to attempt to detect gravitational wave radiation. Each pulse of the pulsar broadens and thus instead of a precise measurement of the peak, any fits from the regular timing models produce errors. This error contribution should be proportional to the amount of scattering time delay due to the ISM. Errors in pulse times of arrival (TOAs) are theorized to need to be reduced from roughly 100 nanoseconds (ns) to around 1
ns in order for gravitational wave radiation to be detected.

**Observations**

We present three nights of observations taken simultaneously at two radio telescopes, Arecibo Observatory and the Robert C. Byrd Green Bank Telescope (GBT), in mid-2008. The process by which radio telescope works is different from optical telescopes. Radio telescopes are large dish structures that collect radio waves into an antenna. These signals are stored as voltages, which correspond to the energy and phase of each radio wave. Optical telescopes gather light by sending it over mirrors and through lenses, leading it to a CCD camera where it counts individual photons. By retaining the phase of each radio wave, we are able to later electronically reconstruct the received light and discern something from its wave properties.

Observations at each site lasted just over one hour in both L (centered 1410 MHz) and S (2650 MHz) frequency bands with a 64 MHz bandwidth, described later in the timing analysis section. Two different backends were used: ASP, which recorded TOAs, and the VLBA Mark5 recorder, which records raw voltage samples for measurements of intensity with respect to time of observation and frequency. We ran post-processing on the samples to obtain any time/frequency resolution needed for data reduction, provided in a data cube known as a dynamic spectrum.

The observations consisted of measurements of the pulsars B1937+21 and B1713+07, chosen because of their usefulness in conducting physical tests. B1937+21 was the first MSP discovered (Backer et al. 1982) and is currently the second fastest MSP observed. B1713+07 also has a high flux density, as well as a shallow spectrum and sharp pulse profile peak, allowing for accurate pulse measurements over a large range of frequencies. These specifications make these prime candidates in these tests.

**Data Reduction**

The data was reduced in three stages. We began by converting the raw data into a readable format. This was then processed using a combination of pulsar timing analysis packages. The PSRCHIVE package (http://psrchive.sourceforge.net) contains a library of data reduction algorithms specific to pulsar .fits files. Dr. Demorest made several additions and extensions to these packages. We first made Gaussian fits of the pulse profiles as a comparison model using paas. Using pat, we next generated TOAs that were provided to the program TEMPO. This fit timing models to the TOA data, residuals were calculated, and lastly converted into ASCII output by print_resid.

The next portion of the project involved calibrating the data and modifying the parameter files for the two pulsars using pac and pam respectively. We then ran psrflux to obtain the integrated flux density, analogous to the intensity of the source, with respect to frequency and time for each observation, which is also explained further in the analysis section. With all of the data processed, we wrote a variety of python scripts to analyze the data using the scipy/numpy packages and viewed with the matplotlib (pylab) package. The first
program developed was a graphical interface for comparing and correlating the timing residuals generated by TEMPO. The second was used to perform our analysis of each of the data cubes.

**Timing Delay Analysis**

First, we tried to determine the statistical correlation between the timing residuals of both observatories for each pulsar and frequency band. We would optimally expect a random scatter around the residuals. Any trends in the residuals in one set of observations would imply some sort of systematic effect, though similar trends in both might indicate external effects on the signal. Unfortunately, computing the cross correlation, explained below, yielded no discernable results.

The process of correlation is often used in signal analysis to determine patterns within a signal or between signals. It involves taking one discrete signal and convolving it with itself or another, yielding the autocorrelation or cross correlation respectively. Figure 6 demonstrates the process of convolution, in which one of the signals is shifted along the time axis and the overlap or area between each signal is calculated. At each time shift, or lag, this value is computed. The final result is normalized between -1 and 1. In autocorrelation, since the signal is being convolved with itself, at a time lag of zero, the entire signal will overlap itself and this value is entirely correlated.

Just as a correlation can be computed in one dimension, it can also be computed in higher dimensions. This technique will be used in the next step of analysis but will be shown here in Figure 7. In a data cube, the two axes on the bottom can be anything, with the z-axis representing some type of intensity. For each x lag and each y lag, the overlap is again computed over the entire domain of the signal.
Figure 6a: Example of autocorrelation. As one signal is passed over another, there is more overlap. In the case of a square pulse, the overlap increases linearly. The peak is shown at a time lag of zero, when the signal overlaps itself.

Figure 6b: As a square pulse is convolved at positive time lags, since it is a symmetric function, the correlation will also be symmetric.

Figure 7a: Autocorrelation, computed in two dimensions. Thus, the signal is moved around in both the x- and y-axes.

Figure 7b: The two signals have some overlap just as in the one-dimensional case. Instead of one axis lag, there are now two. These do not necessarily have to be in the same units.

The remainder of our analysis was done with the dynamic spectrum of a pulsar, or its intensity with respect to both frequency of the light waves and time of observation. The frequency of a wave is how fast it cycles per unit time. One Hertz (Hz) is equal to one cycle per second. Two sample sine waves are shown in Figure 8. For any

Figure 8: Two waves. Compared to the first, the second has a shorter wavelength (peak-to-peak distance) and a larger
frequency since it cycles more quickly in the same amount of time.

wave, the amount of energy associated with it is proportional to the square of its height, or amplitude. Thus, the dynamic spectrum is a data cube representing the intensity of light waves of a given frequency observed at each time interval. Figure 9 shows a typical dynamic spectrum. Without the effects of

Figure 9: Dynamic spectrum for B1937+21 at Arecibo in L band on Julian Day (JD) 2454730. Darker indicates greater intensity. This is value is in calibrator units, where the approximate average intensity (flux) level of 10.0 mJy is equal to 22 calibrator units (1 Jy = $10^{-26}$ W/(m²·Hz)).

the ISM, this would appear roughly flat in nature but because of the scintillation effects, observed intensity shifts both in frequency and in time.

Frequency channels were clipped around the 1420 MHz area as hydrogen gives off strong radiation at this frequency. Channels ruined by radio frequency interference generated by humans were also clipped. Traditional analysis with the dynamic spectrum involves computing the autocorrelation function (ACF) of the dynamic spectrum in two dimensions. At the

Figure 10: ACF (left) for the same data set as Figure 9 and the profile at zero time lag (right). The halfwidth at 1/e is shown.

values of zero time lag for the ACF, the scattering time delay is the halfwidth at 1/e, which is a strong function of the strength of ISM scattering.

We used three other methods using the dynamic spectrum like the one shown in Figure 1 to determine the timing delay due to the ISM. Channels around the 1420 MHz hydrogen line, as well as channels ruined by radio frequency interference, were clipped in each method. The traditional method involves computing the autocorrelation (ACF) of the dynamic spectrum. At the values of zero time lag for the ACF, the scattering time delay is the halfwidth at 1/e, which is a strong function of the strength of ISM scattering.

Our next method was to take the power (secondary) spectrum of the dynamic spectrum. This is performed by taking the square of the Fourier transform. A simple, one-dimensional Fourier transform takes a signal and determines the strength of different frequency waves throughout it. Figure 10 shows two signals, one a simple sine wave, one a half-sinc wave. For the sine
There is some power associated with higher frequency waves, notably around 2, 3, and 4.5 times the base frequency.

The power spectrum is the squared, two-dimensional Fourier transform of the dynamic spectrum. A 2D Hanning window was applied to the data to prevent edge effects present in Fourier transform computations. This smooths the power spectrum so that the edges hit zero, changing the data cube into a weighted data two-dimensional sine wave for better fitting. Otherwise, in order to fit the edges of the cube, smaller and smaller frequencies would obtain power to fit it properly, creating unstable ringing.

In this two-dimensional case, the frequency axis transforms to a conjugate time axis and the time (observation) axis transforms to a conjugate frequency axis. This conjugate frequency axis is not the frequency of specific light waves but rather the rate of intensity changes over the course of an observation. The same applies to the conjugate time axis, which can be thought of as the time delay axis. Looking back at the dynamic spectrum (Figure 9), this tries to find the characteristic scales of the scintillation in both axes. Figure 12 shows the power spectrum. Note that power is concentrated close to around zero conjugate time.
Figure 12: Secondary spectrum for the dynamic spectrum in Figure 9. Power is displayed logarithmically and is scaled to the highest point.

(labeled fringe) frequency. With better sampling resolution, parabolic arcs can be seen more clearly toward the edges of this structure, showing the relationship between time delay and frequency shift in the ISM.

On the secondary spectrum, we calculated the noise levels by taking two boxes in the upper corners and subtracting the mean value to make this zero. We integrated the total power across each time delay, producing the projected secondary spectrum in Figure 13. In the next step, we calculated the running first moment (cumulative delay), defined as

\[ \Gamma_1(t) = \int_0^t f(t) \, dt , \]

by Hemberger and Stinebring (2008). This can be thought of as taking the amount of power up to each delay point in the projected secondary spectrum and accumulating it. As the time delay increases, the power goes down and thus less is accumulated at each subsequent point. Therefore, we reach an asymptotic limit, as shown in Figure 14. This limit estimates the scattering time delay. Fitting this curve produced undesired effects, so the asymptotic limit was calculated by running a window filter over the curve, averaging every five points together for a smoother fit, and then calculating the discrete derivative. As the slope approached zero within certain tolerances, the remaining points were averaged together to find the asymptotic limit.

Our final method involved taking one-dimensional Fourier transforms along each time slice of the dynamic spectrum. A similar procedure was performed to calculate the asymptote of the cumulative delay of each of the Fourier slices. Figure 15 shows this method. This produced curves that
showed variations on timescales we were hoping to relate to the timing residuals. Initial attempts to correlate the two did not provide any meaningful results. Unfortunately, we were unable to finish our analysis of this section.

Figure 15: 1D Fourier Slices (bottom) of the dynamic spectrum and the cumulative delays for each time slice (top). This shape did not seem to relate to the shape seen in the corresponding timing residuals.

**Results**

Using both the values provided by the cumulative delays and the ACFs, we determined delays on the order of 1 - 100 ns as shown in Figure 16 for two nights at

Figure 16a: Scattering Time Delays for both pulsars at Arecibo Observatory. Large error on the one point at top on the left is attributed to bad radio frequency interference producing poor fits.

Arecibo. We have improved our noise estimations by about a factor of 10. We can see that we are severely limited by the amount of data we have. With only three nights of data, and only two fully analyzed, we cannot get a good estimate of any trend present. Lack of time forced us to pause our analysis of GBT observations and limit our attempts at the 1D Fourier slices method. One of the important steps we need to take next will be in determining the scaling factor between the scattering time delay and the physical delay error due to the ISM. Once this number is approximated, we can subtract this amount globally from pulsar timing measurements. We hope that with longer observations and higher frequency resolutions (providing finer conjugate time resolution) we can determine finer structure due to the ISM and reduce our noise levels even further. After testing these numerical analysis techniques, we see that it is feasible to continue this line of research to better pulsar timing and provide an appropriate model that can be made to subtract this
noise and reduce timing residual levels needed to directly detecting gravitational wave radiation.

Acknowledgments
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References