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PROCEEDINGS

8th INTERNATIONAL SCIENTIFIC FORUM, ISF 2017,

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The Persistent South: Southern Distinctiveness, Cultural Identity, and Change

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Abstract

In recent years, contemporary observers and scholars have argued that the distinctiveness of the American South has vanished. Historians sympathetic to this view have cited various causal factors including political shifts, economic changes, migration and demographic data, the rise of a suburban South, racial reconciliation, or a general sentiment that the North and South were always more alike than different. Southern exceptionalism, it is argued, is either gone or never was as significant as previously indicated. In fact, the operative and most persistent characteristics of the South have been cultural, not political or economic. As a result, reports of the distinctive South's demise have been premature. An examination of archetypal southern cultural characteristics such as sport, food, gender, and presuppositions about family and faith indicate that the South in fact remains very much different from the rest of the country. Even elements of southern political culture remain relatively steadfast, most notably a predilection toward the politics of victimization. Despite the fall of the Confederacy, the end of slavery, the decline of the Solid Democratic South, and the comparative diminution of overt racial politics, northerners and southerners continue to manifest cultural differences and recognize these in each other. Southern culture persists.

Keywords: American History; American South; Southern Culture; Cultural Persistence

Introduction

In August, 2008, a Newsweek magazine cover story announced the end of the South, terming the region less distinctive than at any time in American history and noting that a majority of southerners had been born since 1980, a milestone year for some signifying the onset of an assimilated, mainstream South. Recent migration patterns, political realignments, and various census and polling data have led some scholars to ponder the notion

that the South has become Americanized, losing the trademark distinctiveness which echoed through various stages of the Old South, New South, and Modern South epochs. Works like the *End of Southern Exceptionalism*, *The Silent Majority*, *White Flight*, and *The Myth of Southern Exceptionalism* argue to one extent or another that given the rise of a two-party South with a mixed economy and a growing suburban presence, the times of southern distinctiveness are a changing. Some scholars even suggest that the North's political and racial characteristics have in fact never been all that different from the South, rendering Dixie's exceptionalism an overwrought stereotype (1).

Doubtless the South of the twenty-first century is different from previous incarnations. The 1970 Alabama gubernatorial campaign, won by George Wallace ushering in his second term, was rife with public racist appeals to a supposedly insidious "Black Bloc" vote seeking to elect the comparatively moderate candidate Albert Brewer. In a crowded 1970 Georgia gubernatorial campaign for the right to replace outspoken segregationist Lester Maddox, race was also omnipresent. An unnamed Georgia politician noted to the Atlanta Constitution "there's only one issue and you spell it N-I-G-G-E-R." One candidate in that campaign McKee Hargrett, announced the imminent demise of the "army of hippies, yuppies, beatniks, peaceniks, pinks, reds, and yellows" once he was elected. Even so, Albany lawyer C.B. King, the first black candidate for governor, ran and won nearly nine percent of the primary total. By the twenty-first century, demagogic and racist appeals a la James K. Vardaman, James Eastland, or George Wallace were no longer commonplace in southern statewide elections (2).

Even as racially overt campaigns have largely receded, the number of successful minority candidates has increased. By 1989, Virginia elected African-American Douglas Wilder, and Florida tapped Hispanic former Tampa Mayor Bob Martinez to lead the Sunshine State. More recently, Bobby Jindal and Nikki Haley, Indian-Americans, assumed the governor's office in Louisiana and South Carolina, earning the votes of many social conservatives who decades earlier would have resisted in the name of white supremacy. As of the 2016 election, Republicans held control in 10/13 governorships, 23/26 U.S. Senators, and controlled every legislative house in the South. A couple of decades ago, these numbers would have been implausible. The Solid Democratic South – never as solid in practice as in theory—is gone (3).

As with Democratic hegemony and overt racism in politics, poverty, a longstanding by-product of the South's tortured racial past and dubious economic and political choices, has receded. Few airports are as modern or as busy as Atlanta's Hartsfield-Jackson. Charlotte trails only New York in scope and scale of importance in the banking sector. Orlando is the number one tourist destination in the world. In some quarters of the South, farming and

textile mills have been replaced by white collar jobs, and industrial parks have been joined by office parks. The architecture of the region includes growing skylines, symbolic of major corporations and their belief in the economic viability of a region President Franklin Roosevelt once called the nation's number one economic problem. The big business of professional sports has expanded across the South with football, basketball, baseball, and even new hockey teams taking root in Tennessee, North Carolina, and Florida. Northern retirees relocate to the South every year, for the weather and lifestyle, but also for the economic opportunities. Indeed of the eleven former states of the Confederacy, only Louisiana and Mississippi have experienced net out-migrations from 2011-2016. In 2016, only one of the five slowest growing economies of the fifty states was in the South, Louisiana, and the list of the fastest in personal income growth included Florida, Georgia, and South Carolina. Long considered by the North to be an intellectual desert, many southern colleges have established outstanding academic reputations and draw promising students and faculty members from around the world. Lifestyle changes in the notoriously impervious South are observable. "I'm a Southern Baptist," Jay Grelen told author Rick Bragg, "I can't smoke. I can't drink. I can't cuss. And now I can't go to Disney World. So tea is the only vice left for me (4)."

Grelen may have overstated the demise of many of the South's cultural hallmarks southern culture has proven hardy. Two lane southern back roads still feature row after row of crops, road side stands, and tiny clapboard and cinder block churches. Southerners continue to pray and sing in church, structure life around family, and, as crime statistics still indicate, shoot family members with alarming frequency. These inconsistencies—the most religious region and the most violent-- are nothing new and are prime examples of southern confusion syndrome: the ability of southerners to exhibit contradictory tendencies without seeing the conflicting currents as inappropriate. Research data suggests that nearly 40% of citizens own guns, hardly a new phenomenon in a region where firearms are a rite of passage. In fact the men and women of the South hunt and fish, smoke and chew, swear, and drink as they have for centuries. Southerners continue to pass down family recipes for biscuits, cornbread, fried okra, and blackberry cobbler, from one generation to the next and even the way southerners eat remains distinctive. ". . . The institution of fried chicken," humorist Roy Blount Jr. once noted, "demands a great deal of the chicken and (his kinfolk) felt bound to hold up their end. They ate down to the bones, pulled them apart, ate in between them, and chewed on the bones themselves." Plenty of fried chicken still find its way into southern bellies each Sunday afternoon. A continuity of southern cultural distinctiveness is observable (5).

The elasticity of southern culture is all the more important given the remarkable changes to the region's economic and political institutions. In fact, no matter how solid the South's formative economic and political characteristics appeared, most have either been substantially modified or vanished altogether. Antebellum slavery died alongside two-thirds of a million Americans in the Civil War. The Confederacy, a four year experiment, died in 1865, though its memory has been institutionalized in a smattering of monuments and durable myths, some less believable than others. The low-wage, low-skill industrial economy that came in the late 19th century left for Central America and Asia a century later. The Democratic Party transformed from the den of white segregationists to the home of most southern African-American voters. The Republican party, nearly invisible in many parts of the South through the World War Two era, has established deep roots in the region, and the GOP has dominated presidential politics in the South in recent decades (6).

In the midst of all of these political and economic changes, southern culture has been a crucial stabilizing force. The distinctiveness, for example of southern sport, food, and faith remains a generational societal construct relatively immune to wholesale change. Sport remains among the aspects of daily life that generate the most southerner passion. Syracuse, New York reporter Bud Poliquin understood both the importance and distinctiveness of southern sport as soon as he traveled to Alabama to chronicle a college football game between his hometown Orangeman and the Auburn Tigers. "I have descended in college football's grand canyon," Poliquin wrote. "I have stood in its Alps. I have gazed at its ocean sunset. I have done all of these things and I've been changed forever. . . I knew, of course, that we were different up here. I understood that autumn Saturdays in our burg have never been given over to any kind of serious sporting fervor. I've accepted for a good, long while that a fair amount of our citizens regularly choose to pick apples or seal driveways rather than head to the Carrier Dome to watch the Syracuse University Orangemen at play. But, Lord have mercy on our college football souls, I've come to realize we're not merely quirky in these parts. And we're not just overly particular. No, having attended a game in Auburn, Ala. - which is like going to Mass in Rome - I'm convinced that, by comparison, we're as dead as the flying wedge (7)."

Poliquin's hyperbolic comments do indicate one clear conclusion: northerners and southerners see each other as culturally different in ways beyond simple accents, diction, and use of regional language. This is an important point and reflective of work done by sociologist John Shelton Reed who argued that southerners ". . . are seen and see themselves as less energetic, less materialistic, more traditional and conventional, more religious and patriotic, more mannerly and hospitable. Many of these cultural

generalizations existed in much of their present form well before the Civil War.” Observations by Florence King, Shirley Abbott, Julia Reed on gender, fashion, and make-up, Hal Crowther, Bill C. Malone, and Jeffrey Lange on music, Robert Moss, John Egerton, and Elizabeth Englehardt on the importance of barbeque and other Deep South foods all point to a similar conceptual understanding: southerners simply see themselves as culturally different and many northerners agree. As important as regional culture is to the work of southern novelists William Faulkner, Flannery O’Connor, Harper Lee and others of a certain generation, it is just as critical for 21st century writers like Larry Brown, Brad Watson, and Tom Franklin. Southern culture persists and does so distinctively (8).

Franklin, in his novel *Hell at the Breech* about 1897 Alabama, paints a word picture of male southerners, masculine expectations, and cultural practices that could have been written about a time 100 years earlier or later. “Below he could hear the cluck of the river,” he writes of aging Sheriff Billy Waite, “smell its fishy wind, too. See its dull brown shimmer through empty spaces between the trees. He was glad to be here, eager to see his old friend, taste his whiskey, and eat whatever the old man would grill over the coals. Bit had a way with wild mushrooms—in an iron skillet with a slab of lard he could bring the holy spirit out of a deer’s rump.” Southern boys and men in every era of American history have been challenged by mainstream society to manifest toughness, physical exhibitions of masculinity, control of the natural environment, and uphold family honor (9).

The zeal southerners manifest for certain hallmarks of their culture may not be entirely productive. The Southeastern Conference (SEC) and the dormant Southwestern Conference have NCAA rap sheets for violations as long as the throwing arm of any Heisman Trophy winning quarterback. Plenty of southern communities have made the decision to expand their high school football stadium rather than build a computer lab, fund the arts, or fully invest in the intellectual climate of their youth. Robert Andrew Powell’s eye-opening book about the professional atmosphere of youth football in Florida includes revelations about elementary school kids receiving limo and helicopter rides to games, drug dealer and gang involvement, and guidance counselors signing waivers to let failing students continue to play. Win-at-all costs is a pervasive element of masculine, sporting culture which dates to the Colonial era South even if the modern mechanisms—football, NASCAR, for example—are comparatively more contemporary developments (10).

Southern distinctiveness persists in other manifestations of culture as well. Frying most things in lard and drowning everything else in bacon grease comes at a price. The South is the unhealthiest region in the country with the highest obesity rates, and features the least access to public medical and dental practitioners. Such rankings have been largely true since the end of the Civil

War, and yet little seems to change with the South's diet and exercise routine. Family recipes continue to be passed down from one generation to the next, family celebrations and holiday gathering continue to feature the same traditional fare spread across the family table, and chefs across the world recognize the distinctive qualities of southern cuisine. As Julia Reed notes in *Queen of the Turtle Derby*, ask a northerner about the best meal they ever had and they'll mention a trendy restaurant or bistro. Ask a southerner, and they'll talk about a family recipe that a dear relative used to make in the kitchen (11).

Sometimes those same family recipes make an appearance at dinner-on-the grounds, a post-worship service festival of faith, family, and food. Southern religiosity is in flux, yet still remains distinctive from much of the rest of the nation. At first glance, recent church attendance statistics suggest that old time religion is declining in southern societal importance. Millennials, for example, seem relatively disinterested in organized religion and the Southern Baptist Convention reports a 2016 reduction in total members, baptisms, and weekly attendance at both worship and Sunday School. Some of these changes are in fact more national than southern. "The Christian share of the US Population," Pew Research Center declared in 2016, "is declining while the number of US adults who do not identify with any organized religion is growing." Even with the changing metrics of the Southern Baptist Convention, the number of churches in the association grew in 2016 as did the total amount of undesignated receipts or financial contributions. In fact, church attendance may not be an accurate measure of the cultural power of evangelical Christianity in the South. Many southerners are "culturally" Christian and evangelical, though they may not have darkened the door of the local sanctuary in some time. "There's a form of cultural Christianity," the Southern Baptist leader Russell Moore notes of this phenomenon, "that causes people to respond (that they are) 'evangelical' and 'born-again' as long as they're not Catholic, even though they haven't been in a church since Vacation Bible School as a kid (12)."

It's also distinctively southern and timeless to feel your cherished culture and values are under attack. In Alabama, political figures like Governor George Wallace and Chief Justice Roy Moore have consistently characterized the state and region as a victim of outside attacks, often by irreligious northerners or the federal government. Wallace termed the 1964 Civil Rights Act as a "fraud, a sham, and a hoax," an "assassin's knife in the back of liberty," and "a blackjack in the hand of the federal force-cult, the left-wing liberals will (use to) try to force us back into bondage." In a June, 2015 sermon, at a God and Country Celebration, Judge Moore predicted dire consequences for Christians as a result of the *Obergefell v. Hodges* decision recognizing same-sex marriage: "Welcome to the new world. It's just changed for you Christians. You are going to be persecuted (13)."

These notions of victimhood are nothing new. During the Constitutional ratification process, southern states indicated they had no intention of losing their slave-holding privileges in order to establish a more perfect union. David M. Potter, in *The Impending Crisis*, his monumental work on the dissolution of that same Union, argues that “southern nationalism was born of resentment and not a sense of separate cultural identity . . . the cultural dissimilarities of the North and South were significant enough to turn a campaign for the protection of southern interests into a movement with a strong color of nationalism.” James Henry Hammond, an antebellum South Carolina planter, expressed a common view of his social class. “We ask,” he averred of the Confederacy, “nothing but peace and to be left alone. The North seeks to subdue, plunder, confiscate, and enslave us (14).”

Post-Civil War, the white South grew even more distinctively southern as explanations of defeat, discussion of the loss of God’s hand of blessing, and pathways toward moving forward focused on making only the essential changes that would allow the South to keep its most important distinctions, the cultural ones. The Lost Cause, a southern civil religion, became ubiquitous in the rise of organizations like the United Daughters of the Confederacy and the explosion of courthouse and town square monuments of Confederate icons. For some, the war itself became an example of northern aggression with the South an aggrieved party. Even as many statutes were removed from the public square by 2017, some white southerners held fast to a regional mythology that espoused the Civil War was fought over an abstract political philosophy—state’s rights—and not the institution of slavery (15).

In the end, for all the changes over the last century and a half to both the North and South, Dixie remains different and surprisingly consistent from many cultural perspectives. In a 1976 speech, Alabama Governor George Wallace declared “the problem of law and order must be attacked. Whether you believe it or not the thugs have taken over the streets of America. In some cities in this country the American public cannot leave his home at night and walk the streets for fear of being mugged, robbed, or even shot.” An Atlanta Journal and Constitution poll found similar beliefs in a 1987 survey of voters. And in the 2016 election, President Trump carried the South (except for Virginia) in part due to a cultural suggestion that crime and illegal immigration was out of control. For all the changes the South has experienced since World War II—civil rights, economic transformation, two party politics—fundamental presuppositions about faith, family, gender, anti-intellectualism, education, the proper role of the federal government, and definitions of community largely remain the same. The South was and remains a distinctive region that has made and continues to make clear cultural choices designed to mark it as different. Perhaps the more things change, the more they stay the same (16).

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Health Disparities Among African Americans

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Abstract

The purpose of this research, “Health Disparities among African Americans,” is to increase our understanding of the demographic differences of health disparities that exist in America. The state of Tennessee is ranked third in the nation for obesity, and 48th in the nation in education success (CDC, 2014). The correlation between these variables, along with the intervening variable of culture, suggests a strong impact on poor health and wellness among African Americans. This research suggests the peculiar nature of prejudice and its relationship to poor health, race, gender, social economic status and culture as it relates to precursors of poor health. This research assessed 300 TSU African American students on the comparative analysis of body weight and body muscle (BMI Ratio) to the national average of BMI Ratios for teens to young adults ranging in age from 17-20. Comparative analysis suggests that the participants were above the national BMI average. Active Learning Workshop was useful in helping participants to increase their understanding of the correlation between weight and health and wellness.

Keywords: Health Disparities, Race, Gender, Socioeconomics Status, Risk factors, Mortality and Morbidity

Purpose

The purpose of this research is to investigate causal factors related to the onset of increase weight and above the average body mass and body muscle by the index of TSU students ranging from 17-20 years of age.

Aims of this Research are

Aim 1: To increase understanding of the health disparities that existed among African Americans

Aim 2: To identify how social factors such as: institutionalized racism, gender, socio-economic status (SES), and culture are related to health and wellness among African Americans

Aim 3: To investigate Body Weight to Body Muscle (BMI) Ratios are above the national average among TSU students ranging in age from 17-21 years old.

Aim 4: To inform of the importance of exercise and diet to health and wellness among African Americans.

Why Is this Research Important?

This research uses primary data to investigate the extent to which participants are above or below the national BMI and weight average. This has research significance because it allows an increased awareness of how social factors are related to health and wellness. The practical significance is for those understanding the correlation between exercising and diet can decrease the onset of poor health. Further, this is important since it increases our knowledge with the ability of changing our behaviors to improve health disparities and decrease mortality rates among African Americans in the United States of America.

Literature Review

It has been documented in research literature that social factors and Lifestyle Behaviors play an important role in the etiology of health and illness (Keil et al, 1984; and Vargas, 2000). Most epidemiological studies have failed to explain why these social factors and lifestyle behaviors affect health and illness among African Americans and other minority groups. In this paper, however, social factors such as race/ethnicity, socioeconomic status, and gender will be addressed in relation to health disparities.

Race, Ethnicity, and Health

Several studies suggested that differences exist in terms of race, gender, social class and health outcomes (National Center for Health Statistics, 2015; and Centers for Disease Control, 2015). It has been demonstrated in the research literature that African Americans tend to get sick at younger ages, and die sooner than European Americans (Williams et al, 2010). The Centers for Disease Control and Prevention (2013) stated that even European Americans who have low incomes and low levels of education tend to choose foods that are affordable, and junk foods and fast foods, yet they still have lower mortality rates compared to their African American counterparts in the similar socio-economic status. African Americans having higher mortality rates may be due to prejudice and discrimination. According to Fischman 2010, stress related to prejudice and discrimination may increase blood pressure levels, as

well as increase rates of strokes, cardiovascular and kidney diseases (Lewis et al. 2014). An explanation of the African American high rates of mortality suggested by Schnall and Kern (1986) is that they are forced to recognize the reality of their social situation, a reality in this country which is characterized by high unemployment, under employment, low wages and patterns of social discrimination based on race, all of which may lead to health disparities. Because regardless of African Americans social status, they are often faced with prejudice and discrimination on the jobs regardless of their qualifications. For example, they are first one to get laid off of a job when the job market turn down, they are last one on the job to get promoted and often get paid less when they are hired than their European American counterpart with the same educational attainment and job experience. African Americans are not able to get off work to seek preventive and primary health care. They are forced to recognize their social situation that they have no control over the matter if they want to survival in this society so they tend not to rebel. These social situations may lead to anxiety reaction and frustrations which lead to high levels of stress and in turn leads to chronic health and illness.

According to Kindig and Cheng (2013) the Hispanics who immigrated to the United States may be the healthiest and they tend to live in extended families which are very supportive and have community relationships which also build strong social support that may lead to better health outcomes. Nonetheless, low income and low education levels of minority groups are less likely to receive preventive services such as cancer screenings, and to seek medical treatment for chronic conditions such as high blood pressure, diabetes and other chronic diseases. They also tend to live in environments where they are exposed to toxic chemicals and other environmental hazards that may lead to other chronic diseases such as respiratory illness.

On the other hand, African Americans and European Americans with higher incomes and higher levels of education tend to have lower morbidity and mortality rates compared to their low income and low education counterparts. Regardless of income and education levels, European Americans live on the average three years longer than minority groups except Hispanic Americans. When investigating the relationship between race, income and infant mortality rates, Williams (2012) found that African American College Graduates are 2.5 times more likely to have higher rates of infant mortality than European American College Graduates. He maintained that the impact of race on health or may be independent of socioeconomic status, may be due to social and economic circumstances experienced over the course of life. He argued that the African American Graduates may have experienced adversity in their childhood that can affect their health outcomes in adulthood. Further study needs to be done to examine other social factors that may contribute to health outcomes of African Americans and other racial minorities.

Socioeconomic Status and Health

Numerous studies revealed that socioeconomic status such as one's income level, education, and occupation influence one's health status in American Society (National Center for Disease Control, 2012). According to Cockerham (2013), low socioeconomic status is associated with less access to quality healthcare, increased likelihood of having an unhealthy lifestyle, and higher exposure to poor living conditions, injury, and disease. Other studies conducted by Farmer et al. (2010) maintained that people living in poverty are more likely to suffer from malnutrition, hazardous environmental conditions, housing and working conditions, and lack of clean water and sanitation.

Evidence in the research literature suggests that low socioeconomic status is associated with higher incidence and prevalence of chronic health problems and lower life expectancy (Bell et al, 2004). For example, a study of mortality rates conducted by Kindig and Cheng (2013) found that factors most strongly associated with higher mortality rates are those experienced by individuals who live below the poverty line and also those with no college education. They found that the rates of obesity are higher among people living below the poverty line. They stated that this is true because high-calorie processed food tends to be more affordable than fresh vegetables, fruits and lean meats or fish in their communities. Cockerham (2007) found in their study that lower income people are subjected to the most stress because they tend to have less coping mechanism. According to National Center for Health Statistics (2015), these individuals living below the poverty line are nearly ten times more likely to report that they suffer from psychological stress compared to those individuals with middle class status.

Another study by Hummer and Hernandez (2013) revealed that Americans who finished college live an average of ten more years than adults who did not finish school. They contend that higher educational attainment may be better linked to good health and good paying jobs, which can lead to better health care, a safer living environment, physically active recreation, and diet habits with more fresh foods. It was pointed out in their study that higher education tends to lead to greater knowledge about health issues, and individuals tend to make better health choices such as the choice to exercise, avoid smoking and heavy drinking, and to follow doctors' recommendations for managing health problems. National Institutes of Health has found that SES, more than race or ethnicity, predicts the likelihood of an individual's access to education, certain occupations, health insurance, and living conditions, including conditions where exposure to environmental toxins is most common, all of which are associated with the risk of developing chronic conditions. SES, in particular, appears to play a major role in influencing the prevalence of behavioral risk factors for cancer and other chronic conditions

(for example, tobacco smoking, physical inactivity, obesity, and excessive alcohol intake, and health status). Further study is needed to address the overall impact of socioeconomic status on health outcomes.

Gender and Health and Illness

Previous research shows that there is a correlation between gender and health (Mohsenin et al 2009). According to the World Health Organization (2015), the average life expectancy in 2013 was 81 for women and 76 for men. Baker et al (2014) stated that the low life expectancy in males may be due to occupational hazards, dangerous sports, violence, and fast driving. It was pointed out that men are less likely than women to seek health care when they are ill, and when they see a doctor, men are less likely to disclose any symptoms of disease or illness that they may be experiencing (Cockerman, 2012).

Research studies suggested that women tend to care for others often without comprehension and they are more likely than men to suffer from stress and more likely than men to lack resources to pay for their own care, whereas, masculinity can encourage men to ignore pain or other symptoms of illness. As a result, they are less likely than women to consult a health care professional and get treatment. For the same reasons, males are more likely than females to engage in risky behaviors, such as smoking and drinking or extreme sports, that can affect their health outcomes. Studies show that African American females have higher rates of certain cancers (colon/rectal, pancreatic and stomach) than European American females. Among males, African American males have higher rates of certain cancers including prostate, lung/bronchus, colon/rectum and stomach. Freeman and Freeman (2013) revealed in findings regarding mental health that women are more likely than men to experience mental health issues.

Methodology

Three hundred male and female students, freshman through senior classification at Tennessee State University, were volunteer participants in a Health and Wellness project from the years of 2010-2015. Participants agreed to have their height, weight, and Body Mass Ratio (BMI) measured to assess and compare with national average BMI Ratios. Faculty monitored trained graduate students to make the assessments of student participants over the years. Equipment and technology were used to obtain proper weight, height, and BMI ratios. A health and wellness presentation was given to all participants, and a personal trainer offered to assist in proper diet and exercising to improve their BMI ratio ranging from cardio to light weight lifting. (While some students took advantage of the diet/exercise training it

was not mandatory. However, information was disseminated with the theory that proper diet/exercise balance is important for health and wellness).

Statistics

Interval level data was collected to develop a matrix to compare students ranging from ages 17-22, freshman through senior classification. Their weight, height, and Body/Mass ratios were recorded. Comparison of the matrix was imposed on the National Average of BMI Ratio of similar age groups.

Comparative data analysis suggested that of the TSU female participants aged between 17-20, their average weight was higher than the ideal average (Table 1).

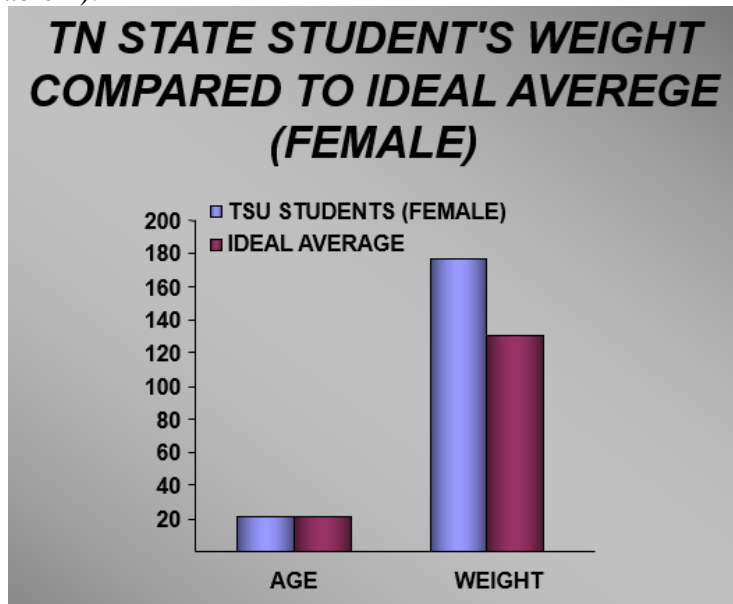


TABLE 1: TSU FEMALE STUDENT'S WEIGHT COMPARED TO IDEAL AVERAGE AGES 17-20

Accordingly, given the average range between 17-20 years old, the TSU female participants Body Mass was higher than the ideal average. Likewise, on the average, their Percent Body Fat was higher (Table 2).

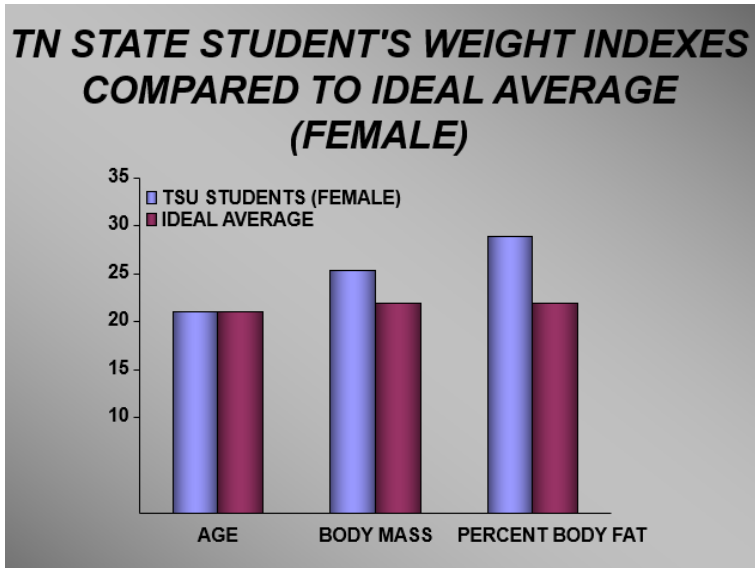


TABLE 2: TSU FEMALE STUDENT'S BMI RATIO COMPARED TO IDEAL AVERAGE BMI
AGE 17-20

Comparative analysis of the TSU male participants between the ages of 17-20, suggested that their weight was higher than the ideal average for males (Table 3).

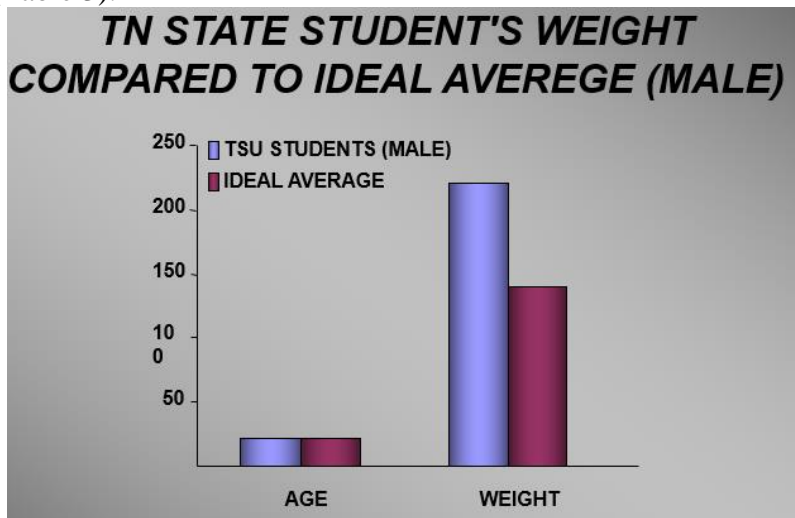


TABLE 3: TSU MALE STUDENT'S WEIGHT COMPARED TO IDEAL AVERAGE FOR MALES
AGE 17-20

BMI Ratio's for TSU male students was on the average higher than the comparative ideal average BMI for males of the same age range.

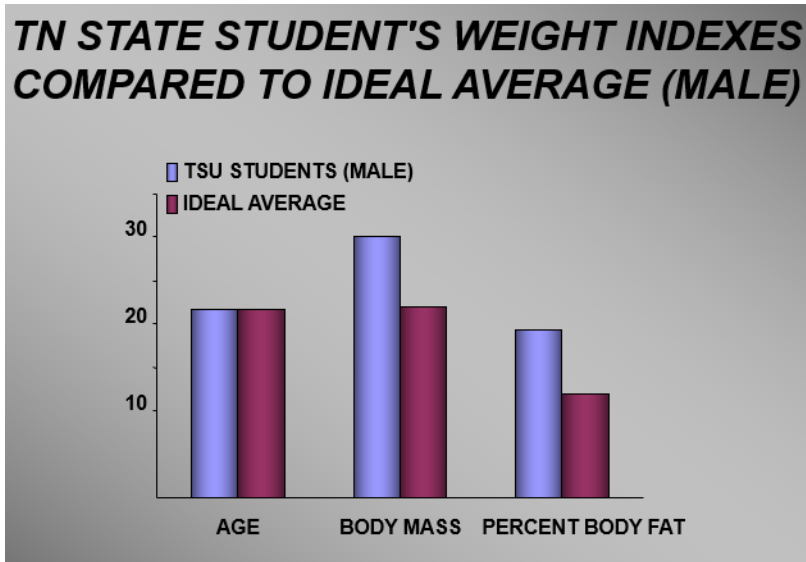


TABLE 4: TSU MALE STUDENT'S BMI COMPARED TO IDEAL BMI AVERAGE FOR MALES AGE 17-20

Results

Comparative data analysis of 300 TSU males and females ranging in age from 17-20 years were on the average above the weight and BMI ratio of the Ideal Weight and BMI ratio. This data certainly had those TSU students that were below the ideal weight/BMI ratio and consisted of athletes, cheerleaders or the exceptional few in number of students that were within their desired weight/BMI ratios. However, the purpose of this research is to recognize the health disparities of African Americans in the United States. This comparative data analysis suggests the precursor or the beginning onset of how chronic illness starts is with being overweight and corresponding high BMI ratios. As indicated, social factors analysis on health has been undertaken mainly by social scientists who observed that biological factors alone cannot explain health behavior and illness. These social factors should be incorporated into health research so that social scientists can continue to investigate and understand the root causes of ill health and develop more effective disease prevention. Results from this data support the understanding that causal factors such as being overweight and having a high BMI ratio could contribute to early signs of the on-set of other causal factors leading to poor health and wellness. Youth certainly can cause people to think that their vital signs are normal. However, as life continues and the aging process continues, high blood pressure and hypertension may become the precursors to the on-set of other chronic illnesses. Participants attended the Active Learning

Workshop afterward to increase their understanding of the contributing social factors leading to poor health and wellness.

This research supports the literature that social factors such as race, ethnicity, SES, gender, culture, and institutionalized racism (oppression and stress) are strong contributors to health disparities. The Center for Disease Control (CDC) national data indicates that African Americans are disproportionate in all chronic diseases and illnesses. This data suggest that teens to young adults are above the national average of weight and BMI ratios. Participants taking the workshop on improving health and wellness were able to assess their BMI ratio and begin using the simple diet exercise model to incrementally improve. Recognizing and understanding the social factors related as well as the correlation of being overweight and BMI location is a great beginning to prevention of poor health.

Conclusion

African Americans' health disparities indicate earlier deaths, decreased quality of life, loss of economic opportunities, and perceptions of injustice. For American society, these disparities translate into less productivity, higher health-care costs, and social inequity (Centers for Disease Control and Prevention (2013). Multiple factors may contribute to African American disparities, including socioeconomic factors (e.g., education, employment, and income), lifestyle behaviors (e.g., physical activity, dietary habits and alcohol intake), social environment (e.g., educational and economics opportunities, racial discrimination, and neighborhood and work conditions), and access to preventive health-care services (e.g., cancer, cardiovascular screening and vaccination) (William, 2012). This review demonstrates a need for further study to explain the African American differentials. However, the concept of "institutional racism" as an explanation of the African American/European American health outcomes gap merits further examination. The institutionalized process by which wages are set and labor is allocated requires further exploration.

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Does the Body Adipose Index (BAI) Work for Elite Athletes? A Comparison of Body Composition Tests Between the Body Adipose Index (BAI) and Bodpod of Female, College Volleyball Players

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Abstract

The Body Adipose Index (BAI) is a relatively new equation used to assess an individual's percentage of bodyfat. Two benefits of the BAI are ease and low cost of testing. While research has looked at the BAI for a general population sample, the BAI has not been tested on elite athletes. This limited study compared results of BAI testing with results from the BodPod, a well-established and precise body composition analysis device, to find out how well the BAI could measure level of bodyfat in female, collegiate volleyball players. Because the volleyball players had higher fat levels that was assumed when selecting a sample population, findings indicated that the BAI appears to work well on a general female population; however, further research is needed to see if this holds true for a larger sample and whether or not the BAI can measure bodyfat accurately for elite athletes.

Keywords: Body Adipose Index (BAI), BodPod, body composition testing, bodyfat

Introduction

For many years, the Body Mass Index (BMI) has been the common method used to measure and estimate overfatness/obesity, and in fact, the BMI is endorsed by the Centers for Disease Control and Prevention. The BMI is a measure of bodyfat based on a person's weight and height and usually is accompanied by a chart with four ranges within which an individual may fall: Underweight, healthy (normal), overweight, and obese (Liguori &

Carrol-Cobb, 2012). Recently some researchers at the University of Southern California (Bergman, Stefanovski, Buchanan, Sumner, Reynolds, Sebring, Xiang, & Watanabe, 2011) considered such variables as age, sex, height, and weight in determining an accurate way to calculate bodyfat and found that instead of height-weight, *height-to-hip circumference* provided a more accurate ratio to assess body composition, and they called this new equation the Body Adipose Index (BAI). The equation developed is $(\text{hip circumference in cm} / \text{height (in m)}^{1.5}) - 18$.

Bergman, et al (2011) believe that this BAI has promise as a new measurement tool, especially in under-privileged and/or remote settings because it is calculated without using bodyweight and requires minimal measuring protocols (height in meters and hip circumference in centimeters) and a minimal level of training to execute properly. The advantages of BAI include ease, low-tech equipment, and no dependence on bodyweight, instead using only circumference measurements. Bergman, et al (2011) did concede that more research needs to be done before the BAI can be considered a valid tool for assessing bodyfat. Therefore, the purpose of this exploratory study was to test the BAI against the BodPod (recognized as one of the most accurate body composition tools) to determine if there was any correlation in bodyfat measurement, and if so, how much.

I.

BAI and BodPod

In their BAI research, Bergman and his colleagues (Bergman, et al, 2011) analyzed data from 1700 adult male and female Mexican-Americans and found that hip circumference and height were strongly linked with bodyfat; a follow-up second study of 220 adult African-Americans found similar results, suggesting that the Body Adipose Index (BAI) may be suitable for all ethnic groups. Although Caucasians were not included, it must be remembered that most of the world's population is non-white. The researchers validated the BAI against dual-energy X-ray absorption [DEXA], and the BAI formula appeared to work for both male and female subjects. Findings revealed that hip circumference ($R=0.602$) and height ($R= -0.524$) were correlated strongly with percentage of bodyfat (Bergman, et al, 2011). When researchers compared BAI with dual-energy X-ray absorptiometry (DXA) results, the correlation between DXA-derived percentage of adiposity and the BAI in a target population had a reliability of 0.85 ($R=0.85$) with a concordance of $C_b-0.9$.

The BodPod is accepted universally as a state of the art technological method of accurately measuring bodyfat and is the only device of its kind in the world (www.bodpod.com). It is practical, commercially available, fast, easy, has no radiation exposure, and is comfortable for subjects. The BodPod uses

air displacement to measure body volume. Computerized pressure sensors determine the amount of air displaced by the person's body, and body volume is calculated by subtracting the volume of air in a closed chamber with a subject inside it from the volume of air in an empty chamber. BodPod validity is 0.93 when compared to hydrostatic (underwater) weighing (Collins, Millard-Stafford, Sparling, Snow, Roskopf, Welb, & Omer, 1999). Furthermore, the BodPod has a reliability of 0.994 with 0.448% error factor (Collins, et al, 1999) and has been shown to be as reliable as hydrostatic weighing or EDXA in both adults and children (Cornier, Despres, Davis, Grossniklaus, Klein, Lamarche, Lopez-Jimenez, Rao, St-Onge, Towfighi, & Poirier, 2011).

Beyond its reliability and validity, another benefit of the BodPod is its ease of use when compared to other established measures of bodyfat, like hydrostatic weighing. One major limitation in widespread use of BodPod testing is cost. The equipment used in the exploratory study presented here cost approximately \$50,000. Another issue is location of the equipment; due to its cost, sensitivity to temperature changes and air movement, and subject comfort (because for testing men must wear form fitting spandex trunks or briefs and women must wear sports bras and spandex shorts or bathing suits), the BodPod needs to be in a relatively quiet environment with controlled access (Fields, Hunter, & Goran, 2000).

Methods

Because the goal of this research project was to compare results of BodPod testing to BAI for a healthy population, a female collegiate volleyball team at the NCAA Division II level was selected since the team was thought accurately to represent adults with low to healthy levels of bodyfat. This particular team was chosen for three reasons: (1) Researchers wanted to look at a single sex, fit population to see how BAI for this sample compared to BAI testing for general population; (2) one member of the research team previously had been a collegiate volleyball coach, hence a personal interest in this particular team; and (3) when apprised of the research that was to occur, the volleyball team and its coaches expressed willingness to serve as test subjects. The team had 14 players; however, due to class schedule conflicts, only 13 members were able to complete both BodPod and BAI testing. The players ranged from freshmen to seniors and all were identified as either Caucasian/white or African-American/black.

All testing occurred in the first half of the 2011 volleyball season. BodPod testing was done two weeks before BAI measurements were taken. The assistant coach took responsibility for scheduling BodPod testing for team members at ten minute intervals. Each subject's BodPod test was conducted in the university exercise performance lab and took approximately

six minutes per individual. To ensure participant comfort, a female researcher was present for all tests, as was the team's athletic trainer. Height measurements were self-reported for BodPod testing based on the researchers' belief that in a sport such as collegiate volleyball, where height is important and reported frequently, players would be able to report their heights accurately. Each individual wore either form-fitting spandex shorts and a sports bra or a bathing suit, as recommended by previous researchers and instructions accompanying the BodPod (Fields, Hunter, & Goran, 2000).

BAI measurements were obtained approximately two weeks after BodPod testing prior to the team's regular practice. Because all testing was done during the competitive season, there should not have been any significant changes in the body composition in the study population. Height was measured against a wall, and hip circumference was measured on a horizontal plane at the level of the widest circumference over the buttocks using a cloth tape measure. To ensure participant comfort, a female researcher took hip measurements required for BAI calculation and described the process to each subject as it occurred. For both BodPod and BAI measurements, participants wore the same type shorts, form-fitting spandex shorts, as are required for BodPod testing and typically worn by volleyball players at practice. Therefore, the hip BAI measurement was taken over these shorts.

Using hip and height data obtained during BAI testing, two members of the research team independently calculated BAI. Through a comparison of results, any discrepancies in data were rectified. Then each female's BAI and BodPod measurements were entered into a statistical software package (PASW Statistics 18) for analysis.

Results

All results of BodPod and BAI testing are expressed as percentages. BodPod results indicated that percent bodyfat for subjects ranged between 17.70% and 33.80% with a mean bodyfat of 26.59% and a standard deviation of 5.20%. Use of the Shapiro-Wilk test revealed that BodPod measurements were normally distributed ($W=0.953$, $p=0.651$), and this finding was confirmed visually with a normal Q-Q plot.

When using the BAI equation, subjects' bodyfat ranged between 21.66% and 31.51% with a mean of 27.34% and a standard deviation of 3.30%. The Shapiro-Wilk test and normal Q-Q plot were employed to check for normal distribution. Both tests indicated that the data was normally distributed ($W=0.925$, $p=0.283$).

To compare the results from BodPod and BAI tests across subjects, a paired t-test was employed. This test was selected to ascertain whether or not subjects' percent bodyfat differed significantly based on the test used (Ott & Longnecker, 2001). Results indicated that the mean percent bodyfat from

BodPod testing was not statistically different from the mean percent bodyfat from BAI testing ($t=0.726$, $p=0.481$) at the 95% confidence level.

Conclusion

Significance of Findings

Based on this limited study, it appears that the BAI is a fairly reliable measure of bodyfat percentage in a selected group of college female athletes. This confirms findings from Bergman, et al (2011). However, the subjects' range of bodyfat (21.66% - 31.51% with a mean of 27.34% as calculated using BAI and 17.70% - 33.80% with a mean of 26.59% as calculated by the BodPod) was higher than anticipated for collegiate athletes based on multiple published reports and tables, including those by Kenney, Wilmore, and Costill (2012) and the American Council on Exercise (ACE). Kenney, Wilmore, and Costill (2012) found elite female volleyball players to be between 10-18% bodyfat. ACE classifies bodyfat ranges for women as follows: 10%-13% = essential fat; 14%-20% = athletes; 21%-24% bodyfat = fitness; 25-31% bodyfat = average individuals; and 32% bodyfat or higher = obese (Muth, 2009). Therefore, this study does not indicate that BAI is a good measure of bodyfat for elite athletes or perhaps even especially fit individuals. However, because the study population carried a higher level of body fat than expected in elite female volleyball players, it appears from this limited research that the BAI could be a practical assessment tool for everyday practitioners to assess percent of bodyfat in such settings as physical education classes, recreational environments (like fitness centers), and catering to the general population.

Limitations

The main limitation in this study was the limited sample size ($N=13$). A larger sample size would have yielded more generalizable results. Had the sample been expanded to include women's volleyball players at other Division II institutions or other female athletes at the same institution as the volleyball team, results may have been different. Another limitation was that BAI and BodPod testing could not be completed for each subject on the same day and in the same attire. However, due to one of the researcher's past experience as a Division II collegiate volleyball coach and the fact that the team was in season when both phases of testing were completed, changes in body composition were assumed to be negligible in the two weeks between BodPod and BAI testing.

Future Research

While the BAI appears to work well on a general female population, based on the results of this study and those by Bergman, et al (2011), more

research needs to be done. Bergman et al (2011) did not test the BAI equation on white/Caucasian females; the present research did include white/Caucasian females but did not consider race/ethnicity as a factor in the accuracy of BAI. More BAI research needs to be done, specifically on white/Caucasian females and males. In addition, while this study endeavored to look at elite athletes, it actually investigated females who were not in an elite range. Therefore, research should be done specifically on elite athletes.

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Paraoxon: An Anticholinesterase That Triggers an Excitotoxic Cascade of Oxidative Stress, Adhesion Responses, and Synaptic Compromise

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Abstract

The anticholinesterase paraoxon (Pxn) is an organophosphate (OP) and the active metabolite of the insecticide parathion. It potently inhibits the enzyme acetylcholinesterase and leads to enhanced glutamate release, diminished GABA uptake, oxidative damage, and neurodegeneration. The resulting increased levels of acetylcholine can trigger seizures and cause neuronal and excitotoxic damage in the brain. The brain susceptibility related to anticholinesterase toxins extends beyond potential brain damage and death from toxic levels of the agent. Asymptomatic low-level exposure to such toxins can also leave the brain vulnerable or even cause it to exhibit neurological problems later in life. The actions of Pxn and similar neurotoxins have been studied in order to examine the events associated with anticholinesterase toxicity in the brain. A recent study demonstrated that Pxn exposure initiates a pathogenic cascade involving seizure events and subsequent signs of damage including unique presynaptic vulnerability and associated behavioral deficits. In addition, Pxn-mediated synaptotoxicity is also associated with enhanced production of oxidative stress as well as integrin adhesion responses. These findings provide a better understanding of the molecular events involved in Pxn toxicity.

Keywords: Paraoxon, neurotoxicity, excitotoxicity, anticholinesterase, synapse decline

Paraoxon (Pxn), an anticholinesterase toxin, is in the organophosphate (OP) class of compounds that includes insecticides and military nerve agents (e.g. soman and sarin). Exposure to OP toxins is one of the most common causes of poisoning worldwide, affecting nearly 3 million people each year, of which approximately 15% die as a result of the poisoning (Eddleston et al.,

2008). Exposure can occur through drinking contaminated water, breathing vapors of the toxins, or subjecting a person's skin to contact with the toxin. In the central nervous system (CNS), such agents classified as neurotoxins and environmental toxins alter cholinergic, glutamatergic, and GABAergic pathways and can lead to seizures, brain damage, and different neurological syndromes.

Understanding the toxic action of anticholinesterase compounds is vital in order to identify pathogenic steps involved and which of these steps lead to disruptions in synaptic integrity and communication. Pxn, the oxidized active metabolite of the insecticide parathion, has become a common research target to study anticholinesterases (Krutak-Krol and Domino, 1985; Harrison et al., 2004; Todorovic et al., 2012; Deshpande et al., 2014). Pxn causes the accumulation of acetylcholine in synapses and results in a cholinergic crisis in the brain (Wei et al. 2014). Enhanced levels of acetylcholine can trigger seizures, long-term behavioral changes, elongated epileptiform action, and reduced cognition (Sánchez-Santed et al., 2004; Millett, 2006; Prager et al., 2015). In humans, acute OP poisoning also leads to respiratory failure and, hence, can cause death (Eddleston et al., 2005).

The brain's susceptibility related to anticholinesterase toxins extends beyond brain damage and death from toxic levels of the agent. Asymptomatic low-level exposure can also leave the brain vulnerable to subsequent brain insults (see Munirathinam and Bahr, 2004). Even neonatal low-doses of exposure to toxic substances such as pesticides can potentiate brain vulnerability to different types of insults in adulthood (Eriksson and Talts, 2000). In addition, repeated exposure to related pesticides has been linked to an increased risk for Alzheimer's disease later in life (Hayden et al., 2010; Sánchez-Santed et al. 2016). Nerve agent exposure is particularly detrimental to the neurodevelopmental processes underlying synaptic connectivity and cognitive ability (Rotenberg and Newmark, 2003). As a result, children are particularly vulnerable to anticholinesterase toxin exposure.

Animal models have been used extensively to understand the effects of anticholinesterase insults and their relationship to brain damage in humans. Harrison and colleagues (2004) found that, in guinea pigs, Pxn caused seizures similar to those caused by the nerve gas soman in humans. Likewise, the anticholinesterase potency of Pxn was similar in macaques and humans (Worek et al., 2011). Furthermore, Rosenberg and colleagues (2017) showed that anticholinesterase-exposed macaques presented severe signs of toxicity (e.g. fasciculations, miosis, salivation, and convulsions), and many died in less than seven hours post-application. This type of research potentially offers an approach to evaluate and better understand the underlying mechanisms of toxins with actions that trigger brain disturbances.

Certain neurotoxins like Pxn act not only on the cholinergic network, but also affect other neurotransmitter systems involved in excitotoxic propagation. Pxn enhances glutamatergic transmission on hippocampal granule cells. This effect is postulated to occur principally through presynaptic mechanisms (Kozhemyakin et al., 2010). It is noteworthy that the stimulation of nicotinic receptors by itself leads to an increase in glutamate release and thereby increases synaptic transmission in the hippocampus (Sharma and Vijayaraghavan 2003; Alkondon and Albuquerque 2004). Similarly, anticholinesterase agents such as Pxn lead to an over-stimulation of nicotinic and muscarinic receptors through the accumulation of acetylcholine. Pavlovsky and colleagues (2003) previously reported the interaction between these two systems and showed acetylcholine-dependent enhancement of glutamatergic excitatory transmission. Subsequently, Mohammadi and colleagues (2008), also found GABA uptake was significantly reduced in both the cerebral cortex and hippocampus of Pxn-treated rats. Such evidence suggests that acute exposure to anticholinesterase agents not only triggers a cholinergic crisis but occurs in correspondence with the release of excitotoxic levels of glutamate from excitotoxic-sensitive regions of the brain.

Excitotoxic insults are thought to be involved in dendritic and synaptic damage, early toxicological signs that lead to neuronal dysfunction and memory impairment (Munirathinam and Bahr, 2004; Raveh et al., 2002, 2003). Functional imaging during an excitotoxicity study suggests that during seizures, limbic structures such as the amygdala, piriform cortex, entorhinal cortex, and hippocampus are activated (Clifford et al., 1987). Interestingly, hippocampal neurons exhibit an enhanced vulnerability to different types of neuropathogenesis (Mattson, 1990; Bahr et al., 1994), and organophosphate compounds have a significant effect on this brain region (Crino et al., 2002 ; Harrison et al., 2004), particularly due to the high density of cholinergic and glutamatergic innervations.

Brain damage caused by organophosphate intoxication is not restricted to the primary event induced by the poison, but secondary events associated with the anticholinesterase-induced cellular toxicity were observed across several studies in different cell types and brain regions (see Table 1). In the hippocampus, the anticholinesterase effect was observed *in vitro* and *in vivo* by Nallapanemi and colleagues (2006), confirming the ability of Pxn to inhibit the enzyme acetylcholinesterase in this brain region. Pxn exposure comprises different cellular disturbances such as reactive astrocytes, synaptic marker changes, morphological changes, and oxidative stress (Kang et al., 2011; Yu et al., 2012). As found by Jafari and colleagues (2012), Pxn-mediated oxidative damage presented itself not only in brain tissue but also in other organs such as the liver, heart, kidney and spleen.

Table 1.

Pxn-induced cellular disturbances in different brain regions		
Molecular Changes	Brain Region / Cells	Reference
reduced cholinesterase activity	hippocampus neuroblastoma cell line	Nallapanemi et al., 2006 Ehrich et al., 1997
enhanced glutamate release	hippocampus and amygdala	Kozhemyakin et al., 2010
diminished GABA uptake	hippocampus and cortex	Mohammadi et al., 2008
reduced cell viability	neuroblastoma cell line	Prins et al., 2010
oxidative damage	human salivary gland cell line	Prins et al., 2014

In a recent study of Pxn exposure using stable explants of brain tissue, indications of oxidative stress and induced alterations to β 1-class integrin adhesion molecules were found in correspondence with synaptic compromise (Farizatto et al., 2017). This synaptic compromise was characterized by selectivity of the presynaptic components it affected. Note that, as shown in Table 2, the new study found Pxn-mediated synaptotoxicity associated with oxidative stress as well as integrin adhesion responses both *in vitro* and *in vivo*. These molecular indicators of toxicity show consistency with regards Pxn-mediated cellular changes across both models. These results further indicate the usefulness of screening studies with brain slices to better understand this type of toxin exposure so that it may be properly treated in such a way that offsets damage caused by the toxic cascade.

Table 2.

Pxn exposure leads to oxidative, adhesive, and synaptic changes in both *in vitro* and *in vivo* experiments.

Toxic Changes	Pxn-treated hippocampal slice cultures	Pxn-treated rats
Oxidative stress	increased 4-HNE adducts	increased 4-HNE adducts
Adhesion response	enhanced β 1 integrin levels	enhanced β 1 integrin levels
Synaptic decline	reduced synapsin IIb and synaptophysin levels	reduced synapsin IIb levels

OP agents like Pxn may initiate synaptic deterioration in which the presynaptic markers appear to be more susceptible than postsynaptic markers (Kozhemyakin et al., 2010; Farizatto et al., 2017). The synaptic decline profile induced by Pxn can be compared to 1) synaptic disruption reported in excitotoxicity studies using hippocampal slice cultures (Bahr et al., 2002; Karanian et al., 2005; Piwońska et al., 2016) and 2) hippocampal slice synaptic declines from protein accumulation stress studies (Bendiske and Bahr, 2003; Butler et al., 2007; Wisniewski et al., 2011). Synaptic pathology after Pxn exposure has been shown *in vitro* and *in vivo* (see Table 2). The illustrative image in Figure 1 shows the synaptic events that are linked to inhibition of acetylcholinesterase. Pxn exposure leads to excess of acetylcholine activity and enhanced glutamate release, and one or both of these changes can lead to seizure, excitotoxicity and brain damage. These findings suggest that Pxn affects the native composition of important CNS synapses and their control of important brain functions.

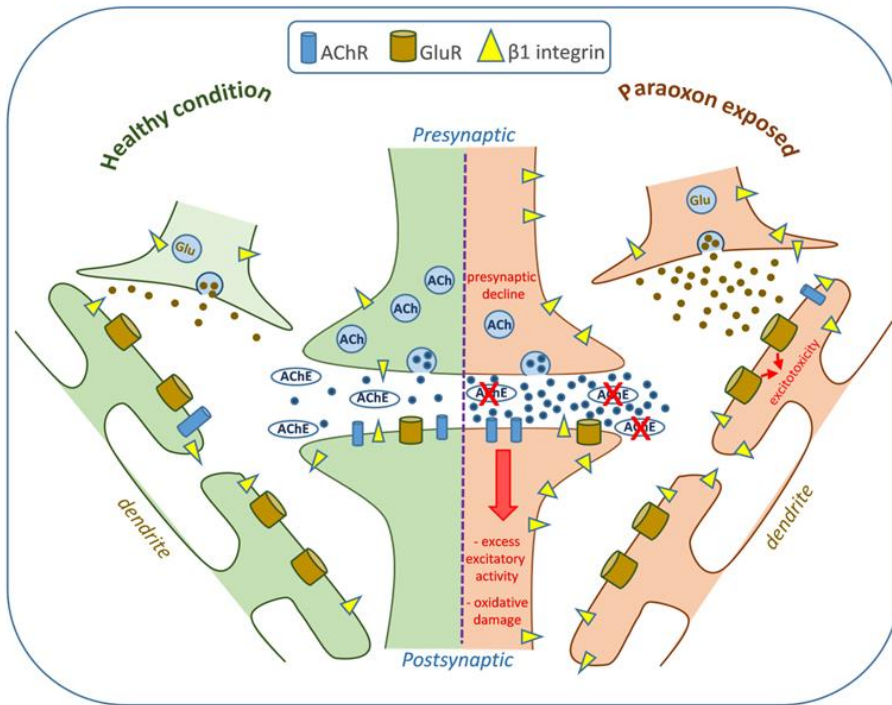


Figure 1: Schematic Illustration of paraoxon-mediated cellular disturbances on brain tissue.

The anticholinesterase paraoxon leads to over-excitatory activity through excess of acetylcholine and enhanced glutamate release in the synaptic cleft, which elicits a cholinergic crisis and excitotoxic damage. Note, the potent inhibition of the enzyme acetylcholinesterase (AChE) by paraoxon exposure also causes presynaptic compromise, adhesion response and oxidative damage.

The degradation of the neurotransmitter acetylcholine by acetylcholinesterase is critical for the maintenance and homeostasis of synaptic integrity and communication. Acute and chronic exposure to compounds like Pxn can lead to neurotoxic effects associated with the human conditions called cholinergic syndrome, intermediate syndrome, organophosphate-induced delayed polyneuropathy, and chronic organophosphate-induced neuropsychiatric disorder. It is very important to understand the actions of related neurotoxins and environmental toxins on synaptic mechanisms and CNS pathways, including cholinergic, glutamatergic, GABAergic, as well as antioxidant systems. The brain's susceptibility to anticholinesterase toxins and the distinct effects on synapses can leave exposed individuals vulnerable to symptoms and neurological problems for the rest of their lives.

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Potential Alzheimer's Disease Therapeutics Among Weak Cysteine Protease Inhibitors Exhibit Mechanistic Differences Regarding Extent of Cathepsin B Up-Regulation and Ability to Block Calpain

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Abstract

Cysteine protease inhibitors have long been part of drug discovery programs for Alzheimer's disease (AD), traumatic brain injury (TBI), and other disorders. Select inhibitors reduce accumulating proteins and AD pathology in mouse models. One such compound, Z-Phe-Ala-diazomethylketone (PADK), exhibits a very weak IC_{50} (9-11 μ M) towards cathepsin B (CatB), but curiously PADK causes marked up-regulation of the $A\beta$ -degrading CatB and improves spatial memory. Potential therapeutic and weak inhibitor E64d (14 μ M IC_{50}) also up-regulates CatB. PADK and E64d were compared regarding the blockage of calcium-induced cytoskeletal deterioration in brain samples, monitoring the 150-kDa spectrin breakdown product (SBDP) known to be produced by calpain. PADK had little to no effect on SBDP production at 10-100 μ M. In contrast, E64d caused a dose-dependent decline in SBDP levels with an IC_{50} of 3-6 μ M, closely matching

its reported potency for inhibiting μ -calpain. Calpain also cleaves the cytoskeletal organizing protein gephyrin, producing 49-kDa (GnBDP49) and 18-kDa (GnBDP18) breakdown products. PADK had no apparent effect on calcium-induced gephyrin fragments whereas E64d blocked their production. E64d also protected the parent gephyrin in correspondence with reduced BDP levels. The findings of this study indicate that PADK's positive and selective effects on CatB are consistent with human studies showing exercise elevates CatB and such elevation correlates with improved memory. On the other hand, E64d exhibits both marginal CatB enhancement and potent calpain inhibition. This dual effect may be beneficial for treating AD. Alternatively, the potent action on calpain-related pathology may explain E64d's protection in AD and TBI models.

Keywords: Alzheimer's disease, calpain, lysosome, PADK, E64d

Introduction

The age-related protein accumulation disorder Alzheimer's disease (AD) afflicts more than 5 million people in the U.S., also causing stress to caregivers, family, and friends. Furthermore, the disease greatly burdens a healthcare system that is incurring over \$250 billion in costs each year. The process of aging is known to exacerbate pathogenic protein accumulation, as most non-familial cases of AD occur in people 65 years or older. Features of AD include *i*) intracellular aggregates, *ii*) extracellular deposits, and *iii*) multiproteinopathic components comprising of $A\beta_{42}$, amyloid precursor protein (APP) fragments, hyperphosphorylated tau, and often TDP-43 and α -synuclein (Nixon, 2007; Mazzuli et al., 2016). Protein accumulations occur prior to the onset of synaptic pathology and neurodegeneration (Bendiske et al., 2002; Goldberg, 2003; Butler et al., 2005), likely as a result of an imbalance between protein synthesis and degradation.

Lysosomes contain a variety of cysteine, aspartyl, and serine proteases as well as other enzymes as part of a key protein degradation pathway. Cathepsins are among the proteolytic enzymes located within the acidic environment of the lysosome where their main function is the degradation of large biomolecules (see Bahr, 2009; Ditaranto et al., 2001; Wang et al., 2017). The specific enzyme cathepsin B (CatB) has been implicated as a therapeutic target for AD since it degrades $A\beta_{42}$ into less pathogenic peptides through C-terminal truncation (Mueller-Steiner et al., 2006; Butler et al., 2011). In addition, positive CatB modulation appears to be a cellular protection avenue since the enzyme exhibits an enhancement effect in response to many types of protein clearance compromise and protein accumulations, including:

- Proteasome inhibitor treatment in SH-SY5Y cells (Cecarini et al., 2014)

- Proteasome inhibition in SH-SY5Y cells expressing human APP (Cecarini et al., 2014)
- Intrahippocampal injection of proteasome inhibitor in aged rats (Gavilán et al., 2015)
- Proteasome inhibitor treatment in hippocampal slices (Farizatto et al., 2017)
- Chloroquine-induced lysosomal stress in hippocampus (Bendiske & Bahr, 2003).
- High concentration A β ₄₂ in hippocampal slices (Bendiske & Bahr, 2003)
- Low-levels of A β ₄₂ in hippocampal slices (Farizatto et al., 2017)
- A β ₄₂ treatment of a mouse neuronal cell line (Mueller-Steiner et al., 2006)
- Expression of mutant human APP in mouse brain (Mueller-Steiner et al., 2006)
- Human huntingtin expression in cultured neurons (Wu et al., 2012)

Note that a compensatory inter-relationship between the proteasomal and lysosomal protein clearance pathways has been suggested with recent evidence showing that impairment of the proteasomal system activates CatB and the lysosomal system (Cecarini et al., 2012; Farizatto et al., 2017). In addition, a positive modulator of the lysosomal system enhanced the level of CatB activity and also reduced A β accumulation in neuroblastoma cells expressing mutant APP (Park et al., 2016). Across AD transgenic mouse models, genetic and pharmacological manipulations found to increase CatB activity also reduced A β levels and offset disease parameters (Mueller-Steiner et al., 2006; Sun et al., 2008; Butler et al., 2011; Yang et al., 2011; Wang et al., 2012).

In other studies, CatB inhibition has been linked to the reduction of A β deposits and improved memory in AD mouse models using the broad cysteine protease inhibitor E64d (see Hook et al., 2007, 2011, 2014a). E64d, however, was also found to potently inhibit the calcium-activated protease calpain and such inhibition was found to protect against different neuropathologies (Inubushi et al., 1994; Tsubokawa et al., 2006; Trinchese et al., 2008; Jeon et al., 2016). Thus, the current study compared the distinct compounds PADK and E64d with regard to the extent of their CatB modulation vs. their calpain blocking capacity. The latter was assessed by measuring calcium-dependent breakdown of the cytoskeletal protein spectrin that is implicated in many pathological states (Vanderklish & Bahr, 2000; Pineda et al., 2004; Weiss et al., 2009; Ono et al., 2016) and the calcium-dependent breakdown of gephyrin, a postsynaptic scaffold protein that recruits transmitter receptors and interacts

with a guanine nucleotide exchange factor (Kawasaki et al., 1997; Fekete et al., 2017).

Materials and Methods

Hippocampal Slice Cultures. All studies with animals were carried out in accordance with the recommendations from the Guide for the Care and Use of Laboratory Animals from the National Institutes of Health. Brain tissue from postnatal 12-day-old Sprague-Dawley rats (Charles River Laboratories) was rapidly removed to prepare hippocampal slices (Farizatto et al., 2017; Butler et al., 2011). Transverse slices (400 μm) were quickly prepared and gently positioned on Millicell-CM inserts (Millipore, Billerica, Massachusetts). The hippocampal slices were maintained at 37°C in 5% CO₂-enriched atmosphere for 18-22 days before being treated with different agents.

Culture Treatments. E64d (2S,3S-*trans*-epoxysuccinyl-L-leucylamido-3-methylbutane ethyl ester or aloxistatin; Sigma-Aldrich; St. Louis, Missouri) was applied daily to hippocampal slice cultures for 2-3 days. The compound Z-Phe-Ala-diazomethylketone (PADK; Bachem Inc., Torrance, California), which promotes mature CatB levels in different model systems (Ryzhikov & Bahr, 2008; Butler et al., 2011; Bahr et al., 2012) was similarly assessed in the hippocampal cultures. After treatments, cultured slices were gently removed from the inserts into groups of 7-9 each using ice-cold isosmotic buffer and homogenates were prepared.

Cathepsin B Activity. The InnoZyme Assay Kit (Millipore) was used to measure CatB activity in the hippocampal slice samples treated with various concentrations of compounds. Aliquots of homogenized samples (10 μg protein) were assessed in duplicate for proteolytic activity using the Z-Arg-Arg AMC substrate and the SpectraMax M3 microplate reader.

Calcium-Dependent Calpain Assay. Brain tissue homogenates were rapidly prepared from adult rats, which were humanely sacrificed by isoflurane anesthesia and decapitation. Brains were cooled and removed from the skull and then placed in ice-cold homogenization buffer. The brains were immediately dissected and telencephalic tissue was collected, homogenized and assayed for protein content level. Equal protein aliquots were incubated with 6 mM CaCl₂ at 37°C, in the absence or presence of potential protease inhibitors, and then assessed by immunoblot for proteolytic products.

Immunoblot Analysis. Immunoblot samples of adult brain tissue and hippocampal slice cultures were sonicated in cold lysis buffer (Sigma-Aldrich; St. Louis, Missouri). Protein content was determined and equal amounts of protein were denatured in sample buffer and separated on gradient gels for subsequent transfer to nitrocellulose. Blots were incubated in blocking solution containing 5% milk or BSA for 1 h. Primary antibody staining utilized antibodies against cathepsin B (1:100, Calbiochem), GluR1 (1:1000;

Millipore) and anti- α II spectrin (1:100, Santa Cruz), as well as against actin 20-33 (1:500, Sigma) and an antibody to gephyrin's C-terminal (1:250) made against the sequence VELHKGEVVDVMVIGRL described in Kawasaki et al. (1997). Anti-IgG-alkaline phosphatase conjugates and anti-IgG-horseradish peroxidase conjugates were used for the secondary antibody step, and antigen staining and image development involved the chemiluminescence protocols using the GE Amersham AI600RGB imager. Immunostained bands were scanned at high resolution to determine integrated optical density with BIOQUANT software (R & M Biometrics, Nashville, Tennessee).

Transgenic Mice Assessment. Transgenic and control mice were housed in vivarium facilities until the desired age. The APP^{SwInd} J20 line mice (Jackson Laboratories) exhibit lower levels of A β deposits compared to the original line, and were used at 9–10 months of age. Genotype was confirmed by PCR. Mice were handled daily for 1 week and subsequently received daily i.p. injections of 20 mg/kg PADK. Control mice were injected with the corresponding volume of vehicle. Mice were handled and familiarized with the open field used for spatial memory. The APP^{SwInd} mice and age-matched wild-type mice were mildly caloric-restricted and assessed for spatial memory in the hidden food cache test. A food reward was placed in one of two opaque cylinders in opposite corners of an open field. The food location was changed after each 3-trial training session over a 24-h period, and food retrieval time was compared across trials.

Statistical Analyses. Specific immunoreactivity values [(optical density – background) \times area] for each antigen were quantitatively compared. Results were evaluated with unpaired *t* tests or analyses of variance (ANOVA) followed by post hoc tests using Prism software (GraphPad, San Diego, California). IC₅₀ and EC₅₀ values were determined using nonlinear regression.

Results

Potential targets of the weak cysteine protease inhibitors PADK and E64d include the lysosomal system and the calcium-activated protease calpain (Fig. 1a). PADK was assessed for CatB inhibitory action in brain homogenates, resulting in a very weak IC₅₀ value of 9-10 μ M (Fig. 1b). In contrast, lower PADK concentrations elicited positive modulation of the 30-kDa CatB active isoform (CatB-30) in hippocampal slice cultures (Fig. 1c), including concentrations that produced no or minimal inhibitory effects on the enzyme (see grey zones in Figs. 1b and 1c).

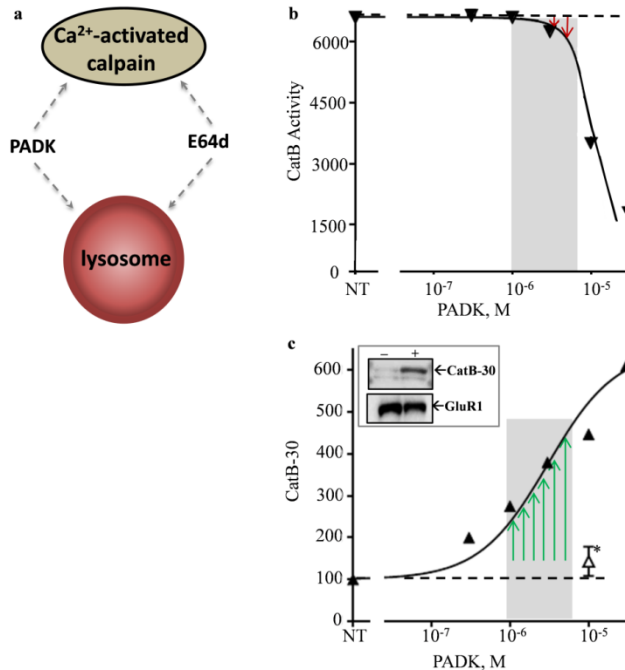


Figure 1. Potential enzyme modulation avenues. PADK and E64d are protease inhibitors that potentially target calpain and/or lysosomal hydrolases (a). PADK was assessed for its effect on CatB activity (b), exhibiting an IC_{50} of 9-10 μ M in brain homogenates. PADK at 1-8 μ M (grey zone) produced little inhibition (red arrows), while the same concentrations enhanced the CatB-30 active isoform 3-5 fold (c; green arrows) in hippocampal slice cultures (EC_{50} = 2.8 μ M). GluR1 was unchanged in PADK-treated samples (+). In the presence of the CatB inhibitor CA074, 10 μ M PADK was unable to have an effect on CatB-30 (* p <0.05).

PADK's dose-dependent modulatory effect on CatB-30 in Figure 1c exhibited an EC_{50} of 2.8 μ M, thus was >3-times more potent than its weak inhibitory potency to explain its enhancing effect on CatB activity previously reported (Butler et al., 2005, 2011; Farizatto et al., 2017). This modulator induced a 3-6-fold increase in CatB-30 as compared to levels found in untreated hippocampal slices, and its effect was blocked by the very potent CatB inhibitor CA074 (open triangle in Fig. 1c). Corresponding with this CatB-enhancing effect, PADK improved spatial memory in APP^{SwInd} transgenic mice using a novel hidden food cache paradigm (Table 1). APP^{SwInd} and age-matched wildtype mice were trained to find the location of food that was placed in one of two opaque cylinders positioned in different configurations for each test. Wildtype mice exhibited improved time to find

the food reward after three trials ($p < 0.001$), whereas APP_{SwInd} mice showed no improvement after 3 trials (Table 1). PADK treatment at 20 mg/kg/day (i.p.) allowed the transgenic mice to improve their food location time ($p = 0.036$), to a level comparable to the performance by wildtype controls. These results are similar to the previously correlated improvement of episodic memory in APP-PS1 mice (Butler et al., 2011).

seconds to find food cache (mean \pm SEM):		
<u>trial</u>	<u>WT mice</u>	<u>APP_{SwInd} mice</u>
1	11.0 \pm 2.5	12.3 \pm 2.8
3 + veh	6.30 \pm 1.2**	13.1 \pm 2.6
3 + PADK	–	6.16 \pm 2.7*

Table 1. Spatial memory was improved in 9-10-month APP_{SwInd} mice treated with PADK (20 mg/kg/day ip for 9 days). APP_{SwInd} mice and age-matched wild-type mice (WT) were mildly caloric-restricted and assessed with the hidden food cache test. A food reward was placed in one of two opaque cylinders in opposite corners of an open field. The food location was changed after each 3-trial training session, and food retrieval time was compared across trials. ** $p < 0.001$, t-test compared to trial 1; * $p = 0.036$, Mann-Whitney test compared to APP_{SwInd} trial 3 + vehicle.

The broad cysteine protease inhibitor E64d also has been implicated as a treatment avenue for AD (Hook et al., 2007, 2011, 2014a). While it has been suggested that E64d's inhibitory effect on CatB is the underlying therapeutic action for offsetting AD pathology, this weak protease inhibitor was found to increase CatB-30 (Table 2). Note that the positive modulation of CatB by E64d was less pronounced than the enhancing effect produced by PADK (increase of 76% vs. 549%; $p < 0.001$). Other weak cysteine protease inhibitors were also found to up-regulate active CatB to varying degrees, including *i*) SD1002, a non-peptidyl PADK analogue previously found to promote A β ₄₂ clearance (Viswanathan et al., 2012), *ii*) the polyphenol quercetin that, like PADK and E64d, exhibits very weak CatB inhibitory action (Ramalho et al., 2015), and *iii*) Cathepsin Inhibitor 1 (CATI-1, also known as Z-Phe-Gly-NHO-Bz), a broad inhibitor of papain and several cathepsins (Table 2). The potent CatB inhibitors CA074, CA074me, and E64 did not exhibit positive modulation of CatB-30. Table 2 also compared the listed 8 compounds for their inhibitory action on the calcium-activated cysteine protease calpain and, interestingly, E64d and the related E64 compound stand out as the most potent.

<u>very weak inhibitors</u>		<u>CatB-30, percent±SEM</u>	<u>IC₅₀ for CatB, μM</u>	<u>IC₅₀ for calpain, μM</u>
vehicle control		100 ± 4.0	–	–
PADK	1 μM	340 ± 38.7**	9 – 11 ^a	≥100 (from Fig. 3d)
	10 μM	649 ± 74.5***		
E64d	1 μM	115 ± 9.2	14 ^b	3 – 6 (from Fig. 3b) 0.04 - 4 ^c
	10 μM	176 ± 12.5*** ###		
SD1002	10 μM	345 ± 13.3**	>50 ^d	n.d.
quercetin	10 μM	198 ± 19.2**	8 ^e	211 ^f
CATI-1	10 μM	149 ± 14.3**	weak inhibitor ^g	>20 ^h
<u>potent inhibitors</u>		<u>CatB-30, percent±SEM</u>	<u>IC₅₀ for CatB, μM</u>	<u>IC₅₀ for calpain, μM</u>
CA074	0.3-1 μM	95 ± 11.9	0.004 ^b	>100 ^b
CA074me	0.3-1 μM	116 ± 9.2	0.12 ^a	n.d.
E64	1-2 μM	112 ± 7.5	0.03 ⁱ	0.57 ^j

Table 2. Comparisons among weak cysteine protease inhibitors and potent inhibitors regarding CatB-enhancing activity in hippocampal slice cultures and inhibitory activity targeting CatB and calpain. Measures of the 30-kDa CatB isoform (CatB-30) in treated hippocampal slices were from Farizzato et al. (2017). ANOVA multiple comparison tests compared to vehicle control: **p<0.01, ***p<0.001; unpaired t-test compared to 10 μM PADK: ###p<0.001. IC₅₀ values for inhibiting calpain-mediated SBDP production are shown for PADK and E64d from Fig. 3. Other IC₅₀ values for inhibiting CatB and calpain were obtained from the following references: a, Butler et al., 2011; b, Jeon et al., 2016; c, Huang et al., 1992; d, Viswanathan et al., 2012; e, Ramalho et al., 2015; f, Je Ma et al., 2009; g, 55; h, Montagne et al., 2017; i, Inubushi et al., 1994; j, Trinchese et al., 2008. CATI-1, Cathepsin Inhibitor 1; n.d., not determined.

To determine whether PADK and E64d have different actions on the calcium-activated calpain, assays were conducted to assess their ability to inhibit previously characterized breakdown products of spectrin and gephyrin mediated by calpain (SBDP and GnBDP; Fig. 2). Pathogenic calpain activation is known to cleave the α -subunit of the cytoskeletal protein spectrin (Vanderklish & Bahr, 2000). Calpain also cleaves the postsynaptic scaffold protein gephyrin into long-lasting fragments of 18 and 49 kDa (Kawasaki et al., 1997). Brain homogenates were prepared and incubated with calcium, producing a 150-kDa α II-spectrin fragment, and E64d inhibited this SBDP production (Fig. 3a). The dose-dependent inhibitory effect exhibited an IC₅₀ of 3-6 μM (ANOVA p=0.0066; Fig. 3b), closely matching E64d's reported potency for blocking μ -calpain (Huang et al., 1992). PADK, on the other hand, did not decrease SBDP levels in calcium-treated brain samples (Fig. 3c). Insignificant variability in SBDP levels was found (Fig. 3d), but some calpain

inhibition may occur at very high PADK concentrations that would negate its positive modulation of CatB.

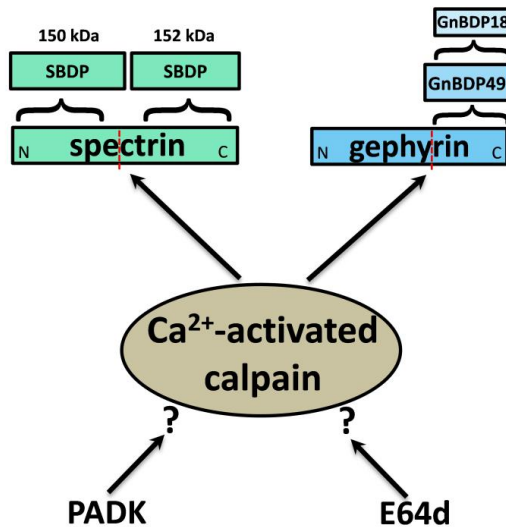


Figure 2. Calpain-mediated proteolysis of spectrin and gephyrin. Compounds may have an effect on calpain, a calcium-activated protease that generates breakdown products of spectrin (SBDPs of 150-152 kDa) and gephyrin (GnBDPs of 18 and 49 kDa).

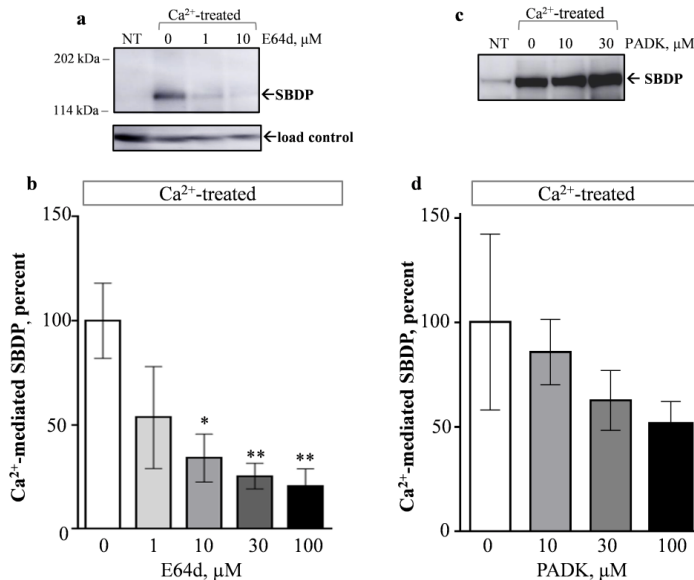


Fig. 3. E64d blocks calcium-induced spectrin breakdown while PADK does not. Rat telencephalic homogenates were not treated (NT) or treated with CaCl₂ at 37°C for 1 h to activate proteases in the presence of E64d (a, b) or PADK (c, d). Equal protein aliquots were assessed by immunoblot for anti- α II-spectrin staining of the 150-kDa SBDP and for labeling of a gel loading control. Calcium-induced SBDP levels were normalized to the 0 μ M control and means \pm SEM were compared to the control: * p <0.05, ** p ≤0.01. PADK had no effect on SBDP.

Concerning the calpain-mediated gephyrin fragments previously characterized in hippocampal membranes, calcium treatment of rat telencephalic samples also led to the production of a 49-kDa breakdown product (GnBDP49) as found in the hippocampal study, and to the production of a smaller 18-kDa fragment (GnBDP18) labeled by the antibodies developed against gephyrin's carboxyl-terminal sequence (Fig. 4a). Comparing the two distinct compounds of this study, PADK at 100 μ M was found to have no effect on the calcium-induced generation of GnBDP18 (Fig. 4b and 4c), whereas 100 μ M E64d completely blocked the 18-kDa fragment from forming (Fig. 4c).

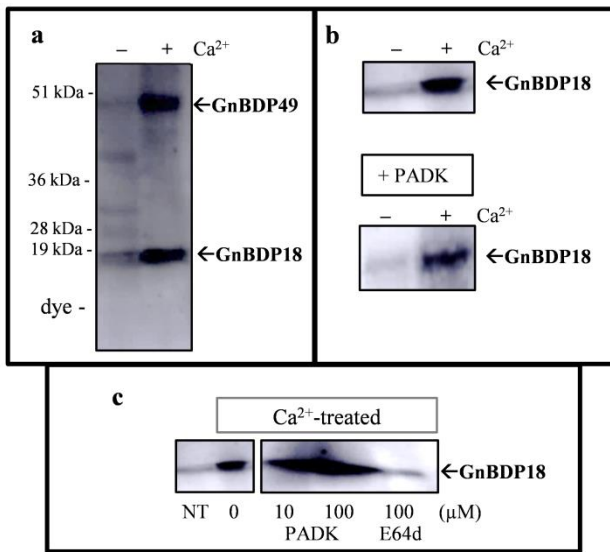


Figure 4. E64d blocks calcium-induced gephyrin breakdown. Telencephalic homogenates were treated without (–) or with (+) CaCl₂ at 37°C for 1 h, generating gephyrin breakdown products of 49 (GnBDP49) and 18 kDa (GnBDP18) that were detected by immunoblot (a). Molecular weight markers are shown. PADK had no effect on calcium-induced GnBDP18 formation (b) whereas E64d blocked its formation (c). NT, not treated with CaCl₂.

In addition to inhibiting the GnBDP18 proteolytic cleavage product, E64 blocked the formation of the larger GnBDP49 fragment as well (Fig. 5a and 5b). The dose-dependent reduction of the 49-kDa cleavage product in calcium-activated samples closely corresponded with E64d's dose-dependent inhibition of spectrin breakdown (Fig. 5c). Note that the calcium-induced loss of the protein band shown as a gel load control was also protected by E64d.

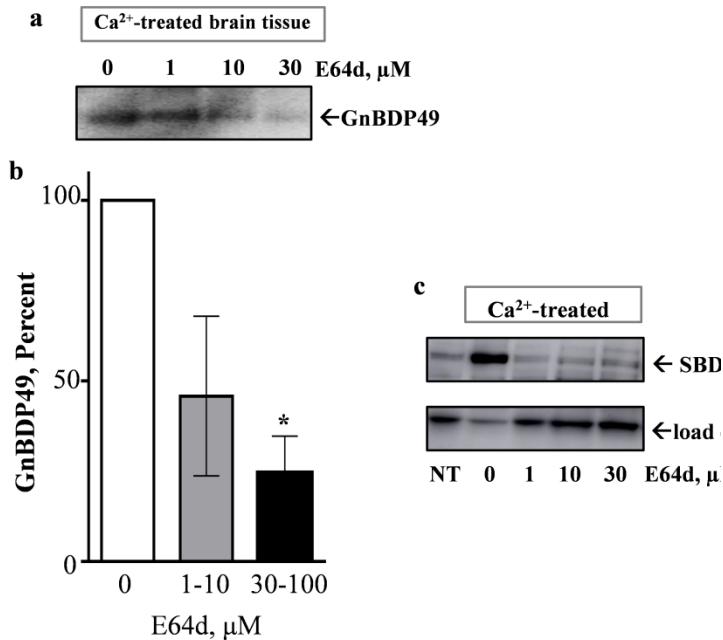


Figure 5. E64d reduces GnBDP49 in calcium-treated brain tissue. Telencephalic homogenates were treated with CaCl_2 at 37°C for 1 h, generating the gephyrin fragment GnBDP49 detected by immunoblot (a) and the E64d inhibitory effect was determined across concentrations. Calcium-induced GnBDP49 levels were normalized to the $0 \mu\text{M}$ control and means \pm SEM were compared to the control: $*p < 0.0182$. A corresponding E64d effect was found for blocking calcium-induced SBDP levels (c). NT, not treated with CaCl_2 .

Next, we tested the E64d and PADK compounds for the ability to protect the parent gephyrin protein, the 95-kDa isoform, from deterioration by calcium-induced proteolysis. In a pair of calcium-treated telencephalic homogenates, the brain sample with the addition of E64d exhibited a correspondence between blocking gephyrin fragment formation and protecting the parent gephyrin (see top two blot strips in Fig. 6a). As also indicated in the figure, the E64d inhibitor had similar abilities to 1) reduce gephyrin from being fragmented to GnBDP49 and other breakdown products and 2) reduce spectrin from being proteolyzed to the SBDP calpain cleavage product.

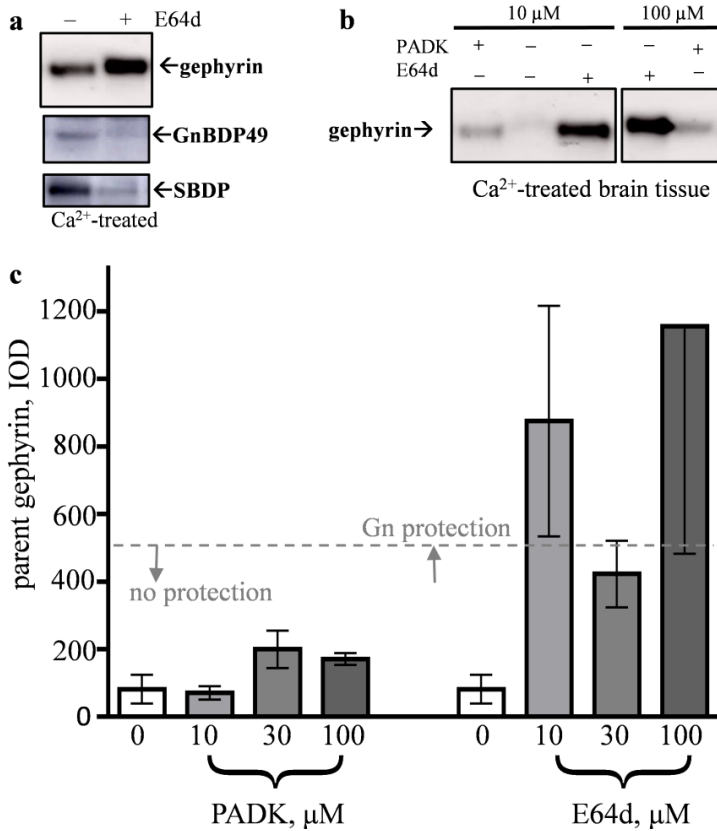


Figure 6. E64d protects the 95-kDa parent gephyrin from being proteolytically degraded. The calcium-treated brain homogenates incubated in the absence (-) or presence of E64d (+) were assessed by immunoblot for both the parent gephyrin and GnBDP49 as well as SBDP (a). PADK- and E64d-treated samples were assessed for protection of calcium-induced loss of gephyrin (b). Integrated optical densities (mean IODs \pm SEM) of gephyrin labeling were normalized to the 0 μ M control for PADK samples (no protection) and for E64d samples that exhibited protection to levels that were \geq control levels (c). Dotted line: gephyrin amount in no-calcium control samples.

Additional calcium-treated brain samples were incubated with 10-100 μ M PADK and showed no evidence that PADK protected the 95-kDa parent gephyrin, but samples treated with 10-100 μ M E64d were associated with robust levels of protected gephyrin protein (Fig. 6b). When examining the effects across dosages of PADK and E64d, for evidence that they govern cytoskeletal decay, calcium-treated samples with different PADK concentrations fell well below the control gephyrin measures from samples without the calcium incubation (average control level noted by dotted line in Fig. 6c). This finding indicates that no protection of gephyrin was produced by PADK. In contrast, calcium-incubated samples with different E64d

concentrations exhibited amounts of parent gephyrin that approached or exceeded the dotted-line control level of gephyrin (Fig. 6c). Interestingly, the calcium-activated homogenates that were treated with 10-100 μM E64d exhibited much more parent gephyrin than those homogenate samples that were treated with 100 μM PADK. Together with results of the breakdown product experiments, these findings indicate that E64d protects gephyrin from calpain-mediated proteolytic damage.

Discussion

For over 30 years, research programs for developing neurotherapeutics and other disease treatments have included cysteine protease inhibitors (see Wang & Yuen, 1994; Nixon, 2000; Vanderklis & Bahr, 2000; Trinchese et al., 2008; Saatman et al., 2010; Ono et al., 2016; Sugiyama et al., 2017). For protein accumulation disorders (e.g., AD, Parkinson's disease, and Huntington's disease), it is counterintuitive to use protease inhibitors that would block the same protein clearance pathways whose dysfunctions are part of pathogenic cascades (see Torres et al., 2012; Burbulla et al., 2017; Farizatto et al., 2017). Pathogenic protein clearance is a critical issue for AD-type pathology since $\text{A}\beta_{42}$ and $\text{A}\beta_{40}$ peptides have impaired clearing rates in the human disease (Mawuenyega et al., 2010). Accordingly, a growing number of studies has investigated agents that enhance enzymes appropriately involved in protein clearance. The CatB cysteine protease is one such enzyme: it is a lysosomal hydrolase that degrades $\text{A}\beta$ into less amyloidogenic species (Mueller-Steiner et al., 2006; Butler et al., 2011; Wang et al., 2012; Cermak et al., 2016; Park et al., 2016) and it is neuroprotective when up-regulated, reducing synaptic and behavioral deficits related to AD (Mueller-Steiner et al., 2006; Sun et al., 2008; Butler et al., 2011; Yang et al., 2011; Viswanathan et al., 2012). The PADK and E64d compounds compared here are both very weak inhibitors of the $\text{A}\beta$ -degrading CatB, but both were found to up-regulate CatB levels which may explain their beneficial actions in AD mouse models (see Butler et al., 2011; Hook et al., 2011; Bahr et al., 2012). It is noteworthy, however, that the two compounds exhibited distinct actions on the active CatB isoform vs. the calcium-dependent cysteine protease calpain:

- PADK up-regulated CatB-30 by 549% while causing no apparent change in calpain activity;
- E64d up-regulated CatB-30 by 76% but reduced calpain activity by 80-90%.

PADK has a >7-fold effect on CatB enhancement as compared to E64d's effect, as indicated by hippocampal slices after being treated with the compounds. PADK's robust effect on CatB explains the improved protein clearance as part of its protective actions in AD mouse models, which is consistent with human

studies showing exercise elevates CatB levels in correlation with improved memory (Moon et al., 2016). E64d, on the other hand, elicits a much smaller enhancing effect on CatB, but this small enhancement may be part of E64d's therapeutic action at concentrations that do not block the protein clearing role of CatB.

This study also indicates that PADK and E64d differ mechanistically in their abilities to block calpain-mediated proteolysis. PADK's positive effect on CatB was found to be selective, apparently independent of any inhibitory effect on calpain, an enzyme linked to several neurodegenerative disorders including stroke, seizures, TBI, and AD (see reviews: Nixon, 2000; Vanderklisch & Bahr 2000). E64d's blocking of calpain-mediated cytoskeletal damage was observed to be many times more potent than its effect on CatB. Thus, PADK and E64d may provide separate yet promising therapeutic avenues by acting on different targets (see Fig. 7).

PADK increases CatB-30 levels through an interaction with the CatB enzyme's active site. Such an interaction appears to occur to different degrees by phenolic-rich structures including PADK, the related Z-Phe-Phe-diazomethylketone, the nonpeptidic modulator SD1002, and the natural phenolic compound quercetin since they were effective at up-regulating CatB-30. In contrast, the structurally distinct epoxysuccinyl peptide E64d acted 7-fold less potently than PADK for CatB positive modulation. In addition to lacking phenolic motifs that may facilitate the modulation, E64d is known to be hydrolyzed once it readily permeates into cells, becoming a potent cysteine protease inhibitor with an IC_{50} for blocking calpain of $0.04 \mu\text{M}$ (Huang et al., 1992). This feature of E64d likely influences its ability to up-regulate CatB since the better positive CatB modulators identified here are very weak inhibitors of cysteine proteases.

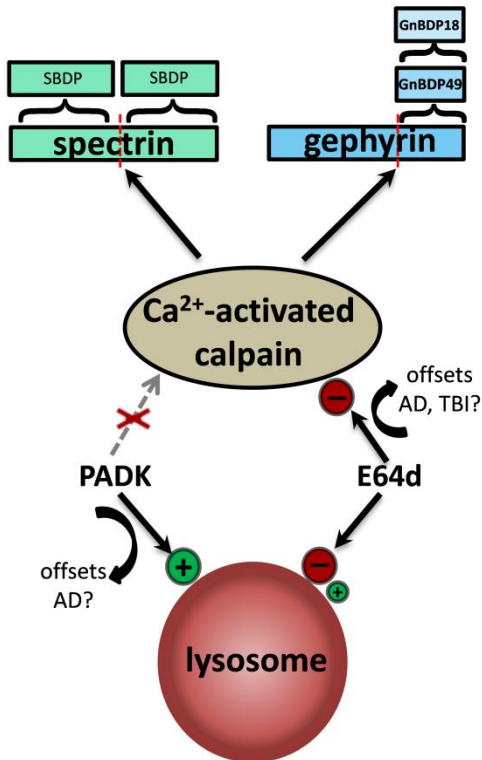


Figure 7. Differential pathways and therapeutic targets of PADK and E64d. PADK has a positive and selective effect on lysosomal CatB which likely explains its beneficial effect on AD-type protein accumulation pathology. E64d elicits low-level positive CatB modulation which may be part of its therapeutic action. In addition, evidence indicates that E64d potentially blocks pathogenic, calpain-mediated cytoskeletal damage, and the compound is known to block a number of lysosomal enzymes. The singular action on calpain or the dual effect on calpain and the lysosomal pathway may explain E64d's protective results.

The results suggest that E64d targets the calcium-regulated enzyme calpain, an enzyme that is essential to a host of cellular processes and is known to participate in many pathologic cascades. E64d effectively reduced cytoskeletal degradation linked to neuropathology, evaluated by measuring spectrin and gephyrin proteolysis that was shown previously to be blocked by selective calpain inhibitors (Kawasaki et al., 1997; Vanderklish & Bahr 2000). E64d and PADK exhibited disparate effects on the cytoskeletal damage in brain samples:

- E64d blocked calcium-mediated spectrin and gephyrin breakdown at $\geq 10 \mu\text{M}$;
- E64d protected the parent gephyrin from calcium-mediated proteolysis at $\geq 10 \mu\text{M}$;
- PADK did not block the induced cytoskeletal breakdown or protect the parent gephyrin.

Of its different modulatory actions depicted in Figure 7, E64d's negative modulation of calpain alone very likely explains its protective effects against neurodegenerative insults, rather than through dual inhibition of both calpain and a family of lysosomal cathepsins (E64d is listed as an inhibitor of cathepsins B, F, H, K, and L). First, selective calpain inhibitors have been widely reported to protect against ischemic insults and TBI (see Vanderklish & Bahr, 2000; Saatman et al., 2010; Ono et al., 2016). Second, E64d completely protected against the TBI-induced neuronal loss measured in CatB knockout mice (Hook et al., 2014b). Third, intracellular and hydrolyzed E64d, having a 0.04- μ M IC_{50} for blocking calpain (Huang et al., 1992), is 350 times more potent towards calpain vs. CatB and has been shown to lower A β peptide levels and improve memory in APP transgenic mice (Hook et al., 2007, 2011, 2014a). In comparison, the calpain inhibitor BDA-410 is 748 times more potent towards calpain vs. CatB and exhibited similar memory improvement as well as restored normal synaptic functions in AD mice (Trinchese et al., 2008). Lastly, inhibition of cathepsins would not be a beneficial feature to add to a therapeutic for synaptic/cognitive protection since CatB-blocking levels of cysteine protease inhibitors were found to be toxic, causing the accumulation of APP fragments and reducing synaptic protein measures (Bahr et al., 1994). Similarly, E64d blocked lysosomal protein clearance leading to accumulating levels of the mutant huntingtin protein (Jeong et al., 2009).

Inhibiting calpain enzymes as a therapeutic avenue has long been a challenge since reducing calpain activity can *i)* negatively affect one of the many physiological roles for calpains and *ii)* lead to adverse side effects. Even with these challenges, drug discovery efforts remain active to develop calpain-targeted strategies to treat cancer, cardiovascular diseases, drug abuse, and neurodegenerative disorders including latter stages of AD (see Ono et al., 2016; Liang et al., 2017).

Interestingly, the E64d neuroprotectant, shown to be effective in London-mutant APP mice, appears to be the first compound identified that is both a potent calpain inhibitor and a positive modulator of the lysosomal pathway through CatB up-regulation. As should be noted, a cautionary study reported that all APP-overexpressing mice exhibit a toxic protein accumulation that does not occur in AD brains and that calpain activation can be an artifact of APP overexpression (Saito et al., 2016). Notwithstanding, aberrant calpain activity may play a role in AD-related oxidative stress and age-related disruption of proteostasis that lead to lysosomal destabilization (see Nixon, 2000; Yamashima, 2016). Perhaps related, calpain inhibition has been suggested to promote protective protein clearance through inducing the autophagic-lysosomal pathway (Menziez et al., 2015; Watchon et al., 2017) and blocking the switch from 26S to 20S proteasomes in order to enhance

regulated 26S proteasomal protein degradation that is essential for neuronal health and survival (Huang et al., 2013). Thus, a potential therapeutic with calpain inhibitory and lysosomal enhancement properties may elicit two separate avenues for proteostasis protection. CatB enhancement, in fact, has been shown to protect against AD-type protein accumulation pathology and associated synaptic compromise in a chloroquine-induced model of protein accumulation stress (Bendiske & Bahr, 2003; Butler et al., 2005; Rhyzikov & Bahr, 2008) and in models directly treated with A β ₄₂ (Park et al., 2016; Farizatto et al., 2017).

In summary, among the weak cysteine protease inhibitors assessed, the PADK compound was found to have a positive effect on CatB but did not appear to inhibit calpain. E64d, on the other hand, was demonstrated to be both a positive CatB modulator and a potent calpain inhibitor. This dual action suggests E64d has a unique ability to treat protein accumulation events related to AD.

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Increase in 2.5 Micron Airborne Particulate Matters, AHPCO[®] and Plasma Nanotechnology in Reducing the Symptoms of Asthma and Allergic Rhinitis

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Abstract

Increase in the particulate matter of size 2.5 microns are a major health concern of the present decade that led to a gradual rise of allergy and asthma cases all over the world. When inhaled, they can reach deep into our lungs and enter tissues via the bloodstream and contribute to health conditions ranging from coughing or lung irritation to chronic bronchitis and cardiovascular complications. These substances are generally composed of the combustion particles, organic compounds and metals. Levels of the most dangerous particles, called PM 2.5 reached beyond the prescribed safe level in all the major cities of the world: Beijing in China, Delhi in India, Los Angeles and New York in the US.

PM 2.5 is becoming an ever-increasing problem that must be addressed. We are aiming our research towards the reduction of PM 2.5 in the indoor air by using a novel hybrid technology. The newly developed AHPCO[®] or Advanced Hydrated Photocatalytic Oxidation and Plasma Nanotechnology in the Bi-Polar units were tested to evaluate the reduction of the particulate matters with a focus on PM 2.5 as well as animal dander and fungal spores. Utilizing two fiber glass chambers, we analyzed the particle count to assess

and evaluate the efficiency of the hybrid AHPCO[®] and Plasma Nanotechnology in reducing the particle count present in the indoor air in course of progressive time intervals. The air purification system developed with the novel hybrid technology reduced the indoor particulate matters and animal dander efficiently.

Keywords: PM 2.5 micron, air pollution, air purifier, AHPCO[®]

Introduction

There is a gradual rise of allergy and asthma cases all over the world (Ghosh et al. 2017). Particulate matter of size 2.5 microns are a major health concern of the present decade since when inhaled they can reach deep into our lungs and tissues via the bloodstreams. These are generally composed of the combustion particles, organic compounds, metals.

In November 2016, in Delhi, India 1,800 Schools were closed due to dangerous smog that obscured the city. Levels of the most dangerous particles, called PM 2.5 reached 600 micrograms per cubic meter in different parts of the city in that week, according to the Delhi Pollution Control Committee. Sarath Guttikunda, the director of Urban Emissions has reported that a sustained exposure to that concentration of PM 2.5 is equivalent to smoking 40 cigarettes a day (Raj and Barry, 2016). People of all ages in Beijing, China have to wear masks to avoid the dense smog that covers the city every morning. The air in New York City is significantly polluted. Due to the airborne pollutants and greenhouse gases, the health of residents in cities across the country is regularly put at risk by the ground-level ozone (forming smog); New York is one of those cities affected. A report published earlier showed that the tristate area had 92 days of "elevated smog pollution" in 2015. Granted, the smog in New York is a drop in the bucket compared to that of southern California—Los Angeles evidenced 213 days of heavy smog during 2015. The five most polluted cities in the US are all in the Southern California (Kirkpatrick, N., 2015). According to the report, ground-level ozone brings about a whole host of health risks, ranging from coughing to an inflammation that is like a "sunburn on the inside of the lungs". High truck and traffic volume, industrial facilities and older heating systems can all contribute to increased levels of air pollution in impoverished neighborhoods. Other environmental factors such as poor building maintenance, mold or insect infestation can also trigger asthma symptoms (Hinsdale, 2016).

AHPCO[®] and Plasma Nanotechnology and Indoor Air Quality (IAQ)

The indoor air surrounding us plays an extremely important role in our well being and efficiency. Breathing pure and clean air allows us to think more clearly, sleep soundly, and stay healthier. Studies show that we receive 56%

of our energy from the air we breathe, more than from water and food combined. On average we breathe 37 pounds of air a day that is equivalent to a volume of an Olympic sized pool (Ionic Healing, 2017). Sick building syndrome (SBS) is a combination of ailments associated with an individual's place of work or residence. A 1984 WHO report into the syndrome suggested up to 30% buildings worldwide may be linked to symptoms of SBS. Most of the sick building syndrome is related to poor indoor air quality (EPA, 2017). Two decades ago NASA developed an ethylene scrub air purification machine using a titanium dioxide catalyst in conjunction with UV lamps to remove the ethylene gas. Subsequent tests revealed that this PCO/TiO₂ air purifier technology also helped to destroy harmful organisms such as bacteria that passed through the system. Air Oasis has utilized this early NASA UV PCO air purifier technology to develop a revolutionary line of filterless air purifiers. We have applied the knowledge of Photo-Catalytic Oxidation Nanotechnology to build the air purifier that reduces the indoor VOCs, air borne pathogens, aeroallergen and particulate matters and thereby improves the air quality.

A collaborative research between the West Texas A&M University and Air Oasis has developed Advanced Hydrated Photo Catalytic Oxidation (AHPCO[®]) Nanotechnology and Plasma Nanotechnology. AHPCO[®] was applied to develop an air purification system to reduce all sorts of indoor aeroallergen to improve the air quality, better food preservation. Plasma nanotechnology is applied to sterilize the ice makers. Air Oasis air purifiers utilize a new generation AHPCO[®] technology that simply produces a blanket of redundant oxidizers that not only clean the surrounding air, but target the particulate matters in the air as well as on the surface and sanitize the air eventually. The AHPCO[®] Nanotechnology has proved to be efficient for net reduction of microbes, VOCs with the specific effect on Methicillin resistant *Staphylococcus aureus*, MRSA. The collaborative research is going on to apply these technologies to develop commodities like efficient air purification system, food preservation system, producing clean ice cubes in the ice makers and cell phone sterilizers. Air Oasis LLP, USA is developing strategies to promote small businesses all over the world. The implications of Nanotechnology can improve the quality of life and add new features to the original functions of the product. Improving the quality of life of individuals is imperative in business because it will improve the well-being of the society as a sum.

Materials and Methods

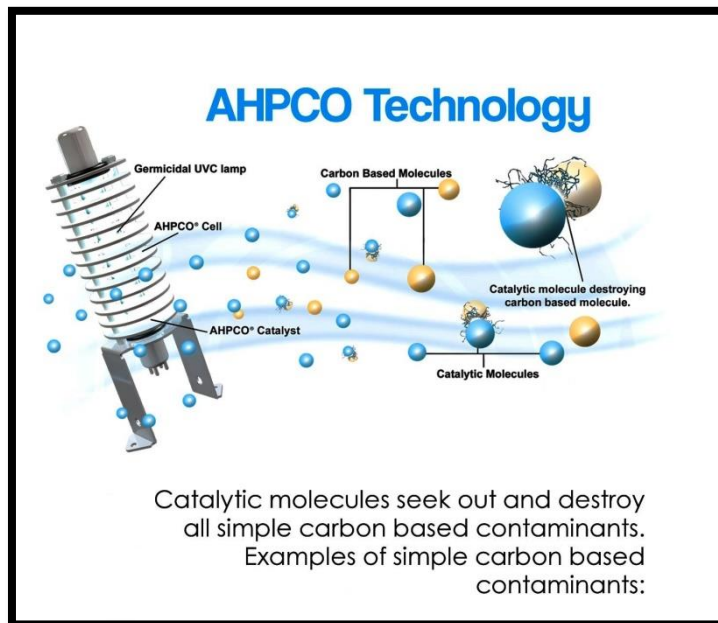


Fig.1 showing how the catalytic molecules produced by the AHPCO[®] technology destroy the carbon based contaminants.

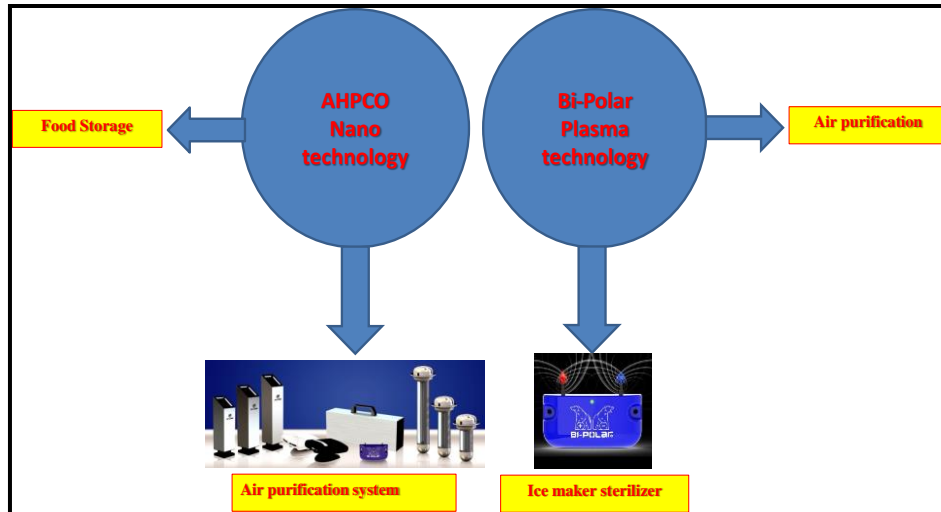


Fig. 2 showing various applications of the AHPCO[®] Nanotechnology and Plasma Nanotechnology in the Bi-Polar[®] units.

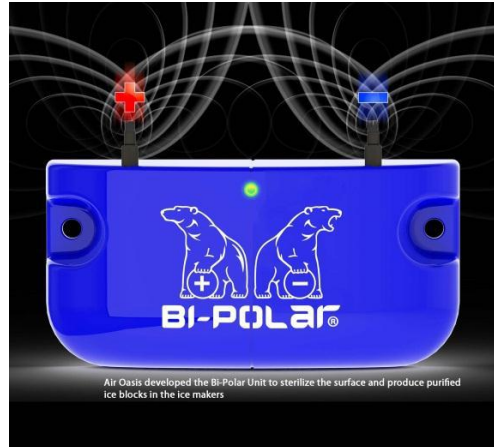


Fig. 3. The Bi-Polar[®] unit created by Air Oasis proved to be efficient in cleaning the air and reducing the contaminants in the ice makes.

Results and Discussion

Experiment 1: Smoke was gone in 60 seconds on using Bi-Polar[®]

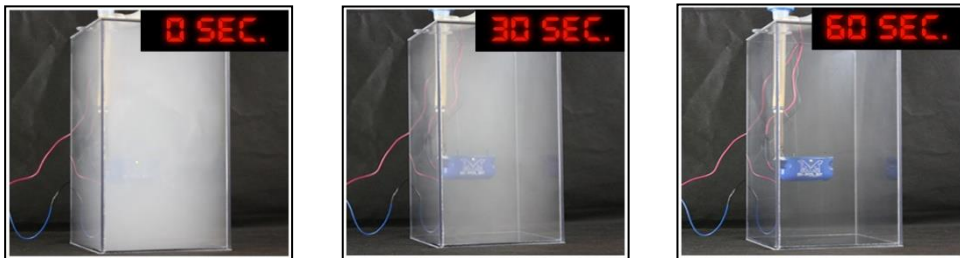


Fig.4. On running the Bi-Polar[®] unit the smoke in the fiber glass chamber was gone in 60 seconds. Cigarette smoke was inserted into a fiber glass chamber through an inlet while a Bi-Polar[®] unit was running inside. The stop watch showed the time for reduction of the smoke concentration. The video recording of the experiment showed a complete reduction of smoke in the fiber glass chamber. The video is available on the YouTube with a link: https://www.youtube.com/watch?v=LpB6qZv0n_M (Ref. Bennert, J, 2016).

Experiment 2: Particulate matters gone in 1000 Seconds

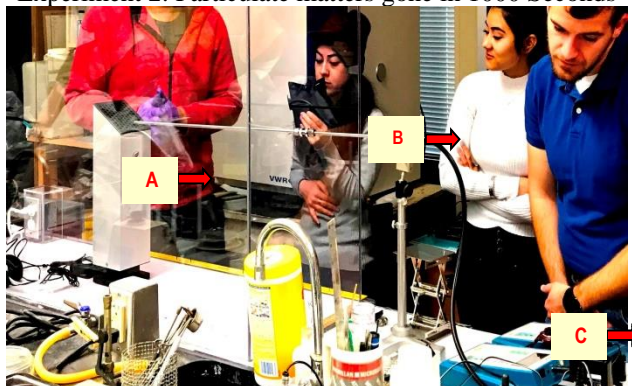
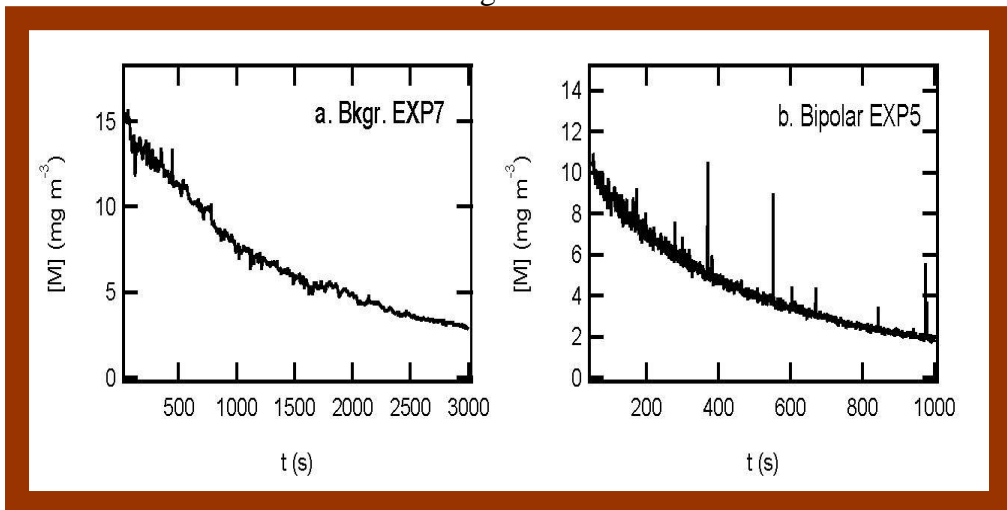


Fig. 5 Arrows from the left showing set up of Air Oasis 3000 unit(A), connecting outlet(B) and DustTrack 8520 Monitor(C). Utilizing a fiber glass chamber, we analyzed the particle count to assess and evaluate the efficiency of the hybrid AHPCO[®] and Plasma Nanotechnology in the Bi-Polar[®] units in reducing the particle count present in the indoor air. We estimated the rate of the decay of the aerosol concentration as a function of time before and after using the AHPCO[®] nanotechnology with the Air Oasis air purifier 3000 and the plasma nanotechnology in the Bi-Polar[®] unit. Through an inlet, the aerosols were injected and dispersed in the chamber in controlled way and particle count was recorded using the DustTrack connected to the outlet. The DustTrack 8520 spectrometer counted the aerosols in the chamber on injecting 12 mg/m³ of NX solution into the chamber; we turn on the DustTrack and let the aerosols settle to the lowest concentration. We used the illite NX powder as aerosol since it has a similar mineralogical composition of the atmospheric mineral dust. Health professional in all the countries expressed their concerns on the increasing trend of allergy and asthma cases due to a significant increase in the PM 2.5 micron particulate matters in the air. Our experiment showed a gradually decay of the particulate matters, PM 2.5 is possible on using the AHPCO[®] and Plasma Nanotechnologies.



Graphs A and B show the reduction of particulate matter in relation to time with and without using the Bi-Polar[®] unit.

To evaluate the animal dander and fungal spores, we used a Dylos Air Quality Monitor. We detected and compared the animal dander counts on running the air purifier for 24, 48, 72 and 120 hours of exposures in the animal vivarium.

Conclusion

The air purification system developed with novel AHPCO[®] and Plasma Nanotechnology efficiently reduced the indoor particulate matters, fungal spores and animal dander in course of progressive time interval. The major conclusive points from our research are summarized below. Investigation on assessing the efficiency of the AHPCO[®] and Plasma Nanotechnology used in Air Oasis air purifiers showed the improvement of the Indoor Air Quality (IAQ) by--

- Reducing the indoor particulate matters and aeroallergen concentration
- Reducing the MRSA, (Methicillin Resistant *Staphylococcus aureus*) concentration
- Reducing the VOCs (Volatile Organic Compounds)
- Improving the odor from cigarette smoke
- Assessing the safety measures showed no harmful effect of the AHPCO[®] Air Purification system on the living system and cell culture.

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Food Sources and Preferences of College Students

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Abstract

Young adults, especially college students, in the United States (U.S.) have to make independent decisions on where to buy food and the attributes of the food to buy. For some, the decision is one of their first undertakings since leaving home and could be foundational relative to their food choices, with its attendant health implications, later in life. We used a data from a survey to ascertain the frequency with which some U.S. college students shop at different types of food vendors such as grocery stores, supermarkets, fast food restaurants and full-service restaurants. We also asked about the food attributes that were important to students. Our results indicate that supermarkets were the primary sources of food at home for the students while fast food restaurants were the dominant sources of food away from home. Taste, followed by price, were the most important food attributes for students. Most students indicated a willingness to pay more for local food and food produced on small farms. Food vendors that could provide food that tastes good at lower prices are likely to have a competitive edge in attracting college students as patrons. The interest of students in local foods suggests that the current local foods movement may not be a fad, but could be sustained for a longer period.

Keywords: Food, preference, price, taste, restaurant

Introduction

Food intake is an important subject that has enormous health and economic implications. Studies have shown that most college students often have poor eating habits (Brevard and Ricketts, 1996; Driskell, Kim, and Goebel, 2005; Racette, Deusinger, Strube, Highstein, and Deusinger, 2005). According to Grace (1997), college life often deteriorates dietary habits among students. This could potentially add to weight problems especially during the first year of college (Anderson et al., 2003) and possibly continue

during later years of life (Centers for Disease Control, 1997; Driskell et al., 2005; Racette et al., 2005). Therefore, studies related to food choices and consumption behaviors among millennials need to be taken seriously since it has several long-term consequences for the individual in terms of health and longevity and to society with regard to health costs. Where and why younger people buy given food items are useful information for developing effective food marketing and nutritional education programs.

The existing literature on food choices cite taste, cost, nutrition, convenience, pleasure, and weight control as the key determinants of food selection and consumption (Sporny and Contento, 1995; Nguyen, Otis and Potvin, 1996; and Glanz et al. 1998). However, some studies show that the cost of food and convenience are the highest determining factors in the choice of food among millennials or young folks compared to older persons (Glanz et al., 1998). Also among the cohort of millennials, cost of food and convenience are found to be important to nonwhites, especially blacks, compared to whites (Glanz et al., 1998). This implies that though some young consumers may have concerns about certain kinds of food produced conventionally, their preference for alternatives is usually conditional, and quite often determined by food prices. Besides cost, Bissonette and Contento (2001) also argue that young people are more likely to admit that they intend to buy organically produced food. Gender differences among millennials also exist when it comes to food preferences. Racette et al. (2005) reveal that female college students tend to eat more fatty foods than male counterparts, although their fruit and vegetable consumption tend to remain similar.

Birch (1999) has shown that people often establish their eating habits while they are relatively young but little research has been done focusing on the food selection behaviors of young adults or millennials (Betts et al., 1995). The intent of this study is to identify and evaluate the food preferences of millennials, especially college students, in order to gain better insights in their consumption behaviors. This is very important because young consumers are likely to take their eating habits into their older age. Although many food preferences are established at an early stage in life, people still make more independent decisions about their food intake as they move through adolescence (Deshpande, Basil and Basil, 2009). For the very young, many food choices are constrained by the decisions of parents and pre-college systems (Nicklas et al., 2001). Thus, an essential time of life for food choice is when people step out independently for the first time and begin to make their own decisions about food. For many people, this is the transition to college or university life. Transitioning to college or university is a critical period for young adults who are facing their first opportunity to make their own food decisions (Baker, 1991; Marquis, 2005) and could have a negative impact on students' eating behaviors (Marquis, 2005; Rappoport, 2003).

Therefore, a clear understanding of young people's decision about food choice and consumption will help to promote desirable behaviors (Glanz, Lewis and Rimer, 1997; and Glanz and Eriksen, 1993).

Methods

We collected data for this study through a survey which was administered to a convenience sample of 120 undergraduate students at North Carolina Agricultural and Technical State University in Greensboro, North Carolina, in the Spring of 2016. The students were majors in animal science, agribusiness, agricultural education, environmental science and economics. The data was collected by using a survey instrument entitled 'Food from Our Changing World: What Do You Think?' (Wimberley, Vander Mey, Wells and Ejimakor, 2003). The students were requested to respond to categories of question/statements on where and how often they bought their food, the importance of food attributes and willingness to pay more for food based on how and where it was produced. Where students bought their food was further sub-categorized as either food at home (FAH), which included raw food from supermarkets, grocery stores and convenience stores, and food away from home (FAFH) which included prepared food from fast food restaurants, cafeterias and full-service restaurants, and ready-to-eat food items. Students were asked to indicate how often they bought food from the various FAH and FAFH sources. The possible responses to this category of questions were: daily, weekly, monthly, seldom or never. On the category for food attributes, students were requested to rate the importance of food labels, taste, and price. The possible responses were of: no, little, some or great, importance. The third category of questions asked students to indicate whether they will be willing to pay more for food based on where and how the food was produced, and how it was processed, which included food produced locally, organically, on small farms, and grown and processed in safe conditions. The possible responses were strongly, agree, undecided, disagree and strongly disagree. The responses were coded, tabulated and used to generate graphs.

Results

Food at Home

Supermarkets were the predominant source of FAH for students. Almost 94 percent of the respondents purchase their groceries from a supermarket on a daily (1.6%), weekly (51.6%) and monthly (40.6%) basis (Figure 1). Convenience stores were the second most important source of food at home with 61% of the respondents indicating that they patronized the outfits on a, daily (14.1%), weekly (34.4%) or monthly (12.5%) basis. The frequency of daily visits to convenience stores was higher than those for supermarkets

and grocery stores. Over 50% of the respondents seldom or never shopped at a local grocery store.

Food Away from Home

Fast food restaurants were found to be the primary source of food away from home (FAFH) for the respondents. Twenty-five percent of the respondents bought FAFH from fast food restaurants on a daily basis while over half (51.6%) and 12.5% did so on a weekly and monthly basis, respectively (Figure 2). Cafeterias and full service restaurants represented the second most important source of food away from home. Over 33.3% of the respondents patronized cafeterias and restaurants weekly and 30.2% did so monthly. The least likely source of food away from home were ready-to-eat food items from grocery stores. Over 30% of the respondents reported that they seldom or never bought ready-to-eat food items from grocery stores, which is about three times the rate for fast food restaurants and almost twice the rate reported for cafeterias and full-service restaurants.

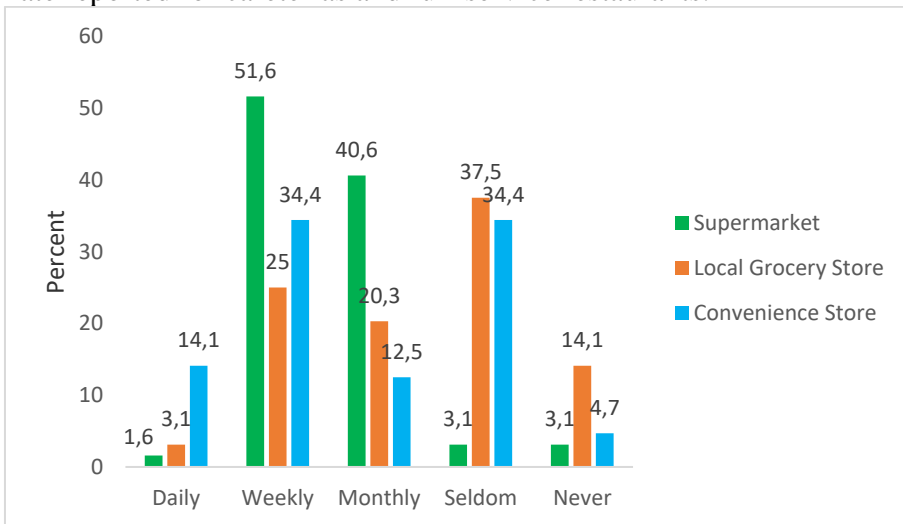


Figure 1: Frequency of Shopping for Food at Home by Type of Store

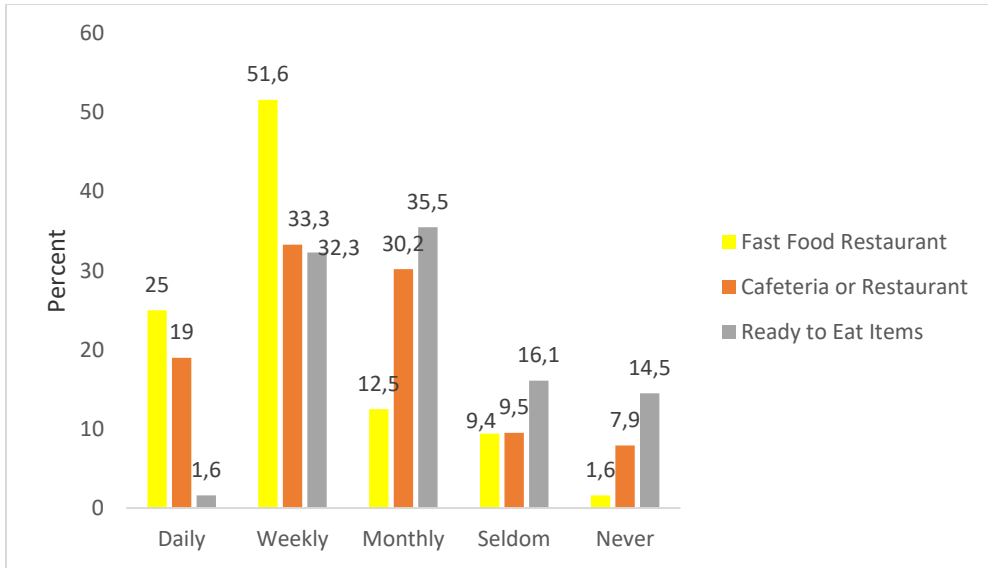


Figure 2: Frequency of Shopping for Food Away From Home by Type of Restaurant Store Types

Importance of Food Attributes

Taste was found to be the most important food attribute. Over 81% of the respondents indicated that food taste was of great importance while an additional 12.5% indicated that taste was of some importance (Figure 3). The second most important food attribute was the price which was cited as being of great importance by over 65% of the respondents. Over 23% of the respondents also indicated that the price of food is of some importance.

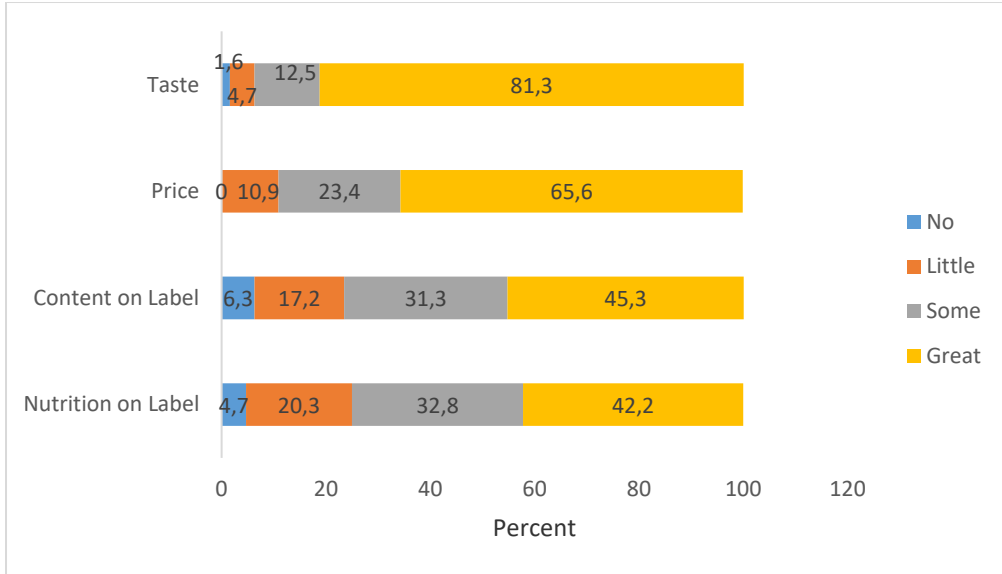


Figure 3: Importance of Food Attributes

Willingness to Pay More for Food Attributes

Respondents were willing to pay more for food based on where and how it was produced. Over 82% of the respondents either strongly agreed (51.3%) or agreed (30.8%) that they will be willing to pay more for food that is produced locally. Food produced on small farms ranked second in terms of willingness to pay more. Over 46% of the respondents strongly agreed that they were willing to pay more for food produced on small farms and another 30.8% agreed with the statement. Food produced organically was a close third based on willingness to pay more, with 41% and 35.9% of the respondents strongly agreeing and agreeing, respectively, that they will be willing to pay more for such food. A majority of the respondents (69.3%) also either strongly agreed or agreed that they will be willing to pay more for food processed in extra safe conditions.

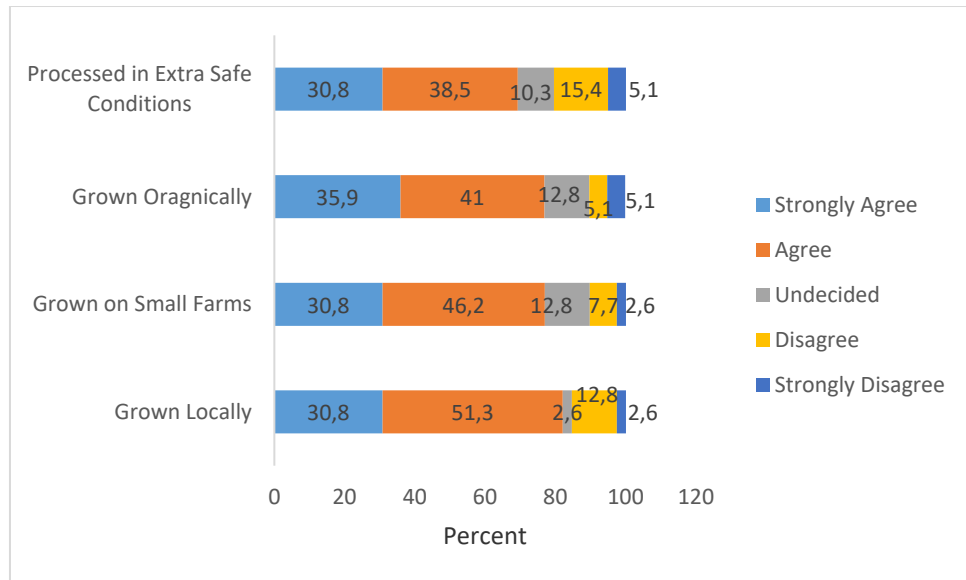


Figure 4: Willingness to Pay More for Food Based Production Practices

Conclusion

The majority of students in this study got their FAH from supermarkets and FAFH from fast food restaurants on a weekly basis. The most important food attributes were taste and price. Food vendors that could provide good-tasting food at lower prices are likely to have a competitive edge in attracting students as patrons. Students also indicated a strong willingness to pay more for locally-produced food. The interest of younger people in local foods indicate that the local food movement could be sustained for a longer period.

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Protectionism: This Good Bad Word

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Abstract

This paper aims to determine the place the economy occupies in sciences and, in turn, the place occupied by Protectionism like school of thought within the economy. From the origin of the stipulated capriciously of the economy as Normative Science, the concentrated economic power has tried in creating awareness among people that Protectionism is harmful. As a result, the only way to development and welfare is Liberalism. This position, convenient for those who are directly benefiting from the accumulation and concentration of wealth, involves the one they have been promoting from the media. It is assumed as an absolute truth and is used for generating the collective consciousness that Liberalism is the only way out. In addition, this is even at the expense of the interests of the people.

Keywords: Economy, protectionism, liberalism, development, people

Introduction

Is Protectionism a tool for commerce or is it a philosophical current inside the economy? Is it only an invention created to justify the mercantilism and today's anachronistic? Is it only an economic school that brings decadence? Is liberalism the only economic current that allows development? Why does liberalism has better press than protectionism?

Many of these questions have actionated in the unconscious group to position protectionism like something bad. Hence, this is contrary to nature, and it leads to poverty and to the enrichment few people.

Protectionism is part of the culture of people. From economic power, impeller of Liberalism, they have sought to generate an awareness that Protectionism is contrary to the development of peoples and nations. This hides the historical reality that that is what allowed the origin of the rational

exchange between different tribes, cultures, civilizations, nations, and peoples throughout history.

The communication strategy highlighting the virtues of Liberalism as the only way to development was contradicted by culture and effective reality. This was embodied in concrete data from the positive economy.

In this study, I will develop the hypothesis that the injury of Protectionism is only useful for economic power to establish the idea that Liberalism is the only way to development.

In this essay, I will kick start to begin to understand why protectionism is considered as a "bad word", being a school that generates welfare people.

I.

Origin of Protectionism

The controversy about the origin of economic Protectionism has been generalized since the emergence of the international trading system. Subsequently, this is with the advent of the concept of country. Also, it is closely linked to Mercantilism. The irruption of the Physiocrats, by the hand of Quesnay as main reference, was provoking the general and erroneous idea that the natural thing is the Liberalism. Nevertheless, there is a force with which Liberalism is imposed on collective imagination, even against the interests of the majorities. It is long-standing and responds to a very intelligent way of advancing the community. This can be achieved by making each of the soldiers to become members of the free trade and Liberalism, even at the expense of their own interests.

From the origin of the tribal economies, there existed a concept of necessity and opportunity. Inside the tribe, the needs were solved in solidarity. It was often ordered by someone who is responsible and others by the collective. When the absence of any element could be provided by another tribe, an exchange (barter) system based on protectionism was generated. As a result, the tribes sought what they lacked and toasted to what was left over. That way, no one could think of putting aside what he needed to deliver for something that he did not. When any "stranger" wished to appropriate something that is necessary for him and which is not surplus on the other side, disputes tends to arise. Therefore, this has not changed beyond the years and forms.

Adam Smith (1794), father of economic liberalism, recognizes that for barter to be possible, there must be a surplus to be changed. In this way, Smith begins to justify his theory about the division of labor.

Anyone who, in the matter of his interest, stipulates another, intends to do this: "Give me what I need, and I will give you what you lack." This is the intelligence of such compromises, and this is the way to obtain from another

greater part in the good offices that it needs in the commerce of the civil society. (Adam Smith, 1794)

It remains clear from that time that the author, also considered father of the economy like science, recognizes that Protectionism is previous even to the formalization of the Economic Science. Therefore, it is the natural behavior of men.

The concept of the man I use in this essay, as opposed to the individual man determined from the liberalism that must be used to justify his theories, is that of Social Man. Man is a social being because that is the only way he can develop. Already, Aristotle (330 BC) in Politics states that "Man is a social being by nature". It is in this sense that man "is" in both "is with others".

In the beginning and in returning to the barter model described above, it was much easier to exchange necessary goods because there was no money. This, however, refers to the intermediate good par excellence. Consequently, we must clarify the fact that barter was not an extended practice. It was done between different people and as a result of the surplus of what was needed and the needs of the needy.

As we advance in the evolution of humanity, we can appreciate the advent of commerce. From its origin, commerce between cities was given on the basis of the concept of missing need. In the absence of some goods, it was accepted by others that offered it. On the supply side, they offered what was left over. Therefore, there is the need to grow articles that were not necessary for subsistence. Also, Protectionism is closely linked to subsistence.

It was described above that man-made economy, from its origin, begins to manage its resources to meet their needs as soon as possible. This is based on the concept of the collective, the supply, and the management of the resources of the clans and tribes which generated the concept of distribution and savings.

After this, and with the connection with other clans and tribes, the concept of the exchange arose. No group was going to give up what it needed. Thus, it was done through two ways: the submission by force or the exchange for things that is needed and which they do not have. It also entails yielding what they had and did not need.

This remnant concept began the idea of commerce: the production of goods that were abundant knowing that for other groups it was not. It also obtained what was needed through barter.

Thus, what has always given me concern is the widespread consensus of the birth of the Economy in the Modern Age, and coincidentally with the advent of Economic Liberalism. Moreover, after what I am expressing till now in this work, this has added two justifications to my criterion:

- The first is that with the first writing of economic philosophy, the economy is born as a science.

- The second is that it is convenient to establish the birth and imposition of the economy as a science when a theory is expressed whereby the individual (liberalism) is justified and prevails over the collective (protectionism). As a result, he establishes as natural the inequality from those sectors that need to disguise that difference to continue exercising the power.

The Economy and its Place in Science

In making a historical journey, Economy (whose literal translation in the Greek is The Law of the House) like discipline goes back to the origin of humanity. However, the first that was characterized were the Greeks. The old economy was based on administration and not on profound study. In the middle ages, feudalism and scholasticism also made their contribution. The advent of modern economics can be synthesized into Mercantilism and Physiocracy.

We deduce that Protectionism emerges in advance of Economics as a science. This means that after the practice of economic activity, the scientific theory was generated. Consequently, we are faced with the first paradox. While Economics as a science is attributed to Adam Smith, with the generation of norms and laws that govern it, the reality is that Positive Economics is much earlier than Normative Economics. Therefore, this moment determines its entrance to the world of Science.

In extending this, I am going to quote some authors.

Mario Bunge (1959) in "Science: His method and His philosophy", divides science into two great branches: Formal and Factual. Broadly speaking, I can say that Bunge states that the formal sciences speak of ideas and factual facts.

However, Economics, as most of the social sciences, is based on formal studies of factual activities. Taking an example from the postulates of the formal sciences, we can determine that in the face of the increase in the prices of goods, its demand falls. This is based on a shortcut called "Ceteris Paribus" which means that we modify a single variable and assume that all others are fixed. In this case, we assume that the only variable that moves is price. Now if we transpose this to facts, we can never keep all variables constant. Therefore, we are trying to generate ideal norms to apply to real contexts.

Furthermore, this brings some problems of interpretation and, on the other hand, the possibility to manipulate the readings of realities from the ideal postulates. It also establishes great zones of conflict.

In return, can we think then that Economics escapes the drastic division of science established by Bunge? This hypothesis is not crazy.

Meanwhile, Paul Feyerabend (1975) defines the traditional definition of science and states:

The difference between epistemological theory (political, theological) and scientific practice (political, religious) that emerges from these quotations is usually formulated as a difference between rules or standards "certain and infallible" (or in any case clear, systematic, and objective) and "our fallible and uncertain faculties which depart from them and fall into the error". (Feyerabend, 1975)

The author determines that anarchy is what really makes progress to science, challenges the previous postulates, criticize them, allows new methods which is not regulated to arise, and favors the revolution by modifying a part or the whole.

According to Feyerabend, I understand that I must make that venture to economic science. Thus, the only way to obtain observations and factual development is escaping from norms or creating new norms. In this case, we can identify what criterion is Economy as a science. "Stable facts arise and are maintained despite the vicissitudes of history." They are forced. They generate their own ideals and reality. Also, complete and complex observation is unknown. At this point, this is regarded as the problem.

Having determined that man is a collective being, and that by definition Economics is a Social Science, can we then base all economic scientific theory on man as an individual being, and not as the subject that must be for a social science? Definitely not.

Protectionism and its Place in Economic Science

It is normal to ascertain the milestone for the recognition of a science for the first formal treaty. What is not normal is that the first treaty which is considered foundational will be written. This is done after the same science recognizes that, prior to its release, there already exist schools that are the same. In this case, economic science was recognized prior to its release to Mercantilism, especially because Mercantilism also generated laws of science. One of these was based on Protectionism as international trade policy. This however is with the objective of obtaining precious metals through the exchange.

There is another point that is much more complex. The generation of awareness in the popular sectors which shows that Liberalism is the only thing that allows development was justified in the concept of the invisible hand. This was stipulated by Adam Smith: "if each one is fine, we all are fine."

The general welfare comes if everyone seeks their particular welfare. However, this concept where we are all "free and equal" to the economy has a vice of origin because there are really different levels of access to opportunities and power. This is because I can determine that the generation of the consciousness of something is natural when in reality is unnatural. Thus, this is only to justify the action of the most powerful economically.

Now then, Why do they try to establish that Protectionism is a bad word?

Liberal school is based on the individual concept. It is the most widespread from an academic point of view due to the laws of accepted science generated from it and with the limitation of the already mentioned concept "Ceteris Paribus". From there, everything that propose a collective action of development has no place. This is why the adherents to this current of economic thought stated that it is necessary that there should be non-intervention of the State. Also, the invisible hand established by Adam Smith in his Theory of Moral Thinking should be well maintained.

From that same school, it is said that any protectionist measure is unnatural (contrary to the origin of protectionism), and will only have harmful effects. As a result, they try to explain that protectionism involves tax increase, loss of jobs, price increase, debt crisis, and transfer of income in the hands of a few.

But is this true? First of all, I analyzed the liberal economy.

In the course of free trade, which theoretically determines the perfect competition market, you must comply with certain circumstances. These include:

- Infinite buyers and sellers.
- All are on equal terms: buyers with the intention and ability to acquire and sellers with the intention and ability to offer.
- There are no barriers to enter or exit.
- All buyers and sellers handle the same information.
- Sellers are aiming to maximize their profit (selling as expensive as possible) and consumers to satisfy their need with the lowest possible price (buy as cheaply as possible).
- All goods are the same regardless of the supplier from which they were gotten.

If I analyzed one by one, with the exception of the third rule and only because is factually possible, none can be translated into a concrete reality. From this, in Economics, the whole theory is simply a frame to establish norms (hence the concept of Normative Economy) of a science which when managed in this way is impracticable.

In fact, all solutions to concrete problems from this theoretical framework failed. There is no scope where purely classical theory can be applied. Thus, this is not to lower the value of Science, but to put in value for the positive concept of Science.

The controversy that I seek to elucidate at this moment is the place that occupies protectionism within the economic science. Therefore, this is previous to the formalization of this one.

The concrete reality is that from a school of economic thought (Liberalism) constructed in an ideal framework, it denies another previous school and emerged from the concrete observation (Protectionism). This has as an explanation on the inconvenience of demonstrating the virtues of Protectionism by the liberal economic order constituted as a factor of power.

Protectionism Enemy of the Liberal Economic Power

From the beginning of civilization, the inequality between men was constant. The societies were built with hierarchical structures. Historically, they were two: one of religious order, and the other of political order. Then with the concept of wealth, a third order arises: the economic one. This put a new player in the bidding of power. A power that was already consolidated and divided in a practical way and that for centuries carried a co-existence – with ups and downs. Nevertheless, coexistence at last did not clearly see the appearance of this new player. Even in modern times, in some cases, it is not entirely clear.

Throughout history, these three orders were congruent. What must have been normal (going through separate lanes) was transformed into the exception to rule. Economic power began to be a determining factor in the decisions of the other established orders. From that place, with the ambition as north, the economic order is camouflaged in the other two which aims to be the Superior without being noticed openly.

Examples of this exist in the past and present. Then I ask myself: if the economic order as an instance of power is generated by those who concentrate income and make others play their games. Is it illogical to think that Liberalism should be exalted and protectionism reviled? Protectionism as an expression of collective interest is an enemy of those who consolidate economic power.

The political order in mercantilism, before the advent of liberal thinkers, promoted this school from the political structure (the ancient kingdoms show that the most powerful country has more precious metals especially since the discovery of America's large reserves of gold and silver). Here, wealth and political power had the same formal heads.

That is why the State was regulating the actions of the economy and was encouraging the imposition of economic barriers to the products that could be imported. In turn, it was encouraging the exportation of everything as a means of accumulating wealth. This was the Power.

Let's not be naive. Since the economic power and political power are the same, everything was mostly water for the same actors. The most powerful State was the one that had the most wealth of precious metals. Therefore, the most powerful King was the one that reined over that State.

With the advent of the physiocracy and the depletion of the mercantilist system, thanks to the start of the process of independence of the countries of America, there was a division between the kingdoms who held up mercantilism. This generated a contest which resulted in the concept that the State is the enemy of economic efficiency.

The Industrial Revolution changed the structure of economic power by only changing the actors. Although the regime was feudal formerly, the owner of capital in the new industrial scheme is consolidated as a member of the supremacy within the economic order. I differentiated economic power from economic order and it is of significant importance that this is done.

The articulation of the economic power with the political power was swinging throughout times. In Mercantilism, political power conditioned economic power, basically because 90% was the same. Abolishing the concept of mercantilism with the concept of Physiocracy, on the one hand, and the emergence of Economic Liberalism, on the other, imposes the individual on the collective. This is because the owners of economic power are strengthened and need this concept to still remain more powerful.

The political power is subjugated by the economic power. It is necessary, in order to convince the people, that the individual order should be established as a natural order. Meanwhile, religious power remains observant. It is being used by the other two powers. In this context, the protectionism which is considered as a commercial policy of Mercantilism should be discarded.

In 1891, Pope Leo XIII begins to weigh the religious order through the Encyclical *Rerum Novarum*. Here, far from being extinguished, he denounces and opposes economic liberalism and the exploitation of man by man who takes aberrant characteristics to form the Industrial Revolution.

Also, 40 years later, the Pope Pius XI issued the Encyclical *Quadragesimo Anno* in the same direction, extolling the Social Doctrine of the Church and the concept of Social Justice.

In this, returning to expose the virtues of the *Rerum Novarum*, it was manifested:

Occasion

3. So, at the end of the XIXth century, the exposition of a new economics sistema and the development of the industry had come in most of the nations to the point that saw the human society more and more Split into two clases: one, certanily slighty numerous, that enjoyed almost the totality of the godos that so copiously were providing the modern inventions, while the other one integrated by the enormous multitude of the workpeople, oppressed by distressing misery, fought to be liberated in vain of the oppresion in which they were living. (Pope Pius XI, 1921)

The denunciation of the reality about the concentration of the wealth begins to draw a glimpse of a strong criticism to the liberalism that is manifested later when it says textually:

27. The encyclical Rerum Novarum, effectively, by vacillating the principles of liberalism, which for a long time had been impeding an effective work of the rulers, impelled the Peoples same to foment more truly and intensely a social policy ...

The religious order weighs down its power and manifests itself strongly marking the inequality that Liberalism brings and condemning that it is unnatural. Also, it goes further to dictate that "To free competition make happen the economic dictatorship."

I can affirm then that Protectionism is an economic school that is intimately linked to the collective. It considers man as a social being and one who understands that inequality is aberrant in as much as it allows the exploitation of man by man. This is the enemy to be defeated by the economic power that determines Liberalism. In addition, it must be away from the popular sectors to which it benefits and generates the awareness that it is bad and contrary to the interests.

Reflecting on the introductory questions

Protectionism: Is it a tool for the commerce or is it a philosophical current inside the Economy?

According to the Spanish Royal Academy, protectionism is "*an economic policy that hinders the entry into a country of foreign products that compete with nationals.*"

My definition of Protectionism is as follows:

"School of economic thought that protects the industry of a country and with it its sources of employment, industrial matrix, distribution of income and stimuli to investment through policies that allows to generate advantageous competitive conditions of national versus foreign, emphasizing the welfare of the Peoples. "

Analyzing my definition, I can say that it is a school of economic thought because this adheres to a philosophical current which encompasses much more than the economic fact. It is not limited only to the trade. Its scope is broader and involves a philosophy where the economy is part of a whole and not an isolated fact. Also, it includes monetary policies to stimulate investment and the distribution of income, industry promotion, job creation and a fair local tax structure and the well-being and development of peoples in the North. It is closely linked to the concept of Sovereignty, and that is the main object of attack from liberals and classical schools.

This can approach the Factual Science of Science, although it contains important components of formal science according to the division of Mario

Bunge. In turn, it is identifiable with the anarchic method proposed by Feyerabend from the scientific point of view. The contingencies or stimuli is not always the same and are often, in many cases, novel.

Protectionism was and is a scientific manifestation of the collective. Within its field of study, in addition to the concept of Nation, the concept of well-being of the peoples is pre-eminent. It emphasizes the distribution of income for the generation of a virtuous circle which starts with consumption and energizes the entire economic circuit.

Is Protectionism only an invention created to justify the Mercantilism and today anachronistic?

Protectionism in its origin was a policy within the mercantilism. Stronger countries are those who have a greater quantity and quality of reserves. This is not far from the mercantilist concept of power. It would be worthwhile to think if the power structure of the current nations is living a Neomercantilist Era. The accumulation of wealth and the planning for the sustainability of the environment are current components for the measurement of economic power.

Protectionism is a comprehensive school. It not only covers national enrichment and the sustainability of resources, but it has its main objectives of the decline of the Gini Index. Gini index is expressed in percentage terms. Gini coefficient is used to measure inequality in incomes within a country. The Gini coefficient is a number between 0 and 1, where 0 is perfect equality and 1 the maximum inequality. Therefore, it is imperative to understand that protectionism not only pursues the economic development of a nation, but also pursues the generation of employment and the distribution of income and development. Not only does it think of the nations, but it makes the people a macroeconomic object.

Therefore, far from being anachronistic, it has full force and is a necessary school to equalize inequalities.

Is Protectionism an economic school that brings decadence?

According to what I said in one of my works, published in the European Scientific Journal (Monzón Gabriel Anibal, 2017), I established that protectionism, far from generating decadence, leads to the development of the people. I also stated that protectionism is the creator of employment. It affects the reduction of tax pressure and determines an increase in real income. As a result, the wage-price ratio becomes more beneficial for the population. In addition, the accumulation of reserves allows the solving of the debt crisis.

All these points are those who criticize protectionism from liberalism as a business tool. Nevertheless, as I have already stated, protectionism is a

school and a current of thought that transcended to mercantilism. Also, it is inserted in the philosophical current serves as Social Justice.

While those who adhere to the Liberal school argue that the consequences of protectionist policies with respect to international trade are dire, they have never developed in their line of thought the fundamental and transcendent fact that protectionism is a much greater current of thought than Commerce. However, commerce is a school within the economy as a science. This adheres to the realities of the factual sciences and to the strength of Positive Science whose objective involves the analysis of the facts and the possibility of generating advances that can be expressed in realities.

Is Liberalism the only economic current that allows development?

For a long time, economic power set up the idea that the only economic school that enables the development is liberalism. By what I have written here, I can prove that it is not so. I will give an example.

In Argentina, from the 1990s to the beginning of 2003, the applied economic policy was the one recommended by the multilateral credit agencies with a strong liberal accent. The International Monetary Fund recommended the implementation of policies that encouraged the nonintervention of the State. This is with a reduction of the same and the liberalization of the borders which allows free trade.

The most important indicators of Argentina were the external debt with respect to the Gross Domestic Product and the Gini coefficient or index. These two indicators will allow us to appreciate the effect of liberal policies on the one hand and protectionist policies on the other hand.

The Gini coefficient of Argentina of 1990 was 0,439. After the period of liberal policies in 2002, it had risen to 0.53. Income inequality had increased by 20.45%.

On the other hand, the external debt was 40% in relation to the Gross Domestic Product. After the liberal stage in 2002, the external debt was 145.9% of GDP.

Liberal policies deepened social inequality, generating a significant concentration of wealth that benefitted the referents of the economic order. This led to a decrease in the quality of life of the popular sectors (workers, pensioners, unemployed). On the other hand, it resulted to the brutal debt that did not result in works that generate employment and income. This resulted in the default of Argentina.

Something similar has been happening since 2016. Argentina borrowed from December 2015 to September 2017 at the rate of 200 million dollars per day. We have an absolute increase of almost 100 thousand million dollars. The Gini index, for its part, had an increase of 7.3% from December 2015 to December 2016.

These numbers was revealed in a particular case with data from the World Bank and ECLACL. ECLAC is an agency of the United Nations. Its symbol represents the Economic Commission for Latin America and the Caribbean. It shows that liberal policies is away from generating and it allows development to bridge the economy, concentrated incomes, and increased social inequality by avoiding the proliferation of developmental foci.

On the other hand, and by always dealing with the statistical data, I can determine that during the protectionist period (2003/2015), Argentina reduced the ratio of external debt to the Gross Domestic Product from 145.9% to 53.5%. Meanwhile, the Gini coefficient was 0.41 at the end of 2015. It grows again since that time at the end of 2016 to 0.44.

Liberalism, then, tends to increase inequality and concentrated income in most economically powerful sectors.

Why Liberalism has Better Press than Protectionism?

According to what we live, every time in the media, we stated that protectionism is automatically associated with something bad, pernicious, and harmful to people and nations. Meanwhile, liberalism enjoys a better press, and is being used as a policy linked to development and that generates welfare.

At this point, I must return to what I have already raised in this essay: the existence of at least two active powers which are political power and economic power. From the latter which is exercised by a few and without any legitimate representation more than the wealth accumulated by them, there is an important pressure in the media to ratify the idea that liberalism is a good word, while protectionism is not.

Liberalism needs to be sustained in order to maintain the prevailing *statu quo*, in order to generate a collective awareness that it is good even though the popular sectors are worse. This is with the important mission of generating more needs to turn people into slaves of consumption. Consumption, in a liberal doctrine, enriches a few who are the owners of economic power.

Furthermore, you must not wonder that the media support this way to generate opinion, since the mission of the media is not in reporting. Basically, the media are companies, and all companies are looking for profits. This is simply because they are part of the economic power. If I analyze in all parts of the planet the corporate formation of the mass media, I can surely state that they are composed of important members of economic power.

In this context, it is essential to maintain that protectionism is considered to be a harmful doctrine that violates the freedom and power that go against development. Since it is linked to the concept of sovereignty, protectionism automatically becomes something to defeat. Also, this is

attributed to the fact that the economic capital has no borders. The economic development needs state intervention and state protection.

Conclusion

In conclusion, I reflected on the following sentence of John Maynard Keynes:

The individualism of political philosophers points to laissez faire. The divine or scientific harmony (as the case may be) between private interest and the public interest points to laissez faire. But, above all, the ineptitude of the public administrators inclines decisively to the practical man in favor of laissez faire, a feeling that has by no means disappeared. Almost everything the State did in the XVIIIth century, above its minimum functions, was, or seemed, detrimental or unfortunate. (Keynes John Maynard, 1926)

This economist, who endorses the intervention of the State to regulate the economy, explains to us that liberalism is an individual construction. Although he justifies selfishness in the inefficiency of the public administration, he leaves open the debate about the end by stating that what the State did above its minimum functions was or seemed detrimental or unfortunate. In this sense, it is where protectionism and liberalism from the political philosophy collide because the "minimal functions" raised by Keynes are different.

Keynes reveals his liberal roots in this paragraph. The State, according to the doctrine it represents, has different priorities. In economics, the role of the state in liberalism is nonexistent, while protectionism is active and intense.

In short, the centuries have passed and the controversy over power is the same: political power vs. economic power.

Economic power has in its ranks the media as its most effective tool to generate, in the collective unconscious, the ideas that suit their interests. It is imperative for economic power to generate the false consciousness that Protectionism is harmful and detrimental to the people.

They must create the false conviction that Protectionism is a "bad word" when in fact it is an economic current that leads to the development and progress of the people.

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Education for Employment: Is the Null Hypothesis Proven Too Frequently?

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Abstract

Employment prospects vary for college graduates, with a few courses of study leading to an overabundance of opportunity. For the majority of students, there is significant mismatch between training preparation and actual job demand in either type of job, location of job, or skills required in job. This qualitative study examined integration of desired employment activities and aptitudes into 30 sections of different graduate courses in counseling over four school years to ascertain student perception of enhancement of job preparation. Activities focused on four areas that research indicated to offer benefit for student employment preparation: engagement in work-simulated skills practice; engagement in course group activities; participation in service learning volunteerism; and student pro-activity. Many students were already working in the general field of study such as school teachers pursuing a degree in school counseling. Student feedback indicated perceived benefit and efficacy toward preparation for desired post-degree job. Further study is indicated in this potential integration with expansion of study into multiple fields of study and into both undergraduate and graduate programs.

Keywords: Job Preparation, Job Mismatch, Employment preparation

Introduction

A student most often goes to college with the hypothesis that „This degree will get me this type of job.“ Employment prospects vary for college graduates. For some, such as health care and insurance/risk-management, there may be more opportunities available than students seeking that work. In other areas, such as some liberal arts majors, students may not find a desired job upon completion of the undergraduate degree. In graduate school, students may pursue a degree as something to do because they do not find employment or per promise of an advanced salary or higher position with their current employer – thus using the degree for some improvement in the current job, but still not seeing the degree result in a new job or better job. For all of these

students, the null hypothesis seems to be proved – that „this degree did not get me this job.“ Rather, the degree was a mismatch for job type, or perhaps a mismatch for jobs in general. There are various reasons for results of the null hypothesis and also various treatments that can promote results of the research hypothesis regarding employment outcome with a college degree.

Coates and Edwards (2010) examined trends in college graduate perceptions of the relevance of courses taken in their degree program to post-degree employment and continued learning pathways. Their study specifically addressed the state of perceptions five years out from graduation. One of the strongest perceptions was that positive employment outcome was directly related to student investment of cost, time, and effort into completion of the degree. Most respondents to this study indicated perceived positive relevance of degree to bachelor degree field of study. However, the ratio of perceived relevance was considerably lower for efficacy of degree preparation for work. Coates and Edwards also noted that work readiness at the point of graduation does not well equate to desirable acculturation into their preferred career or profession. This acculturation could be enhanced through „treatments“ while students are in their programs of study.

Wertel (2015) indicated that employment outcomes are generally impacted by „regional differences, differences in the job market, and individual characteristics of students.“ (p. 33) The regional differences and differences in the job market may be outside the influence level of institutions, faculty, and students – but research indicates there are factors that can be employed by these to enhance employment outcomes for students so that „this type of degree does result in this type of job.“

Nunley, Pugh, Romero, and Seals (2017) noted that a track record of underemployment for college graduates prompted 30 percent lower callback rates with employment than job applicants who were adequately employed at the time of application or who were unemployed (p. 642). Nunley, et al. also shared that employers tended to view underemployment with an applicant as symptomatic for possible lower productivity if hired. This study revealed that internship experience with degree programs significantly helped to offset a negative impact from underemployment.

The employment state for college graduates is a concern internationally. Lim, Rich, and Harris (2008) noted that this concern was especially crucial with developing countries that depended greatly on feeding their economy through continual provision of an educated workforce. Lim, et al. examined factors that contributed the employment potential of college graduates. One of the crucial contributing factors was job mismatch.

Monetary compensation has often been touted as a value that improves with attainment of a college education. Roksa and Levey (2010) also examined other markers of efficacy with post-college employment. They

specifically examined the relevance of work in a student's major field of study influenced work satisfaction and retention. Roksa and Levey noted that many college majors have not readily identifiable labor market match, such as majoring in liberal arts and general sciences. They stressed the value of accurate relationship between education offered and labor market demand.

Literature review

Theory

Lim, et al. (2008) discussed both job mismatch theory and job search theory as frameworks for unemployment. Job mismatch theory posed that skills that did not fit employment needs would cause unemployment. Job search theory poses that unemployment would be related to personal job seeker preferences and timing of job acquisition.

Lee (2015) examined the specificity of training to job requirements with influence on in-job behaviors as opposed to just general training to general job type. Lee noted that mismatch of training to job could result in diminished outcomes with desired behaviors and performance in the work place – whether the mismatch was undertraining or overtraining. A key area of employee impact was in the psychological arena where an undertrained person could perceive injustice in being supported for optimal performance or for promotion. An example would be a classroom teacher who had no clue about classroom management of student behaviors. Overtrained persons may experience frustration or boredom at perceived limitations of their job or a sense of deserving something better. An example would be a student with a graduate degree in social work who could only find a bachelor's degree level position.

St. Clair, et al. (2017) explored the adaptation needed for doctoral students in career preparation for the non-traditional pathways from their programs that would be outside of academia. As institutions reinforced a traditional choice toward academia, students found that they had to independently frame preparation for a non-traditional choice versus relying on their program resources for adequate support. St. Clair, et al. Xx types of student preparation that enhanced the efficacy of their non-traditional job search. Students could derive benefit from explicit resources or training. An example would be a doctoral student in counselor education who went through Play Therapy certification while in a degree program. Benefit was derived from alignment with a mentoring resource within the desired job arena. Finally, students indicated benefit from engagement in general career preparation entities such as credit or non-credit career preparation courses and job fairs or networks.

Demand with Limited Supply

In some areas of study, there seems to be consistent opportunity for employment for college graduates. These areas of study seemed to be specific vocation preparation, such as education, medicine, and law. Where a degree did not directly correlate to job type, the supply of students often exceeded the demand for hire in jobs.

Gorski (2015) indicated that insurance and risk management companies offer excellent pay and positions, but college programs are not graduating enough students with degree preparation to meet this demand. Professors from various programs across the United States were said to note there were too many opportunities for their students.

Another example was mentioned in the Buffalo News, November, 2015 (“ECC,” 2015). That area has experienced a shortage of nurses for many years. Lack of much opportunity to attain nursing education was cited as one of the major factors. A local community college addressed this issue in a win-win for both the college and area health care providers. The college consolidated its nursing program geographically near a major local medical campus.

Supply with Limited Demand

Lim, et al. (2008) found that the supply of students with non-vocational degrees such as humanities or liberal arts exceeded the demand of employment opportunities in available jobs. This can lead the recent graduate from a bachelor’s program to choose to continue into graduate study for „something to do.“ Lim, et al. also noted that rather than providing assistance to match student to available jobs, institutions might be more receptive to facilitating retraining to improve student capacity for job acquisition. Examples of this facilitation could be increased leniency in acceptance of previous course work toward a new degree or development of specialization or certification programs that had more specific career focus.

Roksa and Levey (2010) provided occupational specificity from the National Center for Educational Statistics for several common college majors, with specificity relating to percentages of employment of student graduates in that field. The fields which saw the highest percentage of employed graduates were Education and Health. The fields which saw the lowest percentages of employed graduates were humanities; biological, math, and physical sciences; social sciences; and communication/journalism. Roksa and Levey noted that students who proceeded to graduate school were most often those who were also in the fields of study with the lower occupational specificity. They noted that „graduate degrees seemed to reinforce the patterns that were observed for undergraduate majors.“ (p. 403).

Enhancement of Student Preparation

Various studies have supported the efficacy of integration of hands-on experience in classes that mirrors future work experience. Examples are internships in the degree program, engagement in work-simulated skills practice or group activities in a course, service-learning projects in a course, volunteer work with discipline-related organizations, and use of action research in a course. Student preparation for employment was also enhanced through student personal pro-activity with job readiness, such as early planning and willingness to relocate.

Internships. Degree programs in primary health care, mental-health care, and education have integrated student internships for a number of years. Some degree

Nunley, et al. (2017) indicated that internship experience had significant impact on job acquisition and retention of discipline-related employment. In their study, the authors found that those job applicants who had no internship experience were called back for additional applicant processing at a 31 percent lower rate than those applicants who did have internship experience. In addition to provision of student preparation enrichment, internships also offered employers additional workforce from interns.

Engagement in work-simulated skills practice

Two modalities that have provided work-simulated skills practice are Problem-based learning and Project-Based Learning. Problem-based learning has been included as a motivation for student learning and also for improved student degree preparation alignment with chosen career path. Siew and Mapeala (2017) described the positive effects of Problem-based learning. to be increased student perception of task and learning value, increased student intrinsic goal-orientation, improvement in student self-efficacy beliefs, and improvement in student self-motivation. These positive effects are all supportive of accurate degree and job match for college graduates. Examples in higher education include periodic time in P12 classrooms for students in teacher preparation programs, lab components in courses from biology to counseling, and cores of Problem-based learning in some phases of veterinary education.

Kumari and Nandal (2016) examined the efficacy of Project-based learning in professional education through a Master of Business Administration (MBA) program. They examined the effectiveness of Project-based learning and found consensus among participants that they received enhancement with analytical, interpersonal, leadership, technical, and collaborative skills. A key insight shared by the authors was the need for students to „inculcate their abilities and skills inrealistick working environments so that skills could be generated instead of mere theoretical

knowledge.“ (p. 212). Kumari and Nandal noted accompanying benefit to employers through receipt of more competent new hires and this would in turn reduce training time and costs.

Engagement in course group activities

A natural component of PBL is often group work among students. Siew and Mapeala (2017) found that student groups which used a common set of procedures for thinking also experienced improvements in „critical thinking, interpersonal skills, problem-solving, and learning.“ (p. 380.) These skills translate well to the work place with group work serving to enhance such desirable skills.

Most work environments accomplish productivity through the efforts of groups. Konyu-Fogel, DuBois and Wallingford, (2013) indicated that student work in groups enhanced capacity of students with independent thinking, problem-solving skills, and other key skills desired by employers to promote effective work in teams on the job. Research seems to consistently emphasize the value that employers place on group skills and the ability to translate the theory of the academic classroom to practice in the work setting (Van der Putten and Vichit-Vadakan, 2010, Hamer and O’Keefe 2013, and Lou, 2004).

Service-Learning and Volunteerism

Integration of either/and Service-Learning and Volunteerism have been shown to better prepare students for post-graduate employment than does more traditional pedagogies of lecture or paper-writing. Both Service-Learning and Volunteerism enrich student preparation as they learn by doing. Clayton (2009) indicated that Service-Learning adds the layer of insight gained from student reflection in three key areas: 1) Reflection on self as change agent with the focus issue; 2) Reflection on the relevance of the experience to what student is learning in the course, and 3) analysis of etiology of problem issues and how this will impact on student’s future career work.

Student pro-activity

Wertel (2015) shared information on college graduate employment per The Outcome Survey of 2014. This showed that nine percent of students surveyed reported unemployment due to inability to find employment in the desired location for residence. Wertel also noted the value to students in starting a job search early, such as at least six months prior to graduation. Institutions of higher education can be proactive in provision of services to support students in early job search and development of desired employment skills such as work ethic, communication skills, and problem-solving capacity.

Lim et al. (2008) indicated that English language proficiency influence factors of employment such as acquisition of employment as well as job constituents such as hours of work and wages. These authors also examined types of degrees and employment outcome. Degrees categorized as vocational degrees (eg. meedicine and law, p. 324) supported better employment outcome than did degrees with less clear vocational alignment such as the studies of humanities or liberal arts. Lim, et al. also noted the value of proficiency in work skills such as capacity for effective communication.

Work-related terminal degrees

An emerging practice is the work-related doctorate. Costley and Lester (2012) discussed the efficacy of this practice for both the individual and the employing organizations. The four benefits that were identified were: „1) widening access to higher education; 2) direct impact on the workplace of the investigation or project of the doctoral student; 3) effective personal and professional growth for the candidate; and 4) employer benefits through capitalization on the learner’s development.“ (p. 265). As noted earlier, St. Clair, et al. (2017) found need for greater student preparation and support from doctoral degree programs when students had goals that fell outside the traditional pathway of academia.

Methodology

Description of Research Design

Over four school years, a qualitative study was conducted in which projects and activities were integrated into 30 sections of different graduate courses in counseling to promote better connection of students to desired job components before completion of the degree. The majority of students were already working in the general field of study, such as school teachers who were pursuing a degree in school counseling. Online courses averaged 20 students per course and campus courses averaged 12 students per course. This was a result of faculty observation that many students obtained a graduate degree and either stayed in a job that did not require the degree or took several years to find a job match for the degree. While some students verbalized desire to stay in current geographic locale, even if not finding and advanced skills job, there was also indication that courses perhaps focused more heavily on academic mastery of content than with practical application for the job field. Examples were heavy reliance on writing papers and providing article critiques. The focus of this research was to ascertain benefits of inclusion of more course components that would expose students to actual work in the „real world.“ This research focused on the four areas indicated above by research: Engagement in work-simulated skills practice; engagement in course group

activities; participation in service learning volunteerism; and student pro-activity.

Engagement in work-simulated skills practice

The focus of some courses provide strong support for integration of work-simulated skills practice. One example is theories and techniques courses in which students learn constructs of various counseling theories with accompanying techniques per each theory. In this course, students indicate a real-life concern that they would feel comfortable talking about in a role-play scenario with a fellow students. After instruction with theory techniques, students then role play using the technique as both the client role and the counselor role. Then at the end of the course, an assessment is given in which course students are given random assignments of a scenario, the role of client or counselor, and a technique to demonstrate. This was rotated among students until all students had opportunity to demonstrate counselor and client roles in the assessment.

While counseling skills are demonstration of skills as interacted between people, some desired skills are more individualized such as creativity, organization, planning, and program development. An example in which this was integrated was an introduction to school counseling course, where students were required to develop a comprehensive school counseling program, such as they would be required to develop upon starting a job as a school counselor. This project required students to consult with practicing school counselors as well as research of professional guidance from professional standards, organizations, and published texts or journal articles. The course assignment then produced a product that students could take as a selling point when starting as a job search and interviewing for potential jobs.

Engagement in course group activities

As much as work is done in groups within employment settings, group assignments in courses provided opportunity for students to grow in teamwork skills of communication and collaboration. Most courses lended themselves to integration of group work for some facet of course focus. In the online learning modality, discussion forums are a common group learning experiece in which students typically post a thread of discussion on the assigned topic for the forum and then students reply back and forth to each other regarding these thread. Similar assignments were given in campus classes with which students would divide into groups and discuss together a topic prompt from the instructor.

While students reported benefit and enjoyment of group discussion assignments, there was less enthusiasm for group work to develop a product together. These assignments typically revealed a diversity of student

commitment to work required and diversity of timeliness in completion of „their part“ of the group task. Both campus and online students seemed to prefer that their larger assignments be per individual effort so that they could control the results better.

Service-learning and volunteerism.

Three areas of course content were enriched through integration of service-learning/volunteer projects as student assignments – Counseling Multicultural Populations, Counseling Theories and Techniques, and Lifespan Development and Learning. The service-learning work in these areas are shown in table 1.

Table 1 Courses and Service-Learning/Volunteer Projects

Course	Project	Description of Project
Counseling Multicultural Populations	Cultural Immersion Project	Students engaged in an experience with a culture other than their own, in which the student experienced slices of life of that culture over several weeks during the course, so as to obtain in-depth knowledge of life in that culture.
Counseling Theories & Techniques	Theoretical Intervention with a volunteer regarding health promotion.	Students worked with a volunteer within the framework of a selected theory to help assess current healthy lifestyle habits, plan goals and activities to strengthen those habits, conduct some planned activities, and evaluate how the activities helped to achieve their goals.
Lifespan Development & Learning	Development of a website page on a current issue need for a certain life-span stage.	Students interviewed persons in and stakeholders of a given life-span stage such as students, parents, and teachers on priority needs of that life-span stage. Students then developed a website to address a selected need area to include both static and interactive content to serve as a resource for stakeholders regarding that need. Students then asked their interviewees for feedback on the efficacy.

Student pro-activity

While there are many resources such as websites and professional organizations that offer information to students about potential employment to align with the training in the respective degree program, there is still a need for individual student effort toward effective preparation and self-advocacy in the search for employment that is accurately aligned with the training of the

degree program. Most institutions do offer career counseling for the student body and these have many helpful resources such as resume preparation and various interest inventories to help students increase more accurate awareness of their strengths and interests that could be carried into a job. Some courses provide content that could be framed as student pro-activity in preparation for the eventual career. A course on professional orientation was a strong modality in which to encourage students in professional pro-activity through assignments that integrated that. Several assignments were designed toward these. Students compiled a resource notebook that included resource information that students could use in a job on professional support such as profession organizations, personal self-care such as physical exercise resources, support resources for students and for families such as family emergency or social service resources, and support resources for ethics and legal guidance such as state department of education legal support or the local school district attorney's contact information.

One of the most beneficial student pro-activity assignments is to have students develop a professional plan from where they currently are to the point of qualification and job hire. In the course on professional orientation, students had an assignment to develop such as plan. This plan included identification of requirements to attain professional certification or licensure and plan of how student would meet that; plan for any required practicum or internship; plan for professional networking such as national, state, local, and special interest groups that could give a student guidance, mentoring, and even information and connections for possible jobs in the field; and identification of sources of continuing education that they could use to maintain and renew a professional license once received. The final part of the plan was for students to include a professional statement of practice which would clarify for students, clients, and colleagues the services that would be provided, assurance of confidentiality, expectations of the person receiving counseling, and contact source of governing code of ethics as well as office where the professional license was issued.

Summary Results of Project

Across the courses and sections in which employment skill and knowledge activities were integrated, student feedback in both assignment reflections and end of course feedback indicated perceived efficacy of these assignments for career preparation and enhancement of those job skill and aptitude areas. A few examples of student feedback were:

was able to learn things about

- I was able to learn things about myself and was asked to think about what I was learning and how I could apply it to my professional and personal life.

- All the information is vital to my career choice and gave insight and background to counseling techniques I was unfamiliar with.
- This experience reminded me that while I may only be working as a school counselor at one school, my daily impact on students and their families may result in years of support in the future.
- Initially, I thought my research would just provide me with more information on knowledge I already acquired. I was thrilled to not only strengthen my previous knowledge but to gain more.
- This alters my future by giving me an even more positive outlook on shaping my future children and being a strong system of support and motivation for my age group and others.

As noted by Hollingsworth and Rochester (2016), “Upon post degree employment, university graduates have found a dichotomy between what was learned and what was practiced in the real-world.” (p. 86). Student feedback and professor observation indicated benefit and efficacy for student preparation in finding desirable employment match upon completion of their course of study. This benefit and efficacy extended to institutions as enhanced preparation for employment increased marketing success and to prospective employers as their pool for potential employees grew.

Conclusion

Previous research has indicated challenges for students, both undergraduate and graduate, to find employment that matches their academic preparation. Previous research as also indicated challenges for employers in finding sufficient qualified new hires for existing job vacancies. This study focused on minimizing the mismatch for both students and employers through integration of relevant job skills and aptitudes into course assignments. Results from student feedback and professor observation indicated that this integration does offer benefit and efficacy to students, institutions, and employers.

This study was conducted in one degree program at one university. Continuing examination of such integration into courses is still needed with multiple academic programs of study, multiple geographic locales, and multiple types of institutions of higher education. This further research should also integrate long-term assessment of efficacy, such as follow-up assessment by students and employers at selected periods of time after degree is completed and student has worked in the field, such as one-year out and five years out.

To return to the beginning of this discussion, students do too often see the null hypothesis proven, that „this degree did not get me this job.“ With integration of desirable employment activities as course activities, this can change. Students can begin to see their hypothesis proven more that „This degree will get me this type of job.“

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Automated Aeroponics System Using IoT for Smart Farming

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Abstract

In recent years, the Internet of Things (IoT) has received much attention in the areas of industry and academia. Currently, IoT technologies are being applied in many fields and is changing lives in many areas such as smart homes, smart cities, smart grids, autonomous cars, and the industrial internet. However, traditional agriculture is still waiting for many changes to occur in networking technology especially in IoT. Many researchers and engineers are working towards applying IoT technology to traditional agricultural methods. Aeroponics farming is an efficient and effective process for growing plants without using soil. When we apply IoT technology to an aeroponics system, it is expected that there will be many improvements such as decreasing water usage, increasing plant yield, minimizing rate of growth and reducing the workforce. In this paper, we designed and implemented a new automatic aeroponics system using IoT devices. Our system is comprised of three main components: a mobile application, service platform and IoT devices with sensors. The mobile application provides the user a graphical user interface to monitor and adjust the aeroponics system. The service platform is a middleware system that provides information for the mobile application to store the gathered information from IoT devices using sensors within the aeroponics system. The IoT device uses sensors within the aeroponics system to control each pump and access data. Our work is a new application in the agricultural industry and is expected to be a promising application that will help the farmer with increasing productivity in farming and reducing carbon footprint.

Keywords: IoT (Internet of Things), Wireless Sensor Networks, Sensor Data Integration, Smart Farming, Automated Aeroponic System

Introduction

As technology develops, it will bring great advantages to human beings in all areas of life. Especially, the development of network technology is changing many areas of our lives such as smart homes, smart cities, smart grids, autonomous cars, and the industrial internet. Smart agriculture systems are an area that would benefit from this technology. By adapting the recent innovations in technology for farming it would add many benefits for farmers and reduce our carbon footprint.

The Internet of Things (IoT) [1] is an emerging technology that provides internet connectivity and powerful data analytic capabilities to create a system in which objects in the physical world could be connected to the internet by sensors. However, smart farming is still in its infancy in regard to using IoT devices for agriculture. Aeroponics farming is an efficient and effective process for growing plants without using soil as a medium as well as with little water. In this paper, we propose new automated aeroponics system using IoT devices that will help the farmer by increasing productivity in farming. To the best of our knowledge, this is first work to design and implement of automated aeroponics system using IoT devices.

The rest of the paper is organized as follows. Section II describes current research work in smart farming systems with IoT devices and IoT applications. In section III, we present our design and implementation of automatic aeroponics systems using IoT devices for smart farming. Finally, we summarize our research work in section IV.

Related Work

In relation to IoT technology, many researchers have proposed many different applications for a smart farming system [2] ~ [10]. We will describe some of the proposed research work in the following.

A connected farm based on IoT systems for a smart farming system was recently proposed by a researcher in Korea Electronic Technology Institute [2]. The proposed connected farm system has three main components such as connected IoT devices, an IoT gateway, and an IoT service platform. Many physical sensors and controls will provide the means for monitoring and controlling of the environmental conditions of the farm. These sensors and controllers are connected to an IoT gateway. By smartphone application, the end user can monitor and control in the farming system remotely.

An intelligent monitoring platform framework and system structure for a facility agricultural ecosystem based on IoT described in the research work [3]. The described framework is divided into four function layers: the sensor layer, transmission layer, control layer and application layer. The sensor layer handles the numerical sensor values in farming. The transmission layer processes collected data from sensor layer. The control layer uses the collected

data to control the agricultural production by an automatic control algorithm. The application layer displays the specific business logic of agriculture by using an interactive interface. The proposed framework applies to an intelligent monitoring platform of facility habits in Shanghai.

Agri-IoT, an IoT-based framework based on semantic web technologies presented in the research work [4]. The presented system enables large-scale data processing, analysis and automatic reasoning based on real-time streams of data coming from various heterogeneous sensors, social media, connected farms, governmental alerts and regulations. The authors evaluated the proposed Agri-IoT with two realistic scenarios and investigated the introduction of smart farming using IoT and its opportunities.

A smart greenhouse using Intel Galileo Gen 2 and Arduino will help the farmers carry out the work in a farm automatically proposed by the researcher [5]. They proposed the smart greenhouse can reduce 70%~80% of the water requirement, increase yield and rate of growth, and produce organic agricultural products.

The design of a smart IoT communication system manager used as a low-cost irrigation controller described in the research work [6]. The authors used LoRa WAN network protocol to show the best solution for data acquisition in farming systems. The proposal is a great advantage for controlling irrigation events to reduce the amount of energy and water used.

In the survey [7], the author reviewed many IoT solutions from context-aware computing perspective into five different categories: smart wearable, smart home, smart city, smart environment, and smart enterprise.

A smart farming system using unmanned aerial vehicles is proposed by P. Lottes et al. [8]. The authors described the proposed system for vegetation detection, plant-tailored feature extraction, and classification to obtain an estimate of the distribution of crops and weed relying on object-features and key points in combination with random forest and showed the classification system achieve good performance.

P. Nintanavongsa et al. [9] designed two routing approaches, called Location-agnostic and Location-specific protocols, to facilitate the self-sustaining agricultural monitoring platform, requiring no infrastructure installation, comprises of Unmanned Aerial Vehicle (UAV) with solar energy harvesting and wireless power transfer capability.

Low-cost wireless system to reduce the pesticide dosage for smart farming proposed researcher [10]. As the pesticide control is important issue in farming, the author proposed the pesticide dosage reduction using the wireless sensor network technology and the fuzzy logic theory. The proposed system has been evaluated in real test field experimentally and shown a significant reduction (47%) of the total pesticide dosage in experiment result.

In this research work, we introduce a new application in an automated aeroponics system using IoT for smart farming system.

Design and Implementation of Aeroponics System

In this section, we introduce our aeroponics system using IoT devices including its three main components, mobile interface, service platform, and IoT devices with each sensor.



Figure 1. Graphic user interface for mobile application

Mobile application

We designed a mobile interface that a user can easily check every sensor's value in each aeroponics system through a service platform. This service platform stores the sensor's data such as temperature, humidity, pH balance, nutrient levels, LED lights and water level. Referencing figure 1, the user can view the current sensors' data on the service platform of the aeroponics system. For the service platform, the current web technologies HTML5, CSS Flexbox, Javascript, and SVG are used.

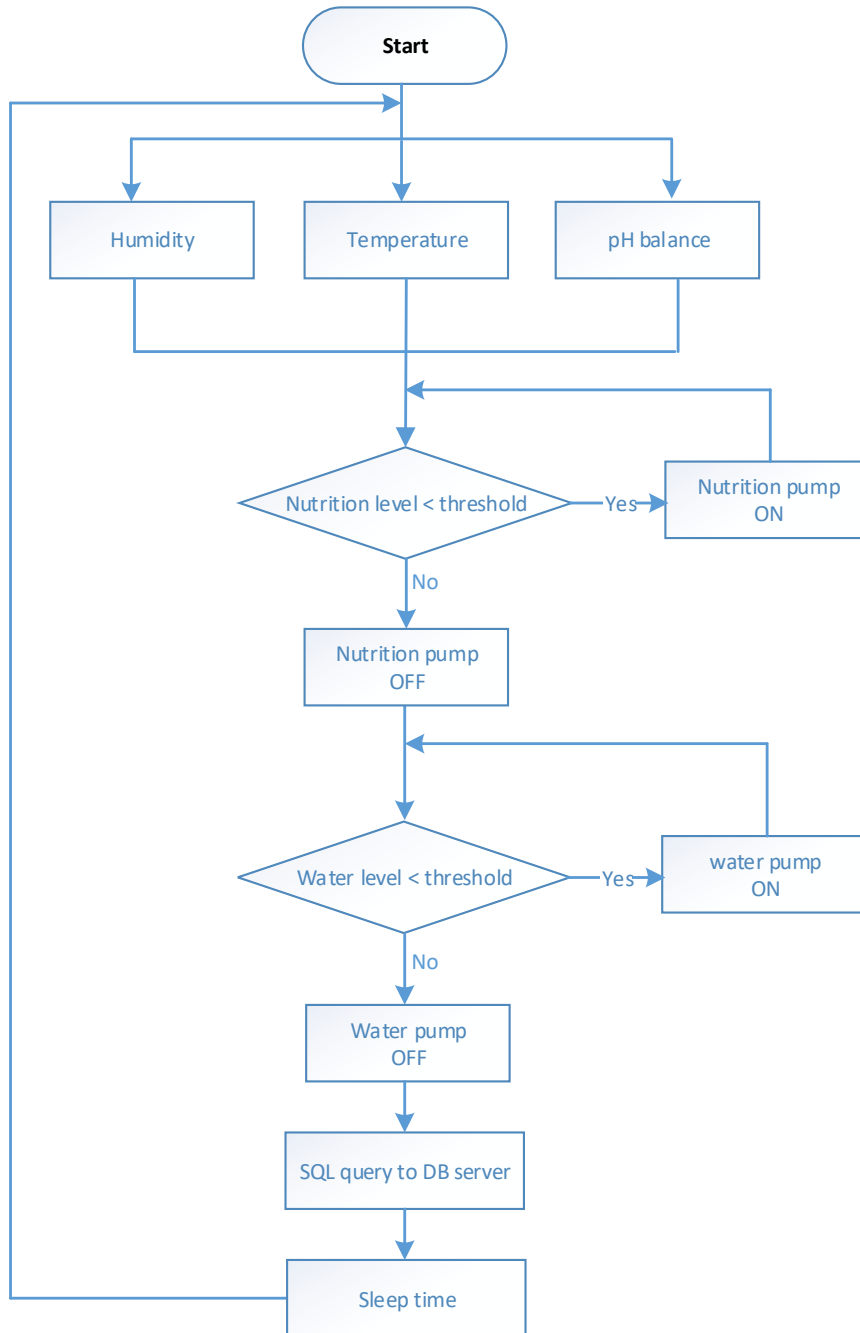


Figure 2. Flow diagram of IoT device

Service Platform

We designed and implemented the service platform to provide an interface to view the sensor data of the aeroponics system. In figure 3, the service platform provides a web interface to access data using a mobile device

or client, and provides a database service to save the gathered information from each sensor using IoT devices. For the web service, we installed Apache 2.4.26, MariaDB 10.1.25, and PHP 7.1.7 on Linux system.

IoT device connected on sensors

We implemented a module to gather each sensors data using IoT devices. Raspberry PI Zero is one of the IoT devices. In this research, we use Raspberry PI Zero to gather information (pH balance, temperature, and humidity) from the sensors to control a water pump and dosing pump to add nutrients and water. The gathered information is saved into a database server by sending a SQL query. GPIO pins on the Raspberry PI Zero connects the DHT11 temperature and humidity sensor, Atlas scientific pH probe and EZO Circuit, water level sensor, LED lights, submersible pump and dosing pumps for the delivery of nutrients. Figure 2 shows the flow chart of the IoT device system.

Each IoT device gathers sensor data (temperature, humidity, and pH balance) during a certain time. After checking nutrition levels if the nutrition level is below a certain threshold value the Raspberry PI Zero will trigger a relay. The connected dosing pumps start to work to add nutrition in the aeroponics system. If the nutrition level is over a certain threshold value it will stop adding the nutrients in the aeroponics system. The submersible pump process works the same as the dosing pump process.

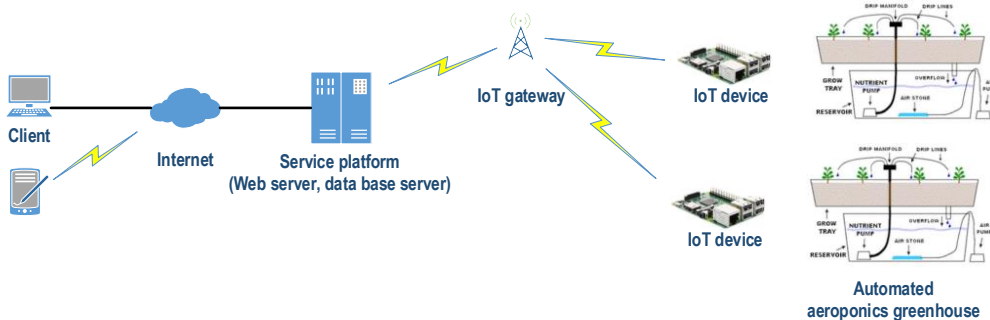


Figure 3. Automated aeroponics system using IoT devices

Conclusion

In this paper, we have presented an automated aeroponics system using IoT devices. We designed and implemented an automated aeroponics system to collect each sensor's data in the system. We used a Raspberry Pi Zero and designed the system to measure and control the environmental factors necessary to reach our optimal agricultural needs. We implemented a mobile application, service platform, and a control module on an IoT device that the

user can monitor and control the Aeroponics system remotely. Our proposed system is expected to be a promising application to help farmers increase the production of organic crops in a smart farming system.

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High Precision Measurements Lend No Supporting Evidence of Previously Reported Large Verdet Constants for Olive Oil

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Abstract

Motivated by a previous report of surprisingly large Verdet constant measurements for olive oil at 633 nm and 650 nm (Shakir, *et. al.*, 2013), and the practical utility of materials possessing such large values, we considered it worthwhile to validate those results. In this work, high precision Faraday rotation measurements were performed utilizing ac magnetic fields, phase sensitive detection, and a collection of diode lasers. Specifically, we measured the dispersion of the Verdet constant for a single brand of olive oil from 410 nm to 675 nm. In addition, we determined the Verdet constant for eight different samples of olive oil at 654 nm, very near the wavelength where the “anomalous” results, i.e. large Verdet constants, were reported. Our measurements of the Faraday rotations, and hence the determination of the respective Verdet constants, call into question those previously reported measurements. Generally, our results suggest that their experimental technique most likely led to inaccurate results for all five of the Verdet constant values they reported.

Keywords: Faraday rotation, Verdet constant, phase sensitive detection (PSD), magnetic rotatory dispersion, anomalous dispersion

Introduction

Materials with large Verdet constants are used in the fabrication of such devices as optical switches (Huang, *et.al.*, 2015), rotators (Popescu, *et.al.*, 2005), circulators (Dutton, 1998), isolators (Wunderlich, *et.al.*, 1977 and Wilson 1991), modulators, laser gyroscopes (Merlo, *et.al.*, 2000), satellite

altitude monitors (Affolderbach, *et.al.*, 2002), and magnetic field/electric current sensors (Maystre, *et.al.*, 1989). Most materials with large Verdet constants are expensive. There are inexpensive fluids with large Verdet constants, such as ferromagnetic fluids (Silva, *et.al.*, 2012) or highly corrosive and/or toxic diamagnetic fluids (e.g. benzene and toluene) (Villaverde, *et.al.*, 1979). Olive oil is both safe and inexpensive, therefore the surprising results (Shakir, *et. al.*, 2013) are certainly worth validating. Essentially, they reported large values for the Verdet constant of olive oil at 633 nm and 650 nm. Furthermore, based on the absorption spectra of olive oil near 670 nm, one might naively suspect that such “anomalous” magnetic rotatory dispersion of the Verdet constant is quite plausible. However, our measurements do not confirm that claim. Additional considerations also lend credence to the results presented here and the subsequent conclusions.

Faraday rotation occurs when linearly polarized light traverses a transparent medium influenced by a magnetic field with directional components parallel, or anti-parallel, to the light propagation direction (Jenkins and White, 2001). Essentially, the electric field defining the plane of polarization exhibits a rotation (i.e. induced optical activity) due to the electronic response of the medium. The rotation of the polarized light is a magneto-optical phenomenon named after Michael Faraday (Barr, 1967) and is ultimately caused by a difference in propagation speeds between left and right circularly polarized photons, when one considers linearly polarized light as a linear combination of these two circular basis states. The parameter characterizing the rotation is the Verdet constant, V , expressed as $V = \theta / Bl$ (Jenkins and White, 2001), with θ being the angle at which the polarized light is rotated, B the magnetic field acting upon the sample of length, l . Verdet constants are material based and also depend on sample temperature and the wavelength of the light, and hence due to the wavelength dependence, are dispersive (i.e. magnetic rotatory dispersion). In this work we tested several different brands of olive oil and determined the Verdet constant at 654 nm, which is very near the 650 nm wavelength where the largest value was reported (Shakir, *et.al.*, 2013) for eight different olive oil samples. The Verdet constants for one of these samples were obtained at multiple wavelengths, and hence its dispersion characterized. Finally, our relatively straight forward Faraday rotation experiments include various aspects of optics and electromagnetism (Turvey, 1993, Briggs, *et.al.*, 1993, Jain, *et.al.*, 1999, Valev, *et.al.*, 2008), and with the addition of an ac magnetic field and corresponding experimental methodology exploiting the phase sensitive lock-in method regarding data analysis of signals buried in noise (Jain, *et.al.*, 1999, Valev, *et.al.*, 2008), such investigations lend themselves quite well to training advanced undergraduates and graduate students in physics, engineering, chemistry and material science.

Apparatus

The experimental setup (Fig. 1) allowed Faraday rotation measurements using a collection of laser diodes (Thorlabs CPS series: 450 nm, 532 nm, 638 nm, 654 nm, 675 nm). In addition, two laser pointers (eBay: 405 nm, 594 nm) were also used with a regulated power supply (RSR HY3003) and a series current limiting resistor, which helps to minimize intensity fluctuations and drift. All laser wavelengths were measured (Photon Control SPM-002-X). In most cases we utilized laser powers of 1-5 mW (Thorlabs PM100D, S120VC). Appropriate lenses were employed for those lasers displaying rather large beam divergences. Next, an aperture to block unwanted back reflections, and a film polarizer to aid in manipulating the intensity, were placed just after the laser. Highly polarized light was obtained using a Nicole prism (length ~ 3 cm), scavenged from an old polarimeter. The air core solenoid (Pasco SE-7585) with inner diameter of 5.5 cm and a length of 14.5 cm, allowed ample room to insert a custom made cuvette housing. A rectangular quartz cuvette providing 10 mm sample length (1 mm walls) was used for sample containment. A sinusoidal voltage output from the lock-in amplifier (Stanford Research Systems, SR-830), provided the internal reference frequency for the PSD, in addition to the solenoid current, which was amplified with a (QSC PLX-1202) power amplifier. The current was monitored by a benchtop multimeter (Vichy VC8145). Upon traversing the sample, the laser beam was directed through another aperture and baffle tube (not shown) to minimize stray light entering the detector. The analyzer (Thorlabs GL5-A, Glan-Laser Polarizer), was set at 45° relative to the polarization direction to maximize the PSD signal (V_{ac}). Finally, the resulting laser beam intensity was monitored with a photodetector (Thorlabs PDA100A). The transimpedance design of this detector provides near optimum impedance matching conditions when splitting the signal as voltage inputs (i.e. PSD signal, V_{ac} , and auxiliary signal, V_{dc}) to the SR-830 lock-in amplifier.

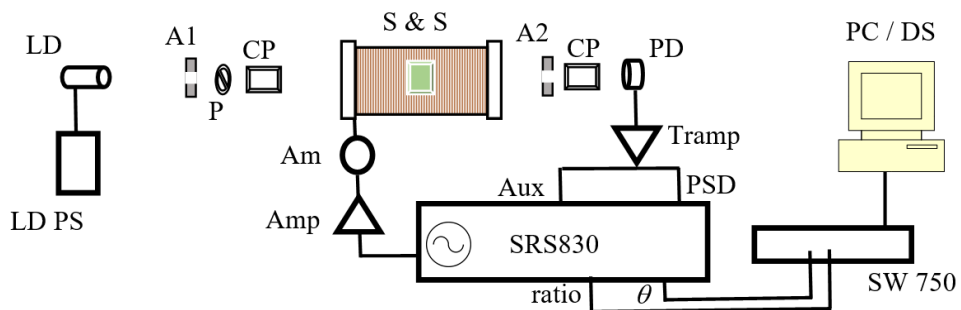


Figure 1. PSD Faraday Rotation Apparatus: LD-laser diode, LD PS-laser diode power supply, A1-aperture, P-film polarizer, CP-crystal polarizer (Nicole prism), S&S-solenoid with sample, A2-aperture, CP-crystal polarizer (Glan-laser) polarizer, PD-photodetector,

Tramp-transimpedance amplifier, Amp-current amplifier, Am-ammeter, SRS830-lock-in amplifier [inputs: Aux- V_{dc} (avg. sig.), R- V_{AC} (PSD sig.), outputs: \odot - AC voltage & ref freq, ratio = $R/Aux = V_{AC}/V_{dc}$, \square - phase], SW750-Science Workshop 750 interface, PC/DS, computer with Data Studio software.

The magnetic field was calibrated (Fig. 2) with a longitudinally configured hall sensor (Magnetic Instrumentation Inc., Model 907 Gaussmeter), in RMS mode. A jig was constructed allowing air core solenoids to be calibrated with up to mm step precision along the solenoid axis. Most of the data was acquired utilizing a current of about 3.5 amperes at a frequency of 85 Hz, which is very near the geometric mean of potential noise sources at the fundamental (60 Hz) and second harmonic (120 Hz) frequencies associated with US mains. With these parameters (i.e. $I = 3.5$ A, $f = 85$ Hz) the magnetic field intensity of approximately 150 Gauss was nearly uniform across the sample (Fig 3). Finally, the front panel outputs of the lock-in amplifier were fed into a PC interface (Pasco Science Workshop 750) and software (Pasco Data Studio) was used to calculate the Verdet constants. Essentially, the apparatus is automated – aside from the solenoid current supplied as user input.

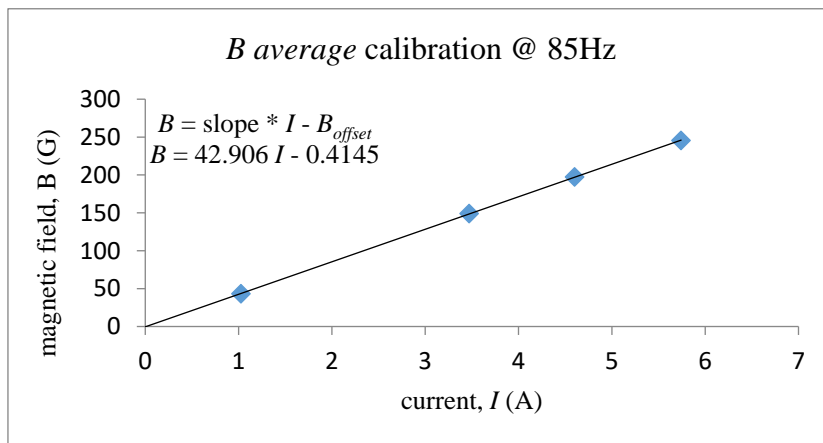


Figure 2. The average magnetic field strength, B (RMS), measured across the 1.2 cm sample cuvette as a function of current, I . The variation of the magnetic field at these values of electric current was very small (see Fig. 3)

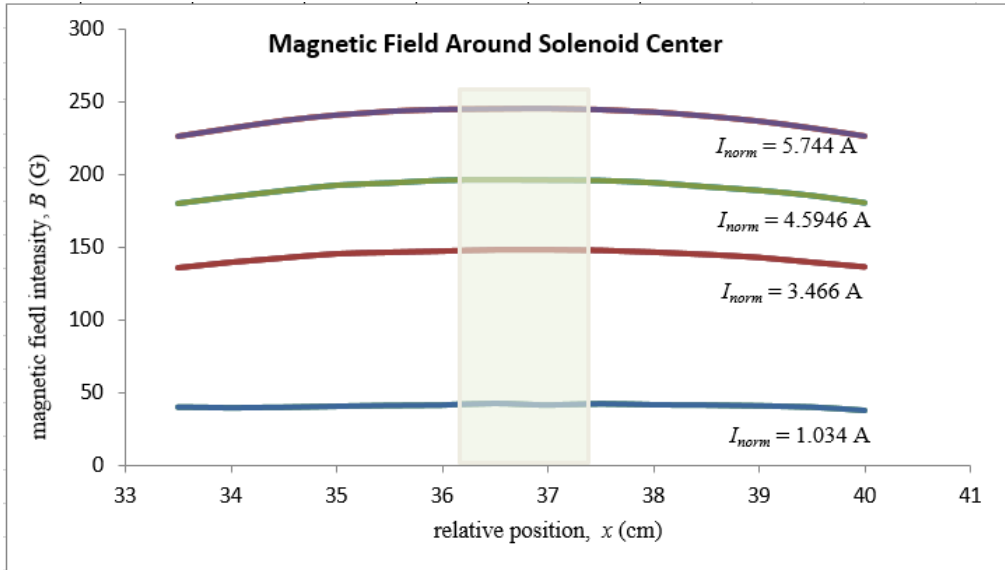


Figure 3. Magnetic field strength (RMS) vs. relative position for several currents. Note that the magnetic field strength across the cuvette and sample (~ 1.2 cm path length shown as a rectangle in the middle of the graph) is nearly uniform.

Theory (Practical Aspects)

Lock-in amplifiers (LIAs) record an input signal as RMS volts. It has been shown that the rotation, in radians, induced by a modulating magnetic field, follows from (Jain, *et.al.*, 1999)

$$\square\square = V_{ac} / 2V_{dc}, \quad (1)$$

where V_{ac} is the voltage associated with the lock-in's PSD signal (R), and V_{dc} corresponds to the average laser intensity (auxiliary input) (*notation* - Valev, *et.al.*, 2008). In our apparatus these voltage signals result from the laser intensities being monitored with the photodiode and amplified via the transimpedance design of the PDA100A, before being fed into the front and back panel lock-in inputs using a BNC T-splitter. We should point out that we have seen no evidence of an "internal leak" from the internal reference frequency generator to the auxiliary inputs for the SRS 830 lock-in amplifier as claimed previously (Valev, *et.al.*, 2008). We suspect that this deleterious behavior was actually due, in their experimental investigation, to a photodetector/amplifier impedance mismatch at low light intensities, which manifested as a correlation between the PSD signal (R) and the phase. We intend to fully address their claim in a future study.

It should be pointed out that an earlier paper describing a Faraday rotation measurement using polarity reversal of dc magnetic fields (Briggs, *et.al.*, 1993) gives an expression that is indeed very similar to Equation 1. The experimental technique described in that paper is certainly superior to that

used by Shakir, *et.al.* Acquiring measurements with both magnetic field directions (parallel and anti-parallel to the light propagation), in addition to a null current measurement, would clarify the unavoidable problems associated with fluctuations in laser output and photodetector drift. In contrast, Equation 1, subsequently utilized and elaborated upon in a phase sensitive detection scheme (Jain, *et. al.*, 1999) is extremely efficacious for Faraday rotations in that it was developed specifically for PSD and it corresponds to a direct measurement of the optical rotation while providing real time normalization to any fluctuations in the light intensity and, to a somewhat lesser extent, fluctuations in photodetector output. The expression is actually an approximation, yet it is completely valid and well within random errors for the small rotations, all less than 5 minutes (~ 0.0015 radians) of optical rotation, that occur in our apparatus (Fig. 1). Finally, the technique is suitable for signal to noise ratios approaching 10^{-5} , which present themselves mainly as the ratio of the PSD signal, $V_{ac}(R)$ buried in the noise of the average signal, $V_{dc}(Aux)$, when the appropriate apparatus is employed (Fig. 1). Therefore, it is entirely possible to measure Faraday rotations approaching 10^{-5} radians utilizing the simple “Jain, *et.al.* prescription” if one employs appropriate devices – mainly a transimpedance amplified photodetector set with appropriate gain.

Experimental Procedure

After calibrating the solenoid (Figs. 2 and 3), the magnetic field strength is determined as a function of the monitored current supplied to the coil. A parameter, \square , is defined as the discrete sum of the magnetic field along the length of the sample, vis. $\square = \square \square Bl$. The data is recorded and the Verdet constant follows from $V = \square \square_s / \square$, where \square_s is the Faraday rotation of the sample (i.e. olive oil). Of course, the contribution of the cuvette to the total Faraday rotation must also be taken into account. Essentially, the Faraday rotation of the empty cuvette, \square_c , must be subtracted from the Faraday rotation of the sample and the cuvette, \square_{s+c} , at every wavelength. That is, $\square_s = \square_{s+c} - \square_c$. The precision of the “Jain *et.al.* prescription” is further demonstrated by the reasonable values for the Verdet constants we obtained for the quartz cuvette (see Fig. 4). Those Verdet calculations for the walls of the cuvette resulted from Faraday rotations of less than one minute (~ 0.3 mrad). Finally, researchers present Verdet constants utilizing a variety of units. The most common of these are rad/T.m, deg/T.m, or min/G.cm, where $1 \text{ T} = 10^4 \text{ G}$, and $1 \text{ rad} = [180/\square] \text{ deg} = [180(60)/\square \square] \text{ min}$.

Results

The Verdet constants for one of the brands of olive oil (Wild Oats) at the wavelengths produced by our collection of laser diodes, shown in Figure 4 and Table 1, follow a similar trend to that of typical materials, such as water

(International Critical Tables, 1929) and quartz (i.e. cuvette walls). The higher values at the shorter wavelengths reflect normal magnetic rotatory dispersion in the same manner as the *overwhelming* majority of diamagnetic fluids (International Critical Tables, 1929), (Smithsonian Critical Tables, 1969) and Villaverde, *et.al.*, 1979). There is no evidence of anomalous magnetic rotatory dispersion, and hence an increasing value of the Verdet constant, in the red region of the spectrum as claimed (Shakir, *et.al.*, 2013).

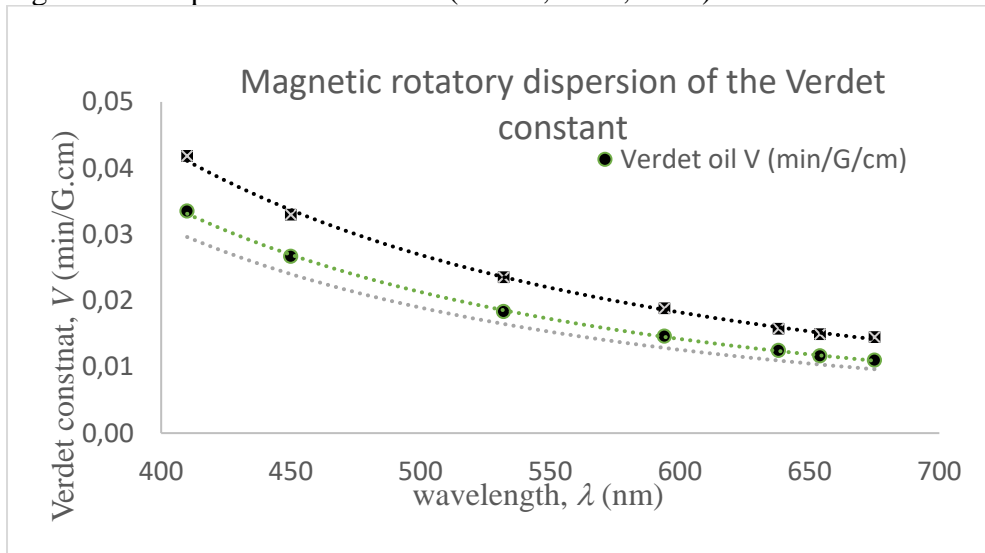


Figure 4. The Verdet constant of virgin olive oil (Wild Oats) vs. wavelength. The data obtained for the olive oil (center plot) shows normal magnetic rotatory dispersion. The Verdet constant for quartz (upper plot) is also shown since the Faraday rotation for the empty quartz cuvette had to be measured and then subtracted from the total rotation (sample + cuvette) according to $\square_s = \square_{s+c} - \square_c$. A trend line for water, combined data (International Critical Tables, 1929) and Smithsonian Critical Tables, 1969) – bottom plot is also presented in this visible range of wavelengths. Power law fits were arbitrarily assigned to each data set as a visual aid.

wavelength \square (nm)	Verdet constant V (min/G/cm)	Verdet constant V (rad/T/m)	Verdet constant V (deg/T/m)
410	0.0335(2)	9.75(8)	558(4)
450	0.0269(2)	7.76(6)	445(4)
532	0.01833(14)	5.33(4)	306(2)
594	0.01460(12)	4.25(3)	243.5(1.9)
638	0.01247(10)	3.63(3)	208.0(1.7)
654	0.01163(9)	3.38(3)	193.9(1.5)
675	0.01099(9)	3.20(3)	183.2(1.5)

Table 1. The table values for the Verdet constants of virgin olive oil (Wild Oats) displayed in the most common units. Random uncertainties accumulated from statistics for the

rotation measurements, the magnetic field calibration, and specifications of the cuvette wall thickness (i.e. actual sample length). Due to the impressive precision afforded by this experimental technique, the contribution from the Faraday rotation measurement is the least of the three relative uncertainties $\Delta\theta/\theta$, $\Delta B/B$, and $\Delta l/l$. The total propagated uncertainties were estimated at just under 1% for most of the final tabulated Verdet constants, as discussed in the section: Propagated Uncertainties.

Interestingly, the absorption spectrum of a few brands of the olive oils we tested (Fig. 5) utilizing an Ocean Optics spectrometer do show an increase near 670 nm. This absorption peak appears to result from chlorophyll (inset Fig. 5). Based on the underlying connection between the refractive index and absorption characteristics for transparent materials one might expect this absorption peak to manifest itself as an increase in Faraday rotation (i.e. anomalous-like dispersion). Nevertheless, we see no evidence of such behavior.

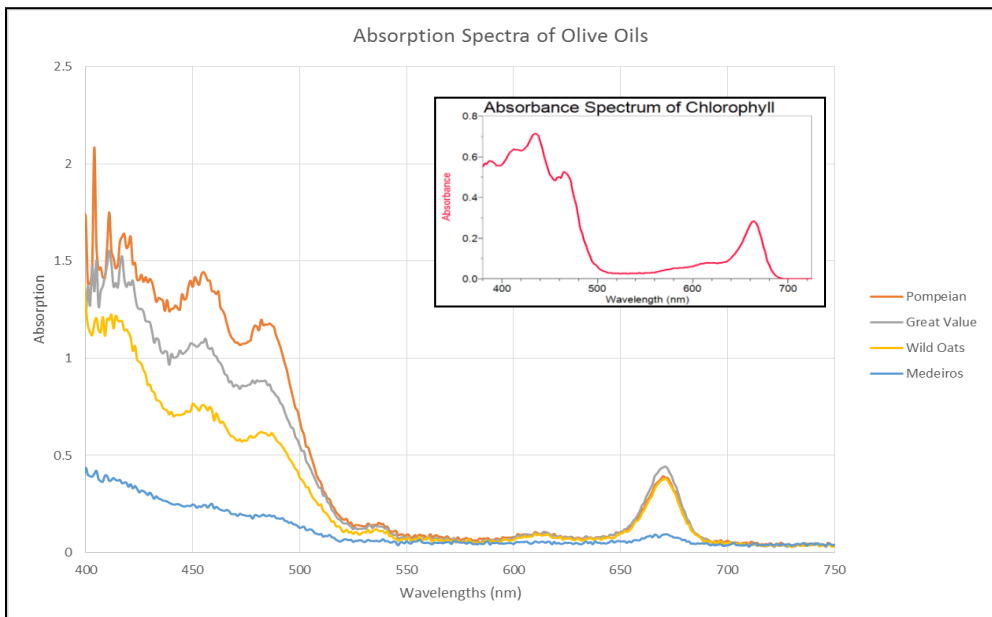


Figure 5. Absorbance spectrum for several different brands of the olive oils tested. The absorbance peaks located near 670 nm are due to chlorophyll (inset). Such behavior in the absorbance spectra of olive oil naively suggests a possible anomalous response in the dispersion of the Verdet constant. However, all eight of the olive oils tested (Table 2 - below) show no increase in the corresponding magneto-optical response.

Based on Shakir, *et.al.*'s data, in particular the rather large Verdet constant value at 650 nm (~ 99 rad/T.m or 0.17 min/G.cm), Verdet constants for a variety of olive oil samples near this wavelength were determined since one cannot expect all brands of olive oil to have the same ingredients. Utilizing the 654 nm laser diode, eight different brands (Table 2) were tested. All had similar values, with no large Verdet constants. The relatively small variations

between the different brands would be expected on account of the different chemical composition of the various samples. However, all of our Verdet constants at this wavelength ranged from about thirteen to seventeen times smaller than that reported by Shakir, *et.al.*

Brand	Verdet Constant
Wild Oats	0.0108(2)
Carlini	0.00996(7)
Casa Di Oliva	0.01181(12)
Food Lion	0.0129(2)
Medeiros	0.01232(13)
Great Value	0.01214(14)
Pompeian	0.01174(8)
Great Value	0.01172(7)

Table 2. The Verdet constants of eight different brands of olive oil measured at 654 nm. The small differences reflect the slight variation in ingredients associated with each respective brand.

These values are presented in min/G.cm. Shakir, *et.al.* reported a value of ~ 0.17 , which is about 13 to 17 times higher than our values, utilizing these units.

It is highly unlikely that any non-linear optical effects (i.e. multiphoton interaction) would ensue for a CW laser power near 114 mW, which coincides with that reported for the 650 nm laser (Shakir, *et.al.* 2013). Nevertheless, we tested one of our brands (Wild Oats) utilizing yet another laser diode at 652 nm (eBay) with a laser power of approximately 120 mW. The Faraday rotation measurements, and hence the Verdet constant calculation, agreed with that obtained at low power (~ 0.01159 min/G.cm) – essentially, no enhancement. In order to carry out this measurement, we applied three strips of *Scotch Magic* tape, acting as a light diffuser, just at the entrance of the photodetector baffle to mitigate against saturation, and a corresponding nonlinear detector response.

Propagated Uncertainties

The relative error due to uncertainty in the measurements follows from

$$\frac{\Delta V}{V} = \left[\left(\frac{\Delta \theta}{\theta} \right)^2 + \left(\frac{\Delta B}{B} \right)^2 + \left(\frac{\Delta l}{l} \right)^2 \right]^{1/2}$$

where $\Delta \theta$ was obtained from statistics (i.e. the standard deviation of five measurements, consisting of three minute runs acquired at every wavelength),

and the corresponding relative uncertainty in rotation, $\Delta\alpha/\alpha$, (largest ~0.2%) was found to be significantly less than the relative uncertainties for the magnetic field (0.8%), obtained from the calibration fit, and sample length (0.5%), obtained from the cuvette specifications. Therefore, we expect uncertainties of just under 1% for nearly all measured values. Of course, any systematic errors resulting from the accuracy, and subsequent creep from manufacturer calibration of the lock-in, gauss meter, current meter, and the 750 interface, are not included in the previous expression. However, based on many self-consistency checks against other instruments within the specific parameters of our experiments, in addition to performing measurements with water, we found the responses of those instruments to be quite accurate and reproducible. In fact, one should certainly verify experimental accuracy with samples of water, since its Verdet constant is quite well-known (International Critical Tables, 1929).

Conclusions

Despite the absorption spectrum (Figure 5) and the earlier report of a large Verdet constant for olive oil in the red portion of the spectrum (Shakir, *et. al.*, 2013)

- 1) the dispersion of the Verdet constant for the Wild Oats sample of olive oil shows no enhancement in the red spectral region of interest (Figure 3) and appears as “normal” magnetic rotatory dispersion, when compared to other common substances.
- 2) all samples tested at ~650nm, which is near the wavelength where the significantly large value of the Verdet constant was reported, show no correspondingly large values (Table 3).
- 3) a variety of laser powers (CW mode) were tested on several brands to eliminate possible non-linear optical effects for the laser power reported, even if unlikely at such CW laser powers, and no anomalous responses were measured.
- 4) the absorption spectra shows a peak at 670 nm, not 650 nm. However, again, we found no enhanced Verdet constant at 675 nm for several brands of olive oil.

Finally, Table 3 suggests that most, if not all of the Shakir, *et.al.* data is highly suspect. None of their values are in agreement with those obtained utilizing our accurate methodology and high precision apparatus. Fitting our data (Figure 1) with a power law (the trend line in Fig. 1) allows us to compare our data at the specific wavelengths indicated, and measured by Shakir, *et.al.* Based on typical magnetic rotatory dispersion curves, one might expect this trend to extend quite accurately into the near infrared portion of the spectrum (i.e. near 805 nm).

wavelength (nm)	Shakir, <i>et. al.</i> Verdet constant (rad/T.m)	This work Verdet constant (rad/T.m)
405	15.381	9.89
532	0.1638	5.39
632.8	33.3716	3.67
650	98.6808	3.45
804.3	1.0936	2.15

Table 3. Comparison of our Verdet constants, numerically calculated from a power law fit (see Fig. 1), with those reported by Shakir, *et.al.* For additional reference, (Abu-Taha, *et.al.*, 2013) also reported Verdet constants of olive oil at 525 nm - “It is seen that the Verdet constant decreases appreciably from 227 deg/T.m (3.96 rad/T.m) for less older sample to 165 deg/T.m (2.88 rad/T.m) for older one.”

While it is difficult, at best, to explain the suspect results of Shakir, *et. al.*, a few underlying effects that could cause errors include: etalon effects, saturation of polarizer, and electronic noise. However, any potential inaccuracies most likely result from fluctuations in laser power and photodetector response. Based on our reasonable values of the Verdet constants and Shakir *et.al.*'s reported magnetic field strengths (550 G maximum) and sample length (1 cm), one is able to estimate that they were attempting to measure anywhere from 5-20 minutes of angular rotation using a DC magnetic field with polarizers set at a relative angle of 45 degrees (for maximum change). In this particular type of experiment such a measurement is difficult, if not impossible, on account of a signal, which is essentially buried in noise. Utilizing their method, there is no way to normalize the signal corresponding to the angular change, and this is a major problem when the light intensity and the photodetector suffer from unavoidable fluctuations. They made no reference as to the reproducibility of these measurements, nor to the type of photodetector used. Also, the level of precision as implied by the number of significant digits reported is quite extreme. The reported precision of those values, considering the crudeness of the apparatus, is unacceptable – even in a rigorous intermediate-level teaching lab. Apparently, the journal reviewers missed this oversight. Finally, one might expect that it is highly unlikely that a “special” ingredient in their brand of olive oil would enhance the magneto-optical response, particularly when armed with the knowledge and experience that nearly all diamagnetic fluids possessing high Verdet constants are highly toxic and/or corrosive (e.g. toluene, benzene, carbon disulfide – Villaverde, *et.al* 1979).

The Verdet constant of olive oil, exhibits normal magnetic rotatory dispersion – similar to that of water, glass, quartz, etc. (i.e. nearly all optically

transparent materials). There are only slight differences in the Verdet constants for the different brands of oil, as would be expected. Our results do not confirm the claim of Shakir *et.al.* In spite of not witnessing any enhancement for the Verdet constant of olive oil, our background research in this investigation did suggest that measurements involving the Verdet constants of

- 1) oleic, oleanic, and linoleic acid, and
- 2) chlorophyll (see inset in Figure 5 graph)

would comprise two distinct sets of experiments, both affording better control of chemical composition, and with a high potential of garnering interesting and useful information in the realm of magneto-optical chemistry.

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A Study of Alternative Catalysts and Analysis Methods for Biodiesel Production

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Abstract

This project aims to develop a cost efficient process for biodiesel production and can be divided in three main components: 1) production of biodiesel from a variety of fuel stocks using liquid morpholine as catalyst; 2) production of biodiesel using a homogeneous phase transfer catalyst; and 3) development of a method for using Infrared Spectroscopy (IR) to determine the extent of conversion of oil to biodiesel. The production of biodiesel from various fuel stocks in the presence of methanol using liquid morpholine as catalyst reduces the problems related to purification of the biodiesel since morpholine can be recovered by distillation. Furthermore the use of two homogeneous phase transfer catalyst, tetramethylammonium hydroxide (TMAH) and choline hydroxide (CH), was evaluated. The advantage of using these catalysts is that it allows for a better separation between the fuel and glycerin, thus additionally simplifying the purification procedure. Finally, this project endeavored to develop a way to use FT-IR to determine the purity of biodiesel samples obtained since FT-IR is faster and more readily available than the standard method of gas chromatographic analysis. For educational applications, a calibration curve was created by comparing data on the purity of biodiesel samples obtained from the GC-FID analysis to the ratio of the absorbances at 1197 cm^{-1} to 1166 cm^{-1} from the FT-IR spectrum. For field application, a similar method was developed using a portable IR spectrometer. The data collected gave a good linear fit for % purity of the samples versus absorbance ratio.

Keywords: Biodiesel, homogeneous catalysis, FT-IR analysis, fuel stock, transesterification

Introduction

Biodiesel is produced in a transesterification reaction between oil, an alcohol such as methanol and a catalyst (Figure 1). In industry, the catalyst of choice is potassium hydroxide (KOH) (1,2); however, it has been previously shown to be both caustic and corrosive making other alternatives attractive.

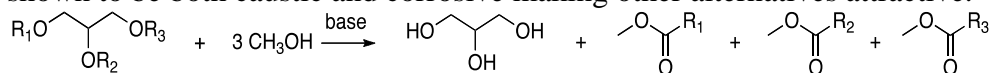


Fig. 1: Biodiesel synthesis reaction

Furthermore, these standard hydroxide catalysts require the use of additional catalyst and alcohol when inexpensive feedstock, for example waste oil, containing high levels of free fatty acids (FFAs) are used in the reaction. In addition, a titration must be performed to determine the concentration of FFAs prior to reaction which increases the time and expertise required.

Organic liquid amines such as morpholine are not as corrosive as the commonly used hydroxide bases and allow for the synthesis of biodiesel without the production of the soapy water byproduct which is generated during purification and which must be disposed of. Although the literature describes the production of biodiesel using low boiling amines (3-6), these examples are rare, take place at subcritical methanol temperature and the catalysts are not routinely recovered due to their high volatility. The study described herein examined biodiesel production using the less volatile (129°C) liquid amine base morpholine as a catalyst which allowed for its separation and recovery by distillation. In addition, a series of commercially available resins containing morpholine were examined as potential heterogeneous catalysts.

An additional goal of this project was to use a homogeneous phase transfer catalyst to facilitate biodiesel production. Choline hydroxide (7) and TMAH (8, 9) are reported to be far less corrosive than the traditional KOH but are equally effective. The main disadvantage of these compounds is the cost. Previous studies have described methods that use the two catalysts separately but these methods are not used extensively. The present work aims to develop an efficient method using one or both of these catalysts in combination in order to reduce the amount of catalyst required thereby reducing the cost of the fuel produced.

The final goal of this work was to develop a simplified method for the analysis of biodiesel. Typically, the purity of the biodiesel is measured via GC-FID analysis, but this method is a time consuming, and requires specialized and expensive instrumentation. A correlation between the quantitative GC-FID data and the qualitative FT-IR data was shown to provide

an alternative method of purity determination for students, faculty and others involved in biodiesel production. FT-IR has been used for functional group characterization (10-16) or in order to monitor the progress of a reaction (17-19) but to our knowledge there is no description of a method that uses the FT-IR for the estimation of the conversion of oil to biodiesel. A simple, portable IR spectrometer, the InfraSpecTM VFA-IR, is available for field-testing for those who wish to produce small quantities of biodiesel for their own use. This instrument presents the advantage of being smaller and therefore more portable and simple enough for a layperson to use. Use of the InfraSpecTM VFA-IR spectrometer in order to estimate the extent to which the conversion of oil to biodiesel has been achieved has not been described previously. Because different types of oils contain differing amounts for various fatty acid and therefore present different ratios between the IR peaks used in the analysis, calibration curves were prepared for the most common types of oils: soybean, canola and corn oil using either an FT-IR or the InfracpecTM.

Experimental Section

Reagents

Methanol and Morpholine were purchased from Fisher Scientific (Atlanta, Ga). Methanol was dried over 4Å molecular sieves prior to use. Choline hydroxide was purchased from Sigma Aldrich as a 45% by weight solution in methanol.

Three oils which are readily available and commonly used to produce biodiesel, pure soybean, canola oil and corn oil, were purchased from Wal-Mart, and used vegetable oil and animal fat were donated by local restaurants.

Raw materials characterization.

Prior to the reaction, a titration of the used vegetable oil or animal fat was performed with an aqueous solution of KOH (1g/L) to determine the concentration of the FFA. The fuel stock solution used in the titration was prepared by dissolving 1g of used vegetable oil or animal fat in 10 mL of 2-propanol. The acid value for used vegetable oil was 2.5 mg of KOH/g of oil, and for animal fat was 1.93 mg of KOH/g of fat.

Pretreatment

In the case of the morpholine catalyzed synthesis, the only pretreatment of the fuel stock necessary was filtration of the used vegetable oil and animal fat to remove any solid residue. In the case of phase transfer catalyzed reactions (CH, TMAH), because the catalyst is water-sensitive, the pure oil, was dried by filtration over silica gel.

Synthesis of biodiesel; morpholine catalyzed procedure

A round bottom flask (250 mL), containing 30.g of oil or animal fat, methanol and morpholine was used as the reactor. In all reactions, a mass ratio of 10:3 methanol/triglyceride was used. The mass % of morpholine used was 9.1% for pure canola oil, 10.3% for used vegetable oil and 14% for animal fat. The additional quantity of morpholine necessary for the reaction of used vegetable oil is 0.027g of morpholine per gram of oil and per mL of KOH solution (1g/L) required in the titration of the waste oil. An additional 0.14g of morpholine were added per gram of fat per mL of KOH needed when titrating the fat. The reaction mixture was heated at reflux (65 °C).

The reactions were followed by NMR. Each hour, a 1 mL aliquot was collected from the reaction mixture and analyzed using ¹H NMR (Anasazi 90 MHz FT NMR). The reaction times required for complete conversion were: 33h for pure vegetable oil, 36h for used vegetable oil and 41h for animal fat.

When the reaction was complete, excess methanol was recovered by distillation. A portion of the morpholine was also recovered by vacuum distillation. Then the reaction mixture was extracted with ethyl acetate, and the solvent was removed *in vacuo*. The organic layer was then purified by filtration through silica gel using hexane as the eluent. (In the case of animal fat, a solid residue was isolated after the filtration of biodiesel using ethyl acetate as eluent. This residue is a mixture of methyl esters, FFA and glycerides.)

The yield was calculated with the formula:

$$\text{weight \%} = (\text{mass of biodiesel}/\text{mass of triglyceride}) \times 100. \quad (1)$$

Synthesis of biodiesel; phase transfer (CH or TMAH) catalyzed procedure

A round bottom flask equipped with a distillation head and a condenser, immersed in an oil bath, was used as the reactor. The reaction mixture was heated at reflux for one hour. When the reaction is complete, the excess methanol is recovered by distillation. Following methanol recovery the reaction mixture is injected with water; 5% of the mass of oil used in the reaction.

The reaction mixture is transferred into a separatory funnel and then the glycerol layer is separated. The organic layer is filtered over silica gel to eliminate the polar impurities. The samples are analyzed by NMR, GC-FID, InfraSpec™ VFA-IR and FT-IR instruments.

Analysis method; Biodiesel Characterization

The biodiesel production was confirmed by NMR. In ¹H NMR the spectra of pure vegetable oil has a multiplet at 4.13-4.28ppm that corresponds to the hydrogen atoms of the glycerol fragment (CH-O; CH₂-O). This peak is

not present in the ^1H NMR of the biodiesel but a singlet at 3.65ppm corresponding to the methoxy group ($\text{CH}_3\text{-O}$) is present instead.

Similarly in ^{13}C NMR for the pure canola oil, two peaks can be observed at 62.54 and 69.53 ppm corresponding to the carbon of the glycerol fragment ($\text{CH}_2\text{-O}$); (CH-O). Instead, for the biodiesel, only one peak is observed at 51.57 ppm corresponding to the methoxy group ($\text{CH}_3\text{-O}$).

Analysis by ^1H and ^{13}C NMR (Anasazi 90 MHz FT NMR).

Pure canola oil: ^1H NMR (90 MHz CDCl_3): \square 0.63-0.88 (m, CH_3); 0.10-1.60 (m, CH ; CH_2); 1.99-2.03 (m, CH_2); 2.21 (t, CH_2CO); 2.29-2.37 (m, CH_2); 4.13-4.28 (m CH-O ; $\text{CH}_2\text{-O}$); 5.32 (t, CH=).

^{13}C NMR (90 MHz CDCl_3): $\square\square$ 14.59 (CH_3); 23.13 (CH_2); 23.23 (CH_2); 25.38 (CH_2); 26.05 (CH_2); 26.17 (CH_2); 27.73 (CH_2); 29.66 (CH_2); 29.76 (CH_2); 29.90 (CH_2); 30.12 (CH_2); 30.26 (CH_2); 30.32 (CH_2); 32.09 (CH_2); 32.49 (CH_2); 34.43 (CH_2); 34.59 (CH_2); 62.54 ($\text{CH}_2\text{-O}$); 69.53 (CH-O); 128.44 (CH=); 128.60 (CH=); 130.13 (CH=); 130.31 (CH=); 130.41 (CH=); 130.51 (CH=); 132.26 (CH=); 172.85 (CO_2CH); 173.21 (CO_2CH_2);

Biodiesel: from pure canola oil (wt=97%); from used vegetable oil (wt=94%); from animal fat (wt=78%)

^1H NMR (90 MHz CDCl_3): \square 0.81-0.94 (m, CH_3); 1.26-1.61 (m, CH_2); 1.98-2.02 (m, CH_2); 2.21 (t, CH_2CO); 2.30-2.38 (m, CH_2); 3.65 (s, $\text{CH}_3\text{-O}$); 5.34 (t, CH=).

^{13}C NMR (90 MHz CDCl_3): $\square\square$ 14.12 (CH_3); 22.75 (CH_2); 25.02 (CH_2); 26.97 (CH_2); 27.29(CH_2); 28.80 (CH_2); 28.86 (CH_2); 29.18 (CH_2); 29.21 (CH_2); 29.36 (CH_2); 29.42 (CH_2); 29.56 (CH_2); 29.62 (CH_2); 29.76 (CH_2); 29.86 (CH_2); 31.62 (CH_2); 32.01 (CH_2); 34.13 (CH_2); 51.57 ($\text{CH}_3\text{-O}$); 128.00 (CH=); 128.16 (CH=); 129.80 (CH=); 130.05 (CH=); 130.23 (CH=); 174.23 (CO_2CH_3)

To confirm that our product has the required properties, determination of the moisture, total glycerin, acid number and kinematic viscosity were performed by Piedmont Biofuels (see Table I).

Table I. Biodiesel test results

Test conducted	Actual	Limit
Moisture	760 ppm	NA
Total glycerin	0.712%	<0.24%
Acid number	0.03 mg KOH/g	<0.50 mg KOH/g
Kinematic viscosity	5.10 mm ² /sec	1.9-6.0

Gas Chromatography (GC)

A Shimadzu GC with Biodiesel Package, On-Column Injector (OCI) and Flame Ionization Detector (FID) was used to determine the free and total glycerol content using the ASTM D-6584 method. Figures 1 and 2 show typical chromatograms for unreacted oil and biodiesel, respectively.

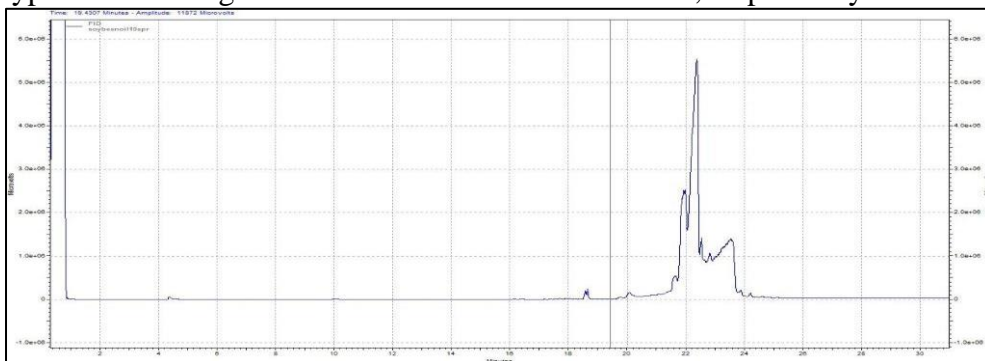


Figure 2: GC –FID of unreacted oil

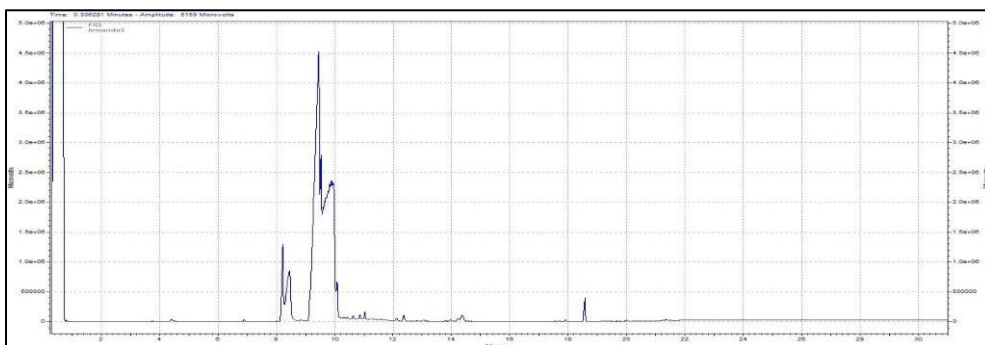


Figure 3: GC –FID of typical biodiesel sample

Fourier Transform Infrared (FTIR) Spectrometer

A Horizontal Attenuated Total Reflectance (HATR) Crystal (Perkin Elmer) with an angle of 45° composed of ZnSe was used. The instrument was configured to perform four scans from 2000.00 cm⁻¹ to 1000.00 cm⁻¹ with a resolution of 4.00 cm⁻¹. Figure 3 shows an overlay plot of the spectra for samples of varying % conversion in order to demonstrate the changes in the spectra which can be observed. A peak height ratio of 1197cm⁻¹ to 1166cm⁻¹ was chosen because it showed the best correlation to % conversion by GC.

The 1197cm^{-1} peak corresponds to absorbance by the O-CH₃ bond of the biodiesel and was observed to have the largest increase as the reaction proceeds.

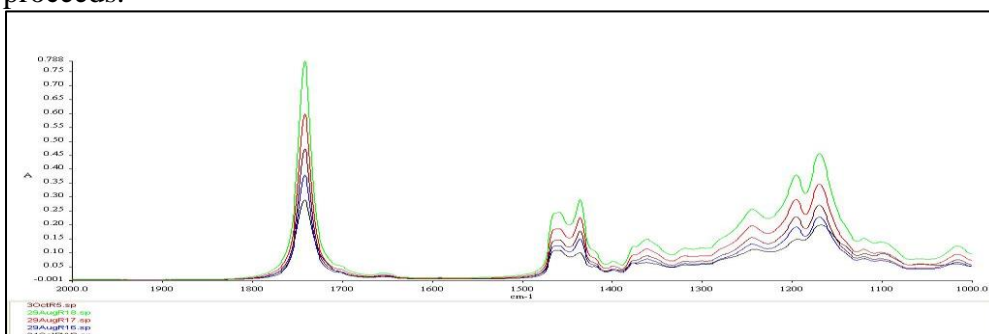


Figure 4: FT-IR spectra of samples of varying purity.

FT-IR and GC-FID analysis

In order to prepare the plot for the comparison of FT-IR and GC-FID analysis at peaks 1197 cm^{-1} and 1166 cm^{-1} various samples of biodiesel had to be produced. Time and temperature of reflux and catalyst amount were varied in order to get samples with a broad range of conversion results. After the biodiesel had been isolated, it was analyzed using the GC-FID. The ASTM D-6584 method determines the amount of glycerol present in the sample, however, this does not give the amount of biodiesel produced. To determine our % conversion, the “raw concentration” values for mono-, di-, triglycerides and free glycerol were summed and then subtracted from 100%. In addition, each sample was analyzed using the FT-IR. Five $1\ \mu\text{L}$ drops were placed onto the ATR crystal. A spectrum was generated and the peak heights at 1197 cm^{-1} and 1166 cm^{-1} were recorded. Finally, % conversion was plotted versus the $1197/1166\text{ cm}^{-1}$ ratio in order to generate a calibration curve which can be used to determine the % conversion to biodiesel for a particular reaction. Figures 5, 6, and 7 show the results for the soybean oil, canola oil and corn oil, respectively.

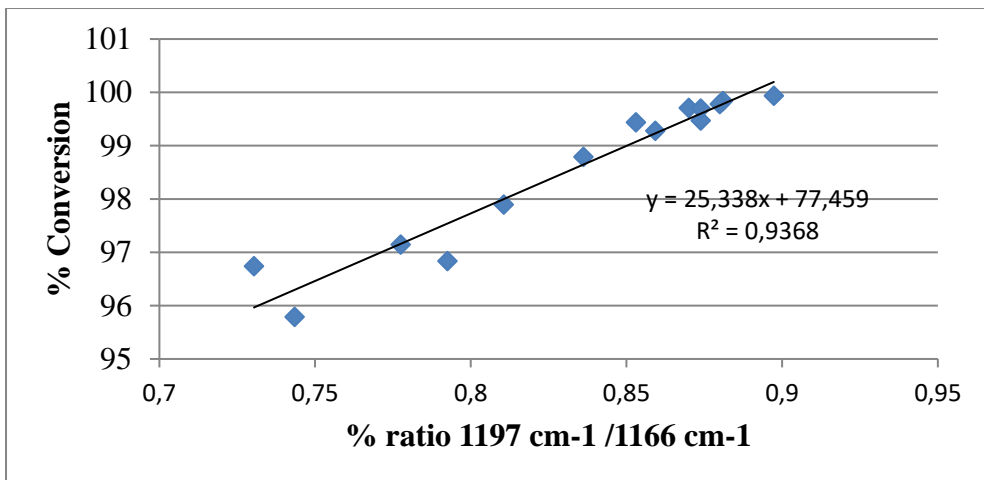


Figure 5: FT-IR curve for soybean oil.

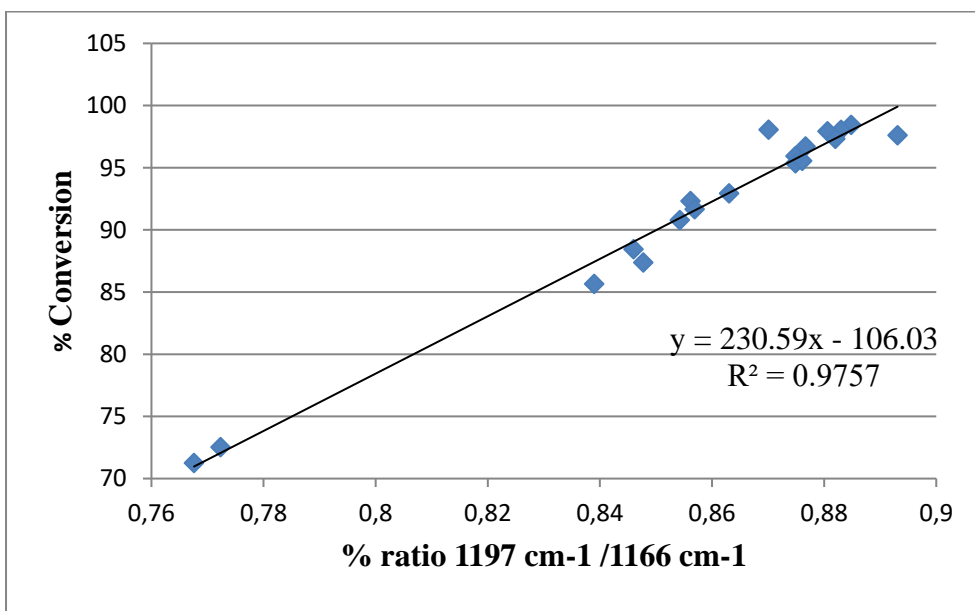


Figure 6: FT-IR curve for canola oil.

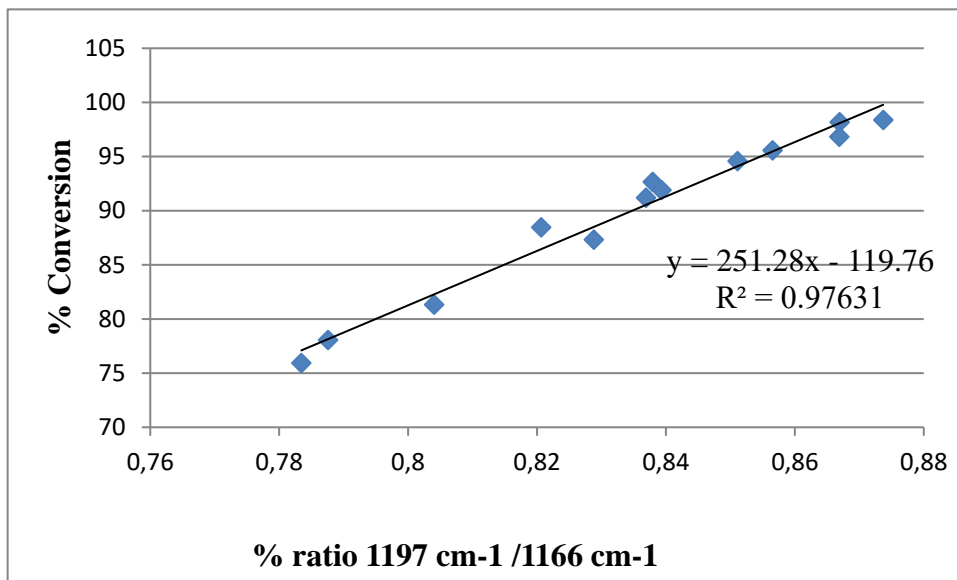


Figure 7: FT-IR curve for corn oil.

InfraSpec™ VFA-IR Spectrometer ES

An Attenuated Total Reflectance (ATR) Crystal (Sample Stage) with an angle of 45° composed of ZnSe was used. A Thin Film with CaF₂ Window was used for the source. The array type (Serial #: 2385) was Linear, 128 pixel, LiTaO₃. The instrument (Serial #: 391) was configured to perform four scans from 2000.00 cm⁻¹ to 1000.00 cm⁻¹ with a resolution of 43.00 cm⁻¹.

InfraSpec™ VFA-IR and GC-FID analysis

Each sample was additionally analyzed using the InfraSpec™ VFA-IR. The ATR crystal well was filled with the biodiesel sample. A spectrum was generated and the peak heights at 1197 cm⁻¹ and 1166 cm⁻¹ were recorded. The calibration curve generated can be used to determine the % conversion to biodiesel for a particular reaction. Figures 8 through 10 show the results for the soybean oil, canola oil, and corn oil, respectively.

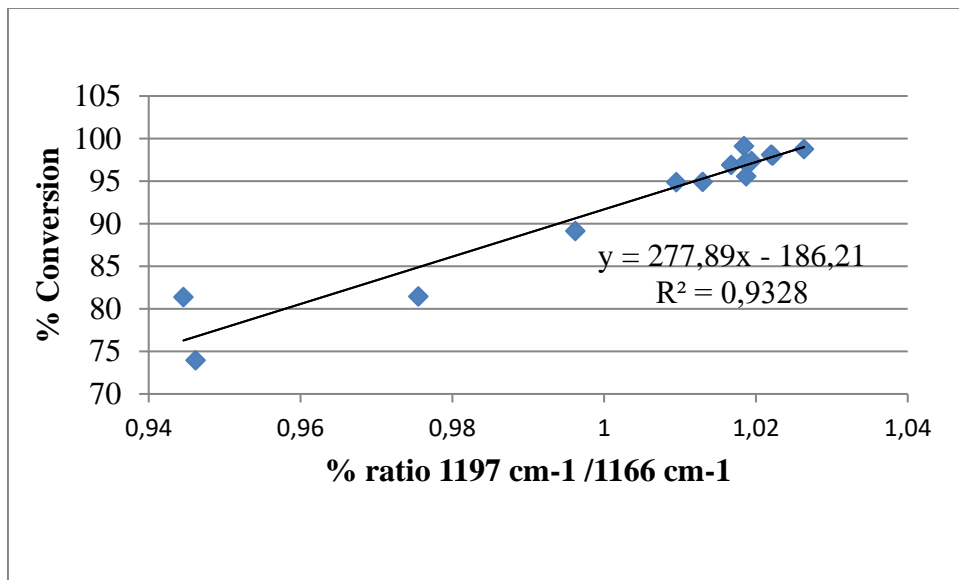


Figure 8: VFA-IR curve for soybean oil

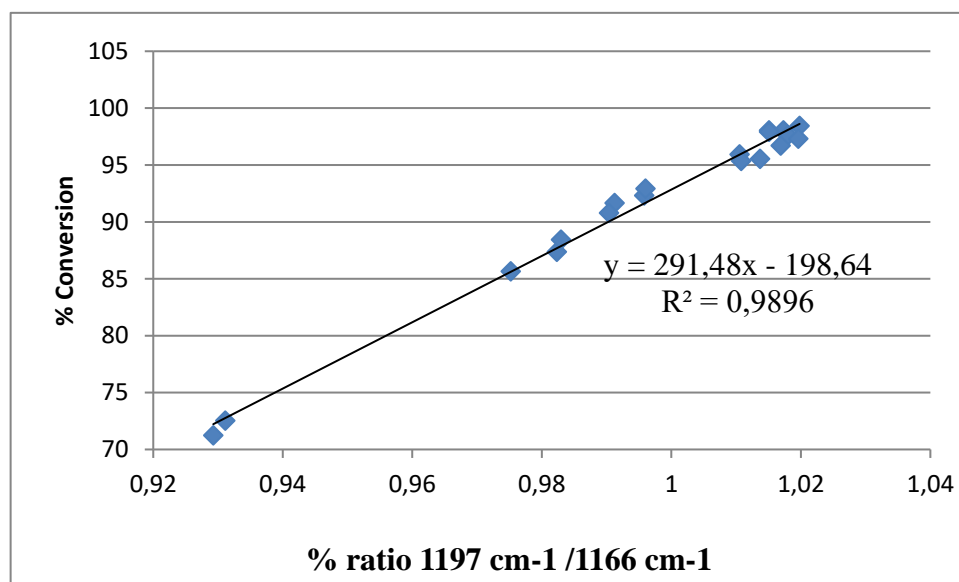


Figure 9: VFA-IR curve for canola oil

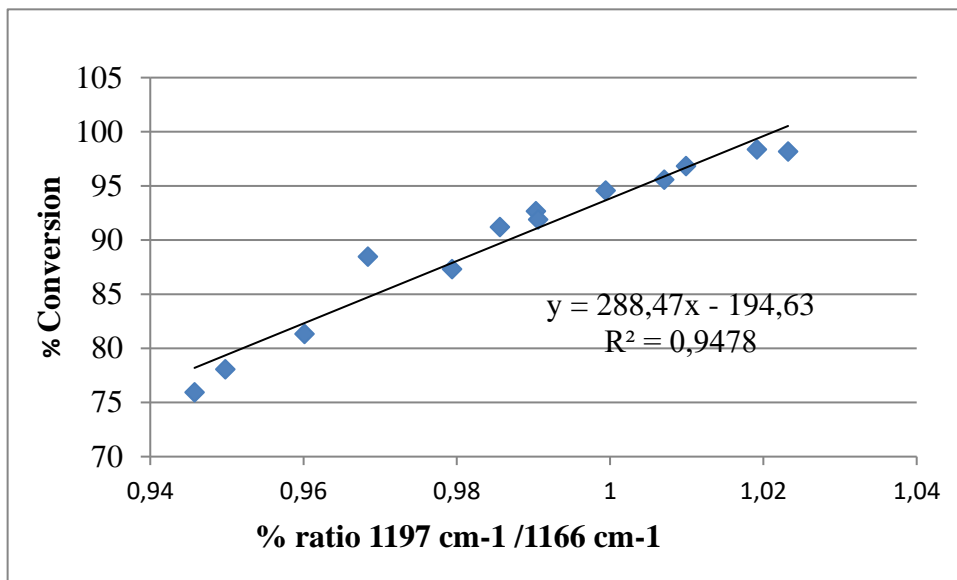


Figure 10: VFA-IR curve for corn oil.

Results and Discussion

Synthesis of biodiesel catalyzed by liquid morpholine

The method described herein was successful using pure canola oil, used vegetable oil, and animal fat. In the case of used vegetable oil the yield was more modest (94%), even though the reaction time was increased to 36h, and an additional quantity of morpholine (2g of morpholine for 30g of oil) was added. Waste vegetable oil has a higher concentration FFAs than virgin oil which under basic conditions can't be converted into biodiesel; the presence of FFA's in waste oil accounts for the lower % conversion.

For the animal fat, the yield was modest (78%). A solid residue containing a mixture of glycerides and methyl esters is recovered at the end of each reaction, indicating incomplete reaction and can be recycled to produce additional liquid biodiesel (45%). Since solid animal fat does not mix as easily with the reagents as the liquid triglycerides do, the rate of the reaction is slower and longer reaction times are required (40h). As a result, an additional quantity of morpholine was added (7g for 30g of animal fat).

In an attempt to improve the yield (20) when using animal fat, mixtures of animal fat with pure canola oil or used vegetable oil were used (see Table II).

Table II. Biodiesel synthesis using mixtures of oil and animal fat

Reaction No.	Mass of pure canola oil : animal fat	Yield wt %	Mass of used vegetable oil : animal fat	Yield wt %
1	2:8	76%	2:8	66%
2	4:6	76%	4:6	76%
3	6:4	82%	6:4	78%

4	8:2	97%	8:2	91%
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The yield of the reactions containing virgin vegetable oil were slightly higher than those using waste vegetable oil. However, only a modest improvement in the yield was noticed for the mixtures with a low concentration of animal fat.

The use of morpholine as a catalyst allowed the synthesis of cleaner fuel and glycerol, which simplified the purification process (1). The biodiesel was simply purified by filtration over silica gel using hexanes as eluent, followed by evaporation of the hexanes *in vacuo*. Recovery of the morpholine by vacuum distillation was moderately successful (52%). The excess methanol was easily recovered by distillation (97%). With respect to the glycerol by-product, the excess methanol or morpholine can be easily removed by evaporation under vacuum, thus simplifying significantly its purification.

Attempts to use commercially available polymer-bound morpholine as a heterogeneous catalyst for biodiesel synthesis were unsuccessful. This could be due to the fact that the basic nitrogen of the catalyst is the nitrogen atom which is connected to the solid support of the polymer and therefore more sterically hindered rendering it less basic.

Synthesis of biodiesel catalyzed by phase transfer catalyst (CH, TMAH)

Both CH and TMAH were found to be effective catalysts for the production of biodiesel from a variety of virgin and used oil stocks under a wide range of conditions. The reaction conditions for **Expt. 1** were developed in our lab. Despite the high % conversion, the use a large excess of methanol (28 equivalents) will increase the cost of the reaction due to the fact that the methanol distillation will consume significant energy and time. A more cost-effective procedure used an increased amount of catalyst, (**Expt. 2 and 3**) or less methanol (6 equivalents).

Table III. Reactions conditions and results

Expt.	Type of oil	Moles of oil ¹	Moles of MeOH	Catalyst used	Mole % catalyst ²	% Conversion (m/m%) ³	Percent Weight ⁴
1	Pure canola	0.27	7.5	TMAH	1%	99.15%	97%
2	Used vegetable	0.49	2.81	TMAH	4%	74.62%	92%
3	Used vegetable	0.49	2.81	CH	5%	83.20%	91%
4	Pure soybean	0.49	2.81	CH	17%	98.77%	94%
5	Pure vegetable	0.49	2.81	CH	10%	98.05%	89%
6	Pure vegetable	0.49	2.81	KOH	13%	99.2%	86%
7	Pure soybean	0.49	2.81	TMAH & CH	2% & 2%	79.85%	78%
8	Pure soybean	0.49	2.81	TMAH	3%	76.11%	89%
9	Pure soybean	0.49	2.81	CH	5%	85.98%	93%
10	Used vegetable	0.49	2.81	KOH & TMAH	4% & 1%	75.58%	90%
11	Used vegetable	0.49	2.81	KOH	13%	95.99%	99%

1. Moles of oil is approximate since different fatty acids will give different molar masses.
2. Relative to moles of oil.
3. From GC-FID data
4. % by mass biodiesel isolated to mass of oil reacted

A variation of **Expt. 4** was described in the literature (Weidner et al., 2011), and the large amount of catalyst necessary for the reaction raises the cost of the process, despite the fact that no distillation of the excess methanol is necessary. **Expt. 5** demonstrates that significantly less catalyst can be used since this reaction has a high conversion rate, meeting the ASTM D6584 standard of containing less than 0.24% free and total glycerin while using substantially less catalyst than **Expt. 4**.

Expt. 6 is the standard procedure using KOH and was performed for the purpose of comparison. We can see that using pre-treated used vegetable oil (**Expt. 1 vs. 2**) requires the addition of a larger quantity of catalyst.

By comparing **Expts. 7-9**, we can determine that it is not an advantage to mix the two phase transfer catalysts. **Expt. 10** show that the same amount of KOH and phase transfer catalyst, in this case TMAH, can be used instead.

GC-FID, FT-IR and InfraSpecTM VFA-IR analysis

The analytical method developed based on the ratio of the 1197 cm^{-1} and 1166 cm^{-1} FT-IR peaks vs. GC-FID % conversion works nicely for organic chemistry laboratory experiments, especially since it allows students to analyze the product generated in a chemical reactions. For at-home biodiesel producers, a simplified IR spectrometer is available for field-testing. Despite the fact that the instrument has a lower resolution compared with the FT-IR, a good linear fit can be observed at similar conversions. The highest variance is observed for biodiesel derived from soybean oil. In this case, the InfraSpecTM VFA-IR spectrometer analysis provides a curve with a better linear fit for conversions lower than 95%.

Overall, it appears that this method works well for reactions in which least 70% of the fuel stock was converted to biodiesel.

Conclusion

With respect to the process catalyzed by liquid morpholine, the method described presents the advantage of using a less corrosive catalyst and producing cleaner reaction products. The main disadvantage of this method is the longer reaction times that consume additional energy. The method is successful with a wide variety of fuel stocks. Blending of the animal fat with pure vegetable oil or used vegetable oil in an attempt to produce higher yields, does not result in significant improvement. Recovery of the morpholine

through distillation was demonstrated which would allow for its reuse in subsequent reactions. While the morpholine resins investigated were unsuccessful at catalyzing the reaction, other derivatives of morpholine resins which leave the active site of the catalyst free could possibly be successful as a heterogeneous catalyst. This method, while not practical for large-scale production, can be improved and presents an alternative to the existing methods used in the laboratory.

Concerning the process catalyzed by the phase transfer catalysts, although the high cost of CH and TMAH catalysts compared to potassium hydroxide presently prevents the widespread use of the method described, possible increased demand for these compounds could lower their prices, thus making this method a viable alternative.

Finally with respect to the IR analysis, data was collected in order to obtain a calibration curve for each of the most commonly used oils: soybean, canola, and corn oil using both an FT-IR instrument as well as the InfraSpec™ VFA-IR spectrometer. Based on the parameters of the method for GC-FID analysis, this technique is most accurate for samples with higher conversion rates (>70%) than those with high levels of unconverted oil.

IR analysis can provide a fast and easy method for the determination of the degree of conversion of the vegetable oils to biodiesel. Although not suitable to replace the GC-FID analysis in the determination of fuel compliance with the ASTM standard, it can provide a good method for estimation of the oil conversion in lab and field, prior to a more complex analysis. This analytical method could also be used in a monitoring system to track the progress of the biodiesel preparation.

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In Using Leaders as Insider Witnesses Without Prosecuting Them, the Special Court for Sierra Leone May Have Legitimised Impunity

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Abstract

There is a determination on the part of the international community that perpetrators of crimes during conflicts should not escape punishment for the roles they play during crises by either committing these offences themselves or by authorising their commission for such actions. Since most crimes are not documented, which makes it hard to acquire the proof or evidence required for conviction, the courts or tribunals rely on the testimony of individuals who witnessed the crimes that have been committed. Such individuals are known as insider witnesses. In cooperating with the prosecution, if they themselves had been among the perpetrators or part of the accomplices, they are sometimes given, though not in all cases, a reduced sentence, as part of the plea bargain with the prosecution. However, agreeing to testify does not exempt one from punishment. This is because there is an underlying principle that individuals who commit such crimes must be held accountable; the same principle is aimed at ending impunity for crimes committed during conflicts such as these that offend international law.

The Mandate of Special Court for Sierra Leone was to prosecute those individuals who bear the greatest responsibility..., including those leaders who, in committing such crimes, have threatened the establishment of and implementation of the peace process in Sierra Leone.¹ However, Prosecutors at various stages of the trials engaged some of these leaders as insider witnesses, without prosecuting them. Consequently, these leaders evaded punishment for their alleged crimes. In this process, the Special Court may have legitimised impunity.

Keywords: Leaders, insider witnesses, impunity, accountability

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¹ Article 1(1) of the Statute of the Special Court for Sierra Leone

Introduction

Sierra Leone was ravaged by a civil war that lasted between 1991 and 2002, resulting in an estimated 70,000 casualties and 2.6 million displaced persons.² The war was characterized by widespread atrocities, including forced recruitment of child soldiers, extensive incidences of rape, sexual slavery and amputation of limbs.³ Various peace processes, facilitated by the international community, which were aimed at ending the war between the Sierra Leone Government and the main protagonists, the Revolutionary United Front (RUF) rebel group, were unsuccessful. These failed peace processes include the Abidjan Peace Agreement reached on 30th November, 1996, which stipulated that a general amnesty be granted to the RUF rebel group, ordering them to disarm and form a political party.⁴ The date of the Abidjan peace agreement was of great significance, as the United Nations Security Council accepted it as the temporal jurisdiction for the Court, being the first comprehensive peace agreement that was reached between the RUF rebels and the Government of Sierra Leone.

Other protagonists in the conflict were members of the Armed Forces Revolutionary Council (AFRC), an offshoot of the main Sierra Leone Army (SLA). This group later formed a military government with the RUF rebels after the overthrow of the Sierra Leone People's Party (SLPP) civilian government of President Tejan Kabba by a military coup on 25th of May, 1997. Another group was the civil militia known as the Civil Defence Forces (CDF), which was fighting on the side of the SLPP government. There was also the international peace keeping troop under different nomenclatures, such as ECOWAS Monitoring Group (ECOMOG), United Nations Observer Mission in Sierra Leone (UNOMSIL), and the United Nations Mission in Sierra Leone (UNAMSIL) peace keepers.

This article aims at discussing that in using leaders as insider witnesses without prosecuting them the Special Court for Sierra Leone may have legitimised impunity.

² Mary Kaldor with James Vincent, 'United Nations Development Programme Evaluation Office', EVALUATION OF UNDP ASSISTANCE TO CONFLICT AFFECTED COUNTRIES; CASE STUDY SIERRA LEONE. p.4<<http://web.undp.org/evaluation/documents/thematic/conflict/SierraLeone.pdf>> accessed 18 August 2017

³ *ibid*

⁴ UNITED STATES INSTITUTE OF PEACE. Peace Agreement Digital Collection, Sierra Leone>> Peace Agreement.https://www.usip.org/sites/default/files/file/resources/collections/peace_agreements/sierra_leone_11301996.pdf, accessed 18 August 2017

Background to Establishing the Special Court for Sierra Leone

The Special Court for Sierra Leone (hereinafter referred to as the Court, the Special Court) was created out of a letter dated the 12th of June, 2000, when President Kabba in his address to the President of the UN Security Council and the international community requested for the establishment of a “Special Court for Sierra Leone.”⁵ The first paragraph of the letter partly reads thus:

“On behalf of the Government and people of the Republic of Sierra Leone, I write to request you initiate a process whereby the United Nations would resolve on the setting up of a special court for Sierra Leone. The purpose of such a court is to try and bring to credible justice those members of the Revolutionary United Front (RUF) and their accomplices responsible for committing crimes against the people of Sierra Leone and for the taking of United Nations peacekeepers as hostages.”⁶

This request was met with the Council’s favourable response and within 8 weeks. On the 14th of August, 2000, the United Nations Security Council passed a Resolution 1315(2000),⁷ instructing the United Nations Secretary General of the time, Kofi Anan, to negotiate an agreement with the Kabba government that should be aimed at establishing the Court. On the 16th January, 2002, a formal bi-lateral agreement was signed in Freetown between the United Nations, represented by its Assistant Secretary-General for Legal Affairs, Hans Corell, and the Government of Sierra Leone represented by its Attorney General and Minister of Justice, Solomon Berewa.⁸ Annexed to the agreement was the Statute of the Court.⁹ This agreement set out the legal framework for a mixed Court, which featured both local and international elements, whilst taking into account some of the experiences of the already functional sister tribunals of the International Criminal Tribunal for Yugoslavia (ICTY) and the International Criminal Tribunals for Rwanda (ICTR). For example, the Rules of Procedure and Evidence (RPE) for the

⁵ President of the Republic of Sierra Leone, Annex to the letter dated 12 June 2000, addressed to the President of the Security Council, U.N. Doc. S/2000/786/ <<http://www.rscsl.org/Documents/Establishment/S-2000-786.pdf> > accessed 3 July 2017

⁶ *ibid*

⁷ The United Nations Security Council Resolution, `1315(2000) UN Doc. S/RES/1315(2000), 14 August 2000. <http://www.rscsl.org/Documents/Establishment/S-Res-1315-2000.pdf> accessed 12 January 2017

⁸ William Schabas` *The UN International Criminal Tribunals The former Yugoslavia, Rwanda and Sierra Leone* (First Published 2006, Cambridge University Press) pp, 38-39

⁹ The Agreement between the GOSL and the UN, on establishing the court was signed on 16 January 2002, came into effect on 12 April 2002, <<http://hrlibrary.umn.edu/instate/SCSL/SierraLeoneUNAgreement.pdf> > accessed 3 July 2017

Court under Article 14(1) were *mutatis mutanda* to the ICTR, as a result of this experience.¹⁰ Whilst the ICTY and ICTR were established under a Chapter VII mandate of the UN Security Council,¹¹ the Court was established in similarity to the Extraordinary Chambers in the Courts of Cambodia, as a bilateral agreement between the UN and the individual countries.

The Global Community's Effort to End Impunity after Conflicts

Since the Nuremberg Trials of 1945 and 1946, there has been a concerted effort, whether by treaty, customary law practice, resolutions or through legislation, by the global community and other organisations, including the UN, human right organisations, civil right activists and the likes, to hold to account individuals who commit crimes during conflicts. This position is reflected in Rule 158 (Prosecution of war crimes) of International Humanitarian Law (IHL), which states; "States must investigate war crimes allegedly committed by their nationals or armed forces, on their territories, and if appropriate, prosecute the suspects."¹²

This position has been unequivocal as was reiterated in the speech by the former UN Secretary General, Ban Ki Moon, on 31st of May 2010:

"In this new age of accountability, those who commit the worst of human" crimes will be held responsible. Whether they are rank and file foot soldiers or military commanders, whether they are lowly civil servants following orders, or top political leaders, they will be held accountable." ... Let it be known as the place where the international community, coming together in concert, closed the door on the era of impunity and, acting in concert, ushered the age of accountability."¹³

It was, therefore, no surprise that after the Balkans war and the Rwandan Genocide, in the late 1980s to early 1990's, the world appalled by the atrocities committed during those conflicts, the UN and the international community established the ICTY in 1993 and the ICTR in 1994, respectively. The establishment of the International Criminal Court through the Rome Statute, which was enforced on 1st July, 2002, and the various *ad hoc* courts

¹⁰ Article 14(1) of the Statute of the Court, reads, "The Rules of Procedure and Evidence of the International Criminal Tribunal for Rwanda obtaining at the time of the establishment of the Special Court shall be applicable *mutatis mutandis* to the conduct of the legal proceedings before the Special Court."

¹¹ Schabas (n 8), p. 49

¹² International Humanitarian Law, Data Base, < https://ihl-databases.icrc.org/customary-ihl/eng/print/v1_cha_chapter44_rule158 accessed 17 August 2017

¹³ United Nations Secretary General Ban Ki-Moon, Address to the Review Conference on the International Criminal Court, Kampala-Uganda on 31 May 2010 <<http://www.un.org/africarenewal/web-features/secretary-general%E2%80%99s-%E2%80%9C-address-icc-review-conference>> accessed 17 August 2017

elsewhere in the world, are all geared towards this same goal of; ending impunity and holding individuals to account for the crimes they commit. Considering the heinous crimes that were committed in Sierra Leone, it was inevitable that those individuals responsible for perpetuating such crimes would be held to account eventually.

The key Objective of United Nations Security Council Resolution 1315 (2000)

The Resolution at paragraph 6, states, "...the Special Court shall have personal jurisdiction over persons who bear the greatest responsibility..., including those leaders who, in committing such crimes, have threatened the establishment of and implementation of the peace process in Sierra Leone."¹⁴

The UN Secretary General, during the negotiations, with the UN Security Council in establishing the Court had accepted that "persons who bear the greatest responsibility" did not limit jurisdiction to political and military leaders only, instead going by the determination of the phrase, it falls initially to the Prosecutor and ultimately to the Court itself.¹⁵ As the phrase was not defined in the UN Resolution, the matter for interpretation of the phrase, "persons who bear the greatest responsibility," came before Trial Chamber I through a defence motion about the Court's lack of personal jurisdiction under Article 1(1),¹⁶ in *Prosecutor v. Fofana*.¹⁷ His defence counsel submitted that the Court did not have personal jurisdiction over Fofana, because the suspect fell outside the category of persons "who bore the greatest responsibility" for alleged violations of serious international humanitarian law contained in his indictment. In its ruling, the Chamber held: "While those 'most responsible' obviously include the political or military leadership, others in command authority down the chain of command may also be regarded as 'most responsible' judging by the severity of the crime or its massive scale... [I]t must be seen, however, not as a test criterion or a distinct jurisdictional threshold, but as guidance to the Prosecutor in the adoption of a prosecution strategy and in making decisions to prosecute individuals"¹⁸

¹⁴ This wording in the Article 15(1) of the Statute do not describe an element of the crime, but rather provided guidance to the Prosecutor in determining his or her prosecutorial strategy. see UN Doc S/2000/40/paragraph 3.

¹⁵ Kirsten Ainley, Rebekka Friedman and Chris Mahony ` *Evaluating Transitional Justice, Accountability and Peacebuilding in Post- Conflict Sierra Leone*, (First Published 2015 by MACMILLAN PALGRAVE) p. 87

¹⁶ (n 1)

¹⁷ *Prosecutor v. Fofana*, Case No. SCSL-04-14-PT (Preliminary Defence Motion- Matters Requiring Factual Determination), 3 March 2004

¹⁸ *Prosecutor v. Fofana*, Case No. SCSL-04-14-PT. 3 March 2004, para 22

In other words, the Prosecutor's responsibility in investigating and prosecuting 'those who bear the greatest responsibility' should not only include the political or military leaders, but also those who committed severe and grave offences or the massive scale of the offences, as a corollary to the UN Secretary General's assertion of 'most responsible'.

The Court only indicted thirteen individuals; two died before they stood trial, one died during the trial, and the fate of another is still unknown. At the end, the Court only prosecuted nine individuals.¹⁹ It has been argued that because only a few individuals faced prosecution, the Court underachieved its mandate. The reason for this emanates from the fact that, considering the war that lasted for eleven years together with the scale and brutality of the atrocities committed, the general expectation of Sierra Leoneans was that more people should have been prosecuted. The counter argument to this was that the Court was meant to last for only a few years and the funding structure also influenced the number of persons prosecuted.

Defining an Insider Witness

During any post conflict period, it is usually very difficult to acquire hard evidence to assist in the prosecution of alleged perpetrators, as these atrocities are hardly documented. The courts or tribunals would therefore rely on insiders to provide valuable information regarding the alleged crimes committed and the identity of the perpetrators who committed them. Persons who were close to the accused are called 'insider witnesses', as explained by the ICTY; "The evidence gained from their testimony is often crucial for the establishing of the degree of responsibility of the accused."²⁰ Former Prosecutor at the ICTY and ICTR, Carla Del Ponte, also explains, "Insider witnesses are persons in a position to provide crucial, high grade information about political and military decision making, because they had witnessed events at close proximity to the decision makers."²¹ Anne Marie de Brueller and Allette Smuelle also stated, "...Insider witnesses are usually accomplices to the crimes with which the accused were charged."²²

¹⁹ The Special Court for Sierra Leone and the Residual Special Court for Sierra Leone, Website <http://www.rscsl.org/index.html> accessed 17 August 2017

²⁰ United Nations International Criminal Tribunal for the former Yugoslavia. Website page on 'Witnesses' <http://www.icty.org/en/about/registry/witnesses> accessed 30/12/2016

²¹ Carla Del Ponte with Chuck Sudetic, 'Madame Prosecutor Confrontations with Humanity's Worst Criminals and the culture of Impunity' (Published 2008, Other Press New York) p. 128

²² Anne Marie de Brouwers and Alette Smeulers, *The Elga Companion to the International Criminal Tribunal of Rwanda*. (Edward Elgar Publishers 2016),p. 248

Prosecutors David Crane,²³ Stephen Rapp²⁴ and Brenda Hollis,²⁵ were United States (US) citizens, who also happened to be the lead Prosecutors as at when the trials began and at different stages of the judicial activities of the Special Court. It should be safe to assume that their prosecutorial strategy might have been influenced by the US judicial system. Therefore, it is thus worth mentioning of the US policy on insider witness. It states thus:

“This policy recognizes that persons who have committed serious crimes should not be allowed to avoid all penal sanctions by agreeing to testify. At the same time, the policy gives the “insider” hope that at the end of the process, the insider will still have the opportunity to start a new life. It is the collective judgment of the United States that the cost of allowing reduced sentences for cooperation against leaders of the criminal organization is justified by the need to defeat the criminal organizations that pose such serious threat to civil society.”²⁶

This policy would be referred to again as the paper is discussed.

The Use of Leaders as Insider Witnesses at the Court

The Prosecutor’s strategy at the Court of using leaders as insider witnesses, without prosecuting them, has come under scrutiny in the context of prosecuting those “who bear the greatest responsibility,” for these reasons: (A) The competence of the Court, which was to prosecute individuals who committed grave or serious offences, and the leaders who in committing offences threatened the establishment and implementation of the peace process in Sierra Leone; (B) by cooperating with the prosecution, individuals should not be allowed to escape punishment for their alleged crime, as encapsulated in the US policy on insider witness already quoted.

Amongst the insider witnesses who testified at the Court were; Gibril Massaquoi, in *Prosecutor v Sesay, Kallon and Gbao* (RUF Trials),²⁷ George Johnson aka. Junior Lion, in *Prosecutor v Brima, Kamara and Kanu* (AFRC Trials),²⁸ Albert Nallo in *Prosecutor v Norman, Fofana and Kondewa* (CDF Trials),²⁹ and Moses Blah in the *Prosecutor v Taylor* (Charles Taylor Trial).³⁰ The first two mentioned individuals did not only occupy leadership roles in

²³ Prosecutor April 2002 to July 2005

²⁴ Prosecutor January 2007 to September 2009

²⁵ Prosecutor February 2010 to 2013

²⁶ Robert Courtney III, ` INSIDERS AS COOPERATING WITNESSES: OVERCOMING FEAR AND OFFERING HOPE` p.39. http://www.unafei.or.jp/english/pdf/PDF_GG4_Seminar/Fourth_GGSeminar_P36-46.pdf accessed 16 August 2017

²⁷ *Prosecutor v Sesay, Kallon and Gbao* (RUF Trial), Case No. SCSL-04-15

²⁸ *Prosecutor v Brima, Kamara and Kanu* (AFRC Trial) Case No. SCSL -04-16

²⁹ *Prosecutor v Norman, Fofana and Kondewa* (CDF Trial), Case No. SCSL 04-14

³⁰ *Prosecutor v Charles Taylor* (Taylor Trial), Case No. SCSL 03-01

their various organisations, but they also admitted or were found to have taken part in the crimes for which others were being prosecuted. This is supported by the Judgement in the RUF trials, which reads:

“...These insider witnesses were themselves high ranking officers in the RUF or AFRC. Many of these witnesses were key participants to the crimes alleged in the Indictment, and may be considered to be co-perpetrators or accomplices. The Chamber reiterates that the Appeals Chamber has clarified that such persons may be considered accomplices even if they have not been charged with any criminal offences.”³¹

It is against this backdrop that the question is asked, whether the Prosecutor’s strategy was robust enough, by using leaders, who have been accused of committing alleged crimes, to serve as insider witnesses, whilst evading prosecution. Their alleged crimes and roles as insider witnesses are now considered in turns:

Gibril Massaquoi

The Country’s Truth and Reconciliation Commission (TRC) in its final report found that, Massaquoi approximately executed 24 innocent people in the Pujehun district.³² The report further states, “Sankoh's "Special Assistant", Gibril Massaquoi, personally fuelled the tensions surrounding the UNAMSIL hostage-taking crisis. He was a central part of the chain of command of the RUF. Massaquoi bears an individual share of the responsibility for the deterioration in the security situation in Sierra Leone.”³³ Massaquoi served as a key witness at the RUF trials, and his testimony was significant to the successful conviction of those RUF leaders who were prosecuted by the Court, even though he himself was a leader within the RUF rebel movement as was found in the TRC report.

George Johnson

From the AFRC Trial, this part of the transcript of George Johnson’s testimony is hereby reproduced. His answers have been highlighted in bolded fonts for emphasis:

1 **A. Yes, his a.k.a. name was Gullit.**

2 Q. You said you were appointed to the position of provost

3 marshal by Alex Tamba Brima in Mansofinia. Before that, what

4 position had you held?

³¹ RUF Trial Judgement SCSL-04-15-T, delivered 2 March 2009, para. 539

³² TRC report. Volume two, chapter two, at paragraph 156.http://www.sierraleonetrc.org/index.php/view-report-text-vol-2/item/volume-two-chapter-two?category_id=20 accessed 05 January 2017

³³ *ibid* TRC Report para. 166

10:58:02 5 **A. Before that, I was still the chief security officer to 6 Ibrahim Bazy Kamara in Kono. As a lieutenant.**

7 Q. Moving on, to still in the year 1998, were there any 8 further alterations to the appointments you held in that year 9 that you are able to recall?

10:58:32 10 **A. Yes, at Camp Rosos, I was given a battalion to command.**

11 Q. Who gave you the battalion to command?

12 **A. Alex Tamba Brima, a.k.a Gullit.**

13 Q. Do you remember the battalion number?

14 **A. It was the 4th Battalion.**³⁴

His testimony continues:

19 **A. After the burial of SAJ Musa, we only spent two days there.**

09:59:47 20 Q. Where did you go after that?

21 **A. We went into the Peninsular Hills to Hastings.**

22 Q. Did anything happen at Hastings?

23 **A. Yes, Hastings was first attacked.**

24 Q. Do you know who led that attack?

10:00:04 25 **A. It was led by me.**

26 Q. What was the purpose of that attack?

27 **A. The purpose of the attack was for us to go and get more 28 arms and ammunitions from the Nigerians because it was their 29 headquarter.**³⁵

It is hereby appropriate to again reiterate that President Kabba's request to the UN for establishing the Court, amongst other reasons, was to prosecute those who attacked and kidnapped the international peace keepers. The offence of direct intentional attack on peace keepers³⁶ was to become a specific offence under international humanitarian law, for the very first time at an international court.

Albert Jusu Nallo

Albert Jusu Nallo, as Deputy National Coordinator, occupied a high position in the CDF hierarchy. At the CDF trial, he testified against his subordinate, Allieu Kondewa. The usual practice according to previous international tribunals was for those persons who occupy lower position in the cadre of the organisation to testify against their leaders, and not the other way round. In the event where leaders testify against their subordinates, they

³⁴ AFRC Trial, Case No. SCSL-2004-16-T, 15 September 2005, p.10

³⁵ AFRC Trial, Case No. SCSL-2004-16-T, 15 September 2005, p.14

³⁶ Article 4(b) of the Statute of the Special Court for Sierra Leone

should not be excused from punishment, as the case of Jean Kambanda at the ICTY, which has been discussed below, would show. Tim Kelsall wrote, "...He (Nallo) claimed to have sat with Moinina Fofana³⁷ to plan strategies for war operations and that he wrote down these strategies and passed it to others to implement."³⁸ As a planner and a leader, even if he did not physically commit an offence, but being under command and bearing superior responsibility, he should have been captured under the umbrella of, "those who bear the greatest responsibility," for the crimes under the jurisdiction of the Court.

Moses Blah

At the Charles Taylor trial, the use of his Vice President, Moses Blah, as an `insider witness` should be justified because of three reasons: (A) He was subordinate to Charles Taylor. (B) It was alleged that he (Charles Taylor) had executed most of the members of his inner circle, and there were very few if any who would have been in the position to provide the information the Court sought in order to carry a successful conviction.³⁹ Indeed, the prosecution claims that some members of the accused's inner circle were murdered because they were aware of the crimes perpetrated by the accused and they stood as potential threats in exposing him (Charles Taylor).⁴⁰ Moreover, many individuals associated with the Taylor regime were afraid to testify for the defence due to the fear of being subjected to a UN-imposed travel ban and seizure of their assets had they attended the Court.⁴¹ (C) There was no evidence suggesting that Blah had committed crimes that fell within the jurisdiction of the Court for which he was to be prosecuted.

It is hereby appropriate to draw a few comparisons on how the Court engaged insider witnesses, as opposed to the sister tribunals of the ICTY and ICTR.

At the ICTY for example, the following individuals served as insider witnesses but they were not exempted from prosecution:

Miroslav Bralo was a member of a Military Police unit of the Croatian Defence Council. Bralo committed a range of appalling crimes and was convicted of killing five people and of assisting the killing of 14 Bosnian Muslim civilians, nine of whom were children. The Trial Chamber believed

³⁷ Moninina Fofana was one of the Accused Persons in the CDF Trial

³⁸ TIM KELSALL, *CULTURE UNDER CROSS-EXAMINATION: INTERNATIONAL JUSTICE AND THE SPECIAL COURT FOR SIERRA LEONE* (Published 2009, Cambridge University Press,) P.99

³⁹ Gill Wigglesworth` *The End of Impunity? Lessons from Sierra Leone`* page 820 <http://web.ics.purdue.edu/~wggray/Teaching/His300/Handouts/Wigglesworth-Sierra-Leone.pdf> accessed 12 August 2017

⁴⁰ Wigglesworth (n 39) p.820

⁴¹ibid

that it was noteworthy when he admitted to crimes of which he was not originally charged with and that he made efforts to atone for his crimes by engaging in community work and assisting in the location of the remains of some of his victims. He was subsequently sentenced to 20 years' imprisonment.⁴²

Dragan Zelenović was a Bosnian Serb soldier and *de facto* military policeman in the town of Foča, Bosnia and Herzegovina in 1992. Zelenović raped and tortured a number of detained Muslim women and girls, including a 15-year-old. Women who resisted his sexual assaults were threatened with death or were beaten. As part of the plea agreement, he agreed to provide truthful and complete information and to testify at any proceedings before the ICTY. He was later sentenced to 15 years' imprisonment.⁴³

Predrag Banović was a guard at the Keraterm detention camp in Prijedor, Bosnia and Herzegovina in 1992. He participated in the abuse and persecution of non-Serb detainees within the camp. He murdered five prisoners as a result of his participation in beatings and also beat up 27 detainees with baseball bats, truncheons, cables, and iron balls. Banović was sentenced to 8 years' imprisonment.⁴⁴ In his guilty plea statement, he states, "I feel sorry for all the victims, and I curse my own hands for having inflicted pain in any way on innocent people. I wish my sincere words to be understood as a balm for those wounds and as a contribution to the reconciliation of all people in Prijedor and the restoration of the situation that existed before the war."⁴⁵

At the ICTR, the case of former Prime Minister Jean Kambanda, who was prosecuted as a leader is worthy of mentioning. He had testified against others including former ministers, government officials including members of the military.⁴⁶ He was found guilty of the crimes he committed and sentenced to life imprisonment. The Trial Chambers in passing Judgment stated this:

"The Chamber recalls as aforementioned that the Tribunal was established at the request of the government of Rwanda; and the Tribunal was intended to enforce individual criminal accountability on behalf of the international community, contribute in ensuring the effective redress of violence and the culture of impunity, and foster national reconciliation and peace in Rwanda. (Preamble, Security Council resolution 955(1994))."⁴⁷

⁴² *Prosecutor v Miroslav Bralo* Case No. IT-95-17 820

⁴³ *Prosecutor v Dragan Zelenovic* Case No. IT-96-23/2

⁴⁴ *Prosecutor v Predrag Banovic* Case No. IT-02-65-1

⁴⁵ *ibid*

⁴⁶ *Prosecutor v Jean Kambanda*, Case No. ICTR 99-54-A-T

⁴⁷ *ibid*, Trial Judgement, 22 January 2004, para. 59

Another example is the case of *Prosecutor v Omar Serushago*,⁴⁸ who did not only volunteer to the authorities; he also cooperated with the Prosecutor. He was sentenced to 15 years in prison, despite his surrender and corporation and his not being a leader, but a middle level perpetrator. Yet another example is the case of *Prosecutor v Georges Ruggiu*. Mr Ruggiu who cooperated with the Prosecutor as well and entered a guilty plea earlier in his trial, and also testified against others; notwithstanding that fact, he received a 20-year prison sentence.

Suffice it to say, it is even possible that Massaquoi, Johnson, and Nallo were rewarded by the Court when they were provided with incentives to serve as witnesses and for subsequent relocation together with their families out of the country as part of the Witness and Victim Services (WVS) programme.⁴⁹ The basis for suggesting these lies or rests in the Court's policy on financial incentives for witnesses who testify⁵⁰ and as well as the Court's policy on relocation of witnesses to a third country after testifying for the prosecution.⁵¹

The question remains, why would the Court, instead of prosecuting those leaders for their individual participation in the alleged committed crimes, allow them to evade prosecution? When in the Court's own decision in *Prosecutor v Taylor*,⁵² it had stated that:

“By reaffirming in the Preamble to Resolution 1315 that persons who commit or authorize serious violations of international humanitarian law are individually responsible and accountable for those violations and that *the international community will exert every effort to bring those responsible to justice in accordance with international standards of justice, fairness and due process of law...*”⁵³

The above ruling of the Court was a reiteration of not only the global community's stance on ending impunity, but also the intent of the Court to carry out its mandate of prosecuting the perpetrators for the crimes allegedly

⁴⁸ *Prosecutor v Omar Serushago*, Case No ICTR 98-39-T, Decision Relating to Guilty Plea 14 December 1998, para 41

⁴⁹ *Prosecutor v Brima, Kamara and Kanu* Case No. SCSL 04-16-T, Trial Judgement 28 June 2007

⁵⁰ Para 127 of the Court's Practice Direction, “...The Practice Direction provides for a wide range of allowances to be paid to witnesses testifying before the Special Court. These include an attendance allowance as compensation for earnings and time lost as a result of testifying, accommodation, meals transport, medical treatment, childcare and other allowances.”

⁵¹ Paragraph 129 further reads, “Relocation to another country is a protection measure employed by WVS pursuant to its responsibility to provide protection for witnesses and victims who are at risk on account of the testimony given by them”⁵¹

⁵² *Prosecutor v Taylor*, Case No. SCSL-03-01-I, Decision on Immunity from Prosecution, 31 May 2004

⁵³ *Prosecutor v Taylor*, Case No. SCSL-03-01-I, Decision on Immunity from Prosecution, 31 May 2004, para 39

committed, which fell within its jurisdiction. However, the Prosecutors were disinclined to acting this out, and the Chambers would only adjudicate on cases that were presented at court. Had these leaders who were alleged to have committed crime been prosecuted, maybe the argument that the Court did not prosecute enough leaders for the crimes committed in the eleven year civil war may not have been so pronounced. By not prosecuting these leaders, victims were also denied justice, and justice for the victims remains the paramount objective for instituting such tribunals, as well as to provide deterrent for potential perpetrators, in as much as punishing the perpetrators.

Conclusion

The crimes committed during Sierra Leone's brutal eleven year civil war saw the establishment of the Special Court for Sierra Leone in 2002. The Court's mandate under UN Security Council Resolution 1315(2000) was aimed at prosecuting those individuals who bear the greatest responsibility of serious offences under international humanitarian and Sierra Leone laws, including the leaders who had threatened the peace process.

In the absence of evidence to assist international courts or tribunals during trials, the testimony of insider witnesses is crucial, as their testimony might provide significant information on the crimes and the persons who allegedly committed them. The earliest tribunals of the ICTY and ICTR had established that even if insider witnesses cooperated with the prosecution, they themselves should not escape punishment. In the case where the court use a leader as an insider witness, that would not exempt that leader from punishment. A case in point is that of Jean Kambanda at the ICTR, though he cooperated with the prosecution, he nevertheless received the maximum punishment of a life sentence for the crimes he committed.

At the Special Court for Sierra Leone, the Prosecutor's strategy involved engaging leaders as insider witnesses, without prosecuting them. In the process, these leaders evaded punishment for the alleged crimes they themselves committed or authorised. The departure from international good practice established by earlier tribunals could be interpreted as a missed opportunity for the Court to accomplish its mandate of holding to account "those who bear the greatest responsibility," of the crimes committed during the Sierra Leone conflict, which offended international humanitarian and Sierra Leone laws, as provided for under UN Security Council Resolution 1315(2000).

Furthermore, by not punishing those leaders for the heinous crimes they allegedly committed, the concerted effort of the global community to hold to account individuals who commit serious crimes during conflict may have been thwarted. This therefore leads to the inevitable conclusion that the Court may have legitimised impunity, thereby failing to align to the position of the

global community including that of the UN as well as the government of Sierra Leone.

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American Whiteness as Perpetual Madness: *Don Quixote* Through the Lens of Ibram X. Kendi's *Stamped From The Beginning*

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Abstract

In *Stamped From The Beginning* (2016), Ibram X. Kendi provides a typology of the ways in which segregationist racism, assimilationist racism, and anti-racism work in the U.S. through the lives of Cotton Mather, Thomas Jefferson, William Lloyd Garrison, W.E.B. Du Bois, and Angela Davis. Kendi's book thus offers several lived-in models for probing the reach of Whiteness, racism, and anti-racism in specific places and times rather than in the abstract. The academic abstraction of real-world problems is a danger that Vine Deloria, Jr. discussed as a part of his leadership within the American Indian Movement of the late 1960's and early 1970's. Deloria asked youth to avoid being "ego-fed by abstract theories and hence unwittingly manipulated" (1969:84). In the analysis to follow, I apply Kendi's typology of racist and anti-racist ideas to the novel *Don Quixote* as a practical work of anti-racism in the subject area of educational equity.

Keywords: Whiteness, educational equity, racism

Introduction: Walking to educational equity the long way home

In the spring of 2017, I carried Ibram X Kendi's 2016 National Book Award for Non-fiction winner, *Stamped From the Beginning: The Definitive History of Racist Ideas in America*, back to U.S. racism's home: Europe. Kendi's book is a justifiably heavy, blood-red tome, and as a fourth-generation Euro-American of German, Dutch, Norwegian, and Bohemian descent, I carried it heavily, too, promising myself that I would finish reading it on European soil during my month-long appointment as a visiting professor, teaching a classical social theory course (in English) to American study-abroad students in Alcala, Spain. Alcala is a cosmopolitan university city about fifteen miles outside of Madrid, and is a UNESCO World Heritage Site because it is the birthplace of Miguel de Cervantes Saavedra (1547-1616), author of *Don Quixote*. A magnificent statue of Cervantes with his feathered

quill in hand adorns Alcala's vital Plaza de Cervantes, where transnational storks protecting permanent nests big as bathtubs reminded me daily of Spain's proximity to Africa.

Kendi opens by locating the genesis of contemporary U.S. racism in fifteenth-century Europe, and explains that U.S. racism's absolute cradle is carved in the rock of late medieval Spain and Portugal. He orients us to America with the Puritan's New England slavery circa 1630. This is roughly the same time in which Cervantes saw the Part One of Don Quixote published in 1605. As I began my teaching stint in one of Europe's oldest universities, founded in 1290, I felt the weight—the pull—of Don Quixote and Stamped From The Beginning in my traveling teacher's bag. Would I use my trip to Europe as an escape or would I engage in an analysis of what American Whiteness has shaped in me and what I might do to make myself less manipulated by it?

Kendi's final book chapter follows the life of American activist and intellectual, Angela Davis, and tells about a time when she was an undergraduate at Brandeis doing a "Junior Year Study-Abroad" program in France. One morning in September 1963, Davis picked up a French newspaper and read about the 16th-Street Baptist Church bombing in the United States. To her White peers' disbelief and ultimate inability to relate, Davis knew the four young girls who had been murdered by racist terrorists back home in Birmingham, Alabama. The slain children were her friends and neighbors. Later on in this chapter, Kendi quotes James Baldwin from London, reacting to Malcom X's murder on February 21, 1965: "'It is because of you,' he shouted at London reporters, 'the men who created this white supremacy, that this man is dead!'" (Kendi 2016:389).

Kendi's typology of racist and anti-racist ideas

Kendi's three-part typology affords any person practice in identifying segregationist racism, assimilationist racism, and anti-racism. A reader might then become better able to apply to his or her ethnic, social, spiritual, and political life what American Indian Movement (AIM) leader Vine Deloria Jr. defined as essential work for Native youth in America: "the arduous task of thinking out the implications of the status of Indian people in the modern world" (1969:83). Deloria argues that this cannot be achieved if Native youth follow dominant narratives about Native Peoples and colonization (past or present) as told to them by contemporary academics such as anthropologists. Decolonization of the mind is a necessary action of mutual responsibility for all people working toward a just society either as the oppressor or the oppressed (Trask 1993, Waziyatawin 2008). But this is so often not the case and truth-telling is left to those most victimized by racism. Denial persists as

the ongoing work, shield, and weapon of racial supremacy (Churchill 1997, Mato Nunpa 2014).

No anti-racist supports denial. Kendi dedicates Stamped From The Beginning “To the lives they said didn’t matter.” On page one, he claims his work in the historical moment of “the shooting star of #Black Lives Matter during America’s stormiest nights” (2016:1). He invokes the names of Trayvon Martin, Rekia Boyd, Michael Brown, Freddie Gray, the Charleston 9, Sandra Bland, “heartbreaks that are a product of America’s history of racist ideas as much as this history book of racist ideas is a product of these heartbreaks” (*ibid.*). Then, very simply on page two, Kendi gives readers the typology:

In 2016, the United States is celebrating its 240th birthday. But even before Thomas Jefferson and the other founders declared independence, Americans were engaging in a polarizing debate over racial disparities, over why they exist and persist, and over why White Americans as a group were prospering more than Black Americans as a group. Historically, there have been three sides to this heated argument. A group we can call *segregationists* has blamed Black people themselves for the racial disparities. A group we can call *antiracists* has pointed to racial discrimination. A group we can call *assimilationists* has tried to argue for both, saying that Black people *and* racial discrimination were to blame for racial disparities (*ibid.*:2, emphasis in original).

Next, Kendi immediately applies the typology so that readers will grasp that this history book has feet planted equally in the past and present,

During the ongoing debate over police killings, these three sides to the argument have been on full display. *Segregationists* have been blaming the recklessly criminal behavior of the Black people who were killed by police officers. Michael Brown was a monstrous, threatening thief; therefore Darren Wilson had reason to fear and to kill him. *Antiracists* have been blaming the recklessly racist behavior of the police. The life of this dark-skinned eighteen-year-old did not matter to Darren Wilson. *Assimilationists* have tried to have it both ways. Both Wilson and Brown acted like irresponsible criminals (*ibid.*, emphasis in original).

The rest of Stamped From The Beginning is divided into five equal sections, using the typology to examine the presence of segregationist racism, assimilationist racism, and anti-racism in the life and times of Cotton Mather, Thomas Jefferson, William Lloyd Garrison, W.E.B. Du Bois, and Angela Davis.

One of the learning opportunities given to me by Kendi is the gift of seeing that each one of us, regardless of our racial identities, holds the power/ability to further segregationist racism, assimilationist racism, and anti-

racism. For example, Kendi argues that at key moments of their intellectual lives, monumental civil rights activists Douglass and Du Bois could be simultaneously their anti-racist best and their assimilationist worst (*ibid.*:199). Following the main tenants of critical race theory, American race equity educator, Glenn Singleton, argues that Whiteness is always in the room—in other words, that Whiteness structures every life and every institutional setting in America (2013). Each participant in his educational seminars is thus asked to specifically interrogate the ways in which Whiteness has invaded the “normalcy” of his or her thoughts, expectations, and interpretations. This questioning is foundational for the interruption of long-standing systems of racial power. Learning to practice Kendi’s typology means using focused attention to see the typology not only in my life (as a representation of a disembodied kind of historical socialization), but also in the actual physical places that my body inhabits.

Indeed, Kendi’s final pages attest to what I had been energized by in his opening pages—the importance of being an able thinker in one’s locality. He writes,

Antiracist protesters have commonly rejected those racist ideas of what’s wrong with Black people that are used to justify the plight of majority-Black spaces and the paucity of Black people in majority-White spaces. *The most effective protests have been fiercely local*; they are protests that have been started by antiracists focusing on their immediate surroundings: their blocks, neighborhoods, schools, colleges, jobs, and professions. These local protests have then become statewide protests, and statewide protests have then become national protests. (*ibid.*:510, emphasis added).

For any kind of locale-based activism to take hold, the past must always inform the present. For example, when Kendi introduces us to the young Thomas Jefferson in Chapter 7, he explains that Thomas was the son of a surveyor named Peter. In 1747, Peter “had been commissioned to certify that colonial America’s westernmost point [the boundary-line between Virginia and North Carolina in the Blue Ridge Mountains] had not become like Jamaica’s Blue Mountains, a haven for runaways” (*ibid.*:79). Describing the bondage-pastoralism of Jefferson’s upbringing on twelve-hundred acres in Virginia’s tobacco-growing Albemarle County, Kendi inserts the powerful but subtle statement, “In his home, no one around him saw anything wrong with the tyranny. Slavery was as customary as prisons are today” (*ibid.*:87).

Stamped From The Beginning consistently challenged me to stare-down the mire of my racist hypnosis—which is not the inability to see the world for what it is, but the supremacist refusal to do so (Baldwin 1979). Milwaukee, Wisconsin is only a three hours’ drive from my current residence,

and is a place my family used to visit when I was a child to see the predator-prey exhibits at the Milwaukee County Zoo and also to attend Brewers' American League Baseball games. What I didn't know then is that our suburban family getaways meshed exactly with the U.S. War on Drugs, an initiative that has contributed to making Milwaukee County, by percentage, the world's largest incarcerator of Black and Native American men. University of Wisconsin-Milwaukee researcher, Professor John Pawasarat, analyzed over twenty years of Wisconsin's prison and employment data and found that nearly 1 in 8 black men of working age in Milwaukee County had served some time in the state's correctional facilities. At 13 percent, the rate was about 3 percentage points above Oklahoma's—the state with the second highest rate of incarceration [in the U.S.] for black males. Gene Demby wrote about this same topic and noted that Wisconsin also has the highest rate of Native American men who are behind bars. 1 in 13 Indian men are incarcerated (Corley 2013: "Wisconsin Prisons Incarcerate Most Black Men In U.S.").

As of this writing, The New York Times reports that the administration of New York Governor Andrew Cuomo "is awarding more than \$7 million in grants to a variety of colleges around the state to offer courses to prisoners" (McKinley, August 6, 2017: "Cuomo To Give Colleges \$7 Million For Courses In Prisons"). The article goes on to explain that,

[i]nmates in New York are already eligible for classes in about half of the state's 54 prisons, but they are largely funded by private sources. Mr. Cuomo, a Democrat in his second term who is said to have presidential ambitions, has been eager to expand educational programs in prisons, saying that only about 1,000 inmates currently take college-level classes. Under Mr. Cuomo's plan, that number would more than triple, with seven colleges and universities offering classes in 17 state prisons... [t]hose colleges include an Ivy League institution—Cornell University—whose faculty members will teach at four upstate prisons, as well as New York University, whose instructors will travel to Wallkill Correctional Facility, a medium-security prison in the Hudson Valley. Mercy College will serve Sing Sing, the famed maximum-security institution in Ossining, while teachers from Medaille College will instruct at Albion Correctional Facility. Two State University of New York community colleges—Mohawk Valley Community College and Jefferson Community College—have also been selected to participate (*ibid.*).

By having their eyes open to the world around them, UW-Milwaukee researchers Pawasarat and Demby—and perhaps many of the faculty who will be involved in Cuomo's initiative—may be exceptions to the rule. Time will tell if the fruits of these efforts will truly transform the lives of the people

involved. In a scholarly article that sits close in tone to Kendi, Tulkin links the academic enterprise to the work of colonized minds by arguing that “[s]ocial scientists have been missionaries when they needed to be social change agents, and the result is that many programs have met with very minimal success” (1972:326).

When Angela Davis went to France in 1963, she learned about the murders of her friends and neighbors back home in America. In 1991, a boy with whom I attended Presbyterian Sunday school from grades one to five became one of the notorious cross-burners in my hometown of Dubuque, Iowa. I spent the freshman year of my undergraduate study at the University of Iowa that fall watching this young man and a few others interviewed in their fifteen-minutes of fame as America’s freckle-faced racists of the hour on the nationally syndicated Phil Donohue Show. Today, I teach college students in my hometown. On my way back from Spain to resume this work, I met some fellow, White “Dubuquers” at the return gate of the Chicago O’Hare airport. It didn’t take too much talking to ferret out our connections. I’d attended middle school with the man (but we didn’t know one another) and among our shared set of acquaintances was one of the perpetrators of the 1991 cross-burning. Like us, he would have been 44 years-old. “Did you know he just committed suicide?” the man asked me. I have a lot of reasons to practice Kendi’s typology and to be honest, none of them are academic.

Segregationist racism in Don Quixote

I had not read Don Quixote prior to traveling to Alcala, Spain—but I had been accused of the self-catharsis of fighting windmills. However, the visceral experience of reading Kendi’s history alongside Don Quixote in Spain was a powerful change agent for me. This is because it brutally underscored the deep entrenchment of Black dehumanization on the European soil that feeds the violence of American racism down to this day. Segregationist racism is any kind of idea that defines a targeted group as sub-human. We can see Europe’s anti-Black, patriarchal racism in the relationship between Don Quixote and Sancho Panza, and then in the subsequent brutality that the latter exercises over even imagined African peoples. When Don Quixote was not cussing his peasant-squire, Sancho Panza, he often called him his “son.” Sancho Panza endured these humiliations because Don Quixote promised to make Sancho Panza the governor of an island at the end of his successful adventures. In the following passage from the novel, we get an insight into Sancho’s lusty fears and longing,

As for Sancho, who trudged long on foot, he felt again the aching grief for the loss of Dapple [his mule], but he bore it cheerfully, reflecting that his master was on the way to marry a princess, and so become at least King of

Micomicon; though he was sorry to think that country was populated by negroes, and that when he became a ruler his vassals could be black. But then remembering a special remedy, he said to himself: ‘What care I if my subjects be blacks?’ What have I to do but ship them off to Spain, where I may sell them for ready money with which I may buy some title or office, on which I may live at ease all the days of my life? (1605, 2003:160).

I think about this excerpt as a map, as a story, basically, of my generational history as European migrant to America—and if Cervantes meant it as farce, as social satire, my socializations did not. We took land and lives that were not ours to take from the Native Peoples of North America and we bought and sold Black bodies, Black Lives, to “live at ease all the days of our life.” I think of Kendi teaching me that the original word for “slave” was from the Bohemian “slav,” and I learned that some of my pre-Minnesota, Bohemian ancestors would have then been the original slavers or enslaved people of Europe. I think of the rebuke I was socialized to carry when I fought with my three siblings growing up White in Dubuque, Iowa in the late 1970’s and early 1980’s—*No, I won’t get that for you—I’m not your slave*. In a recent American documentary film, *I’m Not Your Negro* (2017), Baldwin asks the White person to examine his or her heart for the reasons they need him to play an inferior role which he refuses.

Kendi also discusses the practice of Black Exhibits as examples of segregationist racism. He tells the stories of African American poet, Phillis Wheatley (1753-1784), and a woman named Sarah Baartman (1790-1815), who was sexually trafficked in European “freak shows” as the “Hottentot Venus.” Both of these African women grew up in bondage and were forced to parade their minds and bodies before Euro-White patriarchal panels of judgement in the most dehumanizing ways possible. After Baartman’s death in 1815, the famous European comparative anatomist, Georges Cuvier, removed, dissected, and preserved her genitals in what Kendi calls a “scientific rape” (2016:139). Cuvier concluded that Baartman’s people, “[t]he Khoi people of South Africa...were more closely related to the ape than to the human” (*ibid.*). Baartman’s skeleton, genitals, and brain were displayed in Paris until 1974. Nelson Mandela demanded the return of her remains when he took office in 1994. In 2002, France finally returned her remains to her homeland for burial (*ibid.*). Within Kendi’s writing is an urgency to locate stories such as these in our own places. Growing up in Dubuque, Iowa, my father told me many times of the Mesquakie leader, Peosta. The White elders of my city had seen fit to display his bones as if he were an animal in a local, White mansion-turned-museum clear through to the 1980’s. While reading Kendi in Spain, the *Don Quixote* trinkets and the life-sized statues in Alcalá began to look to me like Black bodies for sale on those Spanish streets, those

American ports, *these* American prisons, concentration camps (such as Fort Snelling, where Indigenous Dakota women, children, and men were force-marched, detained, raped, starved, and otherwise murdered during the winter of 1863 in Minneapolis, Minnesota), and in the false recruitment propaganda of many American colleges today. In case I wanted to forget any of this, Kendi's writing allowed my eyes to see Sancho's continued colloquy in a new light,

No! I might as well go to sleep like a blockhead if I have not the gumption to sell thirty thousand Negroes in the twinkle of an eye! By God! I'll make them fly, little and big: even if they're blacker nor coal I'll turn them into white and yellow boys with the true ring out of them. Come on, all of you: I'm licking my fingers already (*ibid.*, from "The quaint and delightful adventure that befell the curate and the barber in the same Sierra XVII).

As if speaking directly to Sancho Panza, and to all who follow in his Euro-American racist footsteps, Kendi quotes Malcolm X's 1964 statement to the United Nations,

Now you tell me how can the plight of everybody on this Earth reach the halls of the U.N...and you have twenty-two million African Americans whose churches are being bombed, whose little girls are being murdered, whose leaders are being shot down in broad daylight! And America still had the audacity or the nerve to stand up...with the blood dripping down his jaws like a bloody-jawed wolf (Malcolm X quoted in Kendi, pg. 384).

In the ongoing practice of Euro-American racism, there are those, too, who would turn families and societies and bodies and blood to coins and call themselves Christians, teachers, Saviors—and this is assimilationist racism.

Assimilationist racism in *Don Quixote*

In Alice Walker's fiction, the "mad dog is wise because it has lost its mind. Which is one of the most difficult things in the world to do" (1998:92). This is because within the wisdom of madness there is a lack of shame, "for what good would shame be to someone who might become at any moment that of which she is ashamed?" (*ibid.*:94). Don Quixote is perhaps the Western world's most celebrated mad man, and for most of the novel, he does lack shame, so convinced is he of his righteousness. It's the moments I think I'm most unlike Don Quixote that I run the danger of being most deluded (and racist). Through Kendi's analysis of William Lloyd Garrison, for example, I learned that abolitionism did not necessarily equate anti-racism—if it required Black people to change themselves in order to change White people's minds about African worth. Kendi reminds me that all of us can house the internalized colonialisms of *uplift suasion*, "the idea that White people could

be persuaded away from their racist ideas if they saw Black people improving their behavior, uplifting themselves from their low station in American society” (*ibid.*:124). At his “maddest” moments, Don Quixote reminds me of the White Savior deluded into the disastrous belief in that “hand up.” Oppressors can house “colorblind” racism—one that seeks to decrease the cognitive dissonance of racism by believing that racism is non-existent, dead, and/or that moving someone [of Color] to White middle-class status is noble and even God-blessed. This is the kind of assimilationist racism that I think many of Don Quixote’s adventures can expose for fruitful, humanist reflection. Assimilationist racism has caused utter human destruction, such the generational trauma resulting from forced Native American boarding schools (from roughly the 1870’s through the 1940’s in the U.S.; see, for example, Lesiak 2007).

Very early on in his first set of knightly adventures, which Cervantes describes as “our imaginative hero’s first sally from his home” (1605, 2003:6), Don Quixote becomes an official knight after beseeching an innkeeper as follows,

and so I say unto you that the boon I have demanded and which out of your liberality have granted unto me, is that, tomorrow morning, you will dub me knight. This night I shall watch over my arms in the chapel of your castle and tomorrow, as I have said, you will fulfil my earnest desires, so that I may sally forth through the four parts of the world in quest of adventures on behalf of the distressed, as is the duty of knighthood and knights-errant who, like myself, are devoted to such achievements (*ibid.*:13).

How like Whiteness this quote strikes me; mere humans granting themselves special status and privilege through the generations that abounds the world over. For if one who is steeped in Whiteness finds segregationist racism unpalatable, the assimilationist racism of the Peace Corps activist, the anthropologist, the abolitionist, the missionary, the social worker, the warden, the educator (etc.) await your service. I am in no way saying that people in these professions are unable to practice anti-racism; only that assimilationist racism is perhaps the easiest most profitable hand to play for institutional (and monetary) advancement.

How does one become a knight? As in the acquisition of Whiteness, it is not without violence. The innkeeper, as almost every person whom Don Quixote encounters, decides to have a little “sport,” as he knights him,

The landlord did not relish the mad pranks of his guest, so he determined to make an end of them and give him the accursed order of chivalry before any further misfortune occurred...he went over to Don Quixote and ordered him to kneel: he then read in his manual [really an account of straw and

barley supplied to his muleteers] as if he had been repeating some pious oration. In the midst of the prayer he raised his hand and gave him a good blow on the neck, and after that gave a royal thwack over the shoulders, all the time mumbling between his teeth as if he was praying (*ibid.*:16-17).

Surely there was no one moment in which I acquired Whiteness. However, the self-loathing that is required for the White person to try and maintain social and financial status by any means necessary demands a certain sense of worthlessness. To propagate the status of White, each generation must parent as they themselves have been parented—accepting heavy doses of humiliation and abuse, even by close loved ones, in the [hetero]gendered enterprise of acquiring (White) spouses and material possessions to mark one as a “good” person and in many cases, a Christian. The famous psychiatrist and intellectual, Franz Fanon, argues that colonizers project their own sickness with the self upon the colonized “other,” who then may, in turn, predate upon his or her own psyche through the “White mask” of internalized racism (1952).

In the following scene, we find Don Quixote applying his newly acquired knighthood to a person whom he perceives as a lowly “other” in need of “help.” Actions such as the one to follow are required as daily rituals of acquiescence, subjugation, and affirmation in a racist system that consistently “knights” White status and dehumanizes Bodies and Persons of Color as *lack*. If we have no helpless body, no Carlisle Indian boarding school student, no gangbanger, no damsel, and no underprepared “urban” student at our Primarily White Institution (PWI), we have no knight. For a knight exists only if a person whose life is perceived of by the racist as abject *lack* is in need of a clean-up. Immediately after leaving the inn, Don Quixote

had not traveled far when he thought he heard faint cries of someone in distress from a thicket on his right hand. No sooner had he heard them than he said: ‘I render thanks to heaven for such a favor. Already I have an opportunity of performing the duty of my profession and of reaping the harvest of my good ambition. Those cries must surely come from some distressed man or woman who needs my protection.’ Then turning his reins, he guided Rozinante [his horse] towards the place where the thought the cries came. A short distance within the wood he saw a mare tied to a holm-oak and to another a youth of about fifteen years of age naked from the waist upwards. It was he who was crying out, and not without reason, for a lusty countryman was flogging him with a leather strap, and every blow he accompanied with a word of warning and advice, saying: ‘Keep your mouth shut and your eyes skinned.’ The boy answered: ‘I’ll never do it again, master. By God’s passion I promise in future to be more careful with your flock’ (*ibid.*:19).

Here we have the necessary triad for assimilationist racism: the socially privileged insider who has acquired economic stability through generational wealth or current job (Don Quixote); the upper-class or upwardly

mobile land-owner/power-holder (the countryman), and the exploited life and body of the out-casted human scapegoat (the fifteen year-old boy). Don Quixote shouts at the countryman, “Discourteous knight, it is a caitiff’s deed to attack one who cannot defend himself. Get up on your horse and take your lance...I will show you that you have been acting a coward’s part,” (*ibid.*). Don Quixote then demands “justice” for the boy, “by the sun that shines on us I will pierce you through and through with this lance of mine. Pay him instantly and none of your denials. If not, by almighty God who rules us all I will annihilate you this very moment,” (*ibid.*). The countryman unties the boy and promises Don Quixote that he will pay the youth his due. Thus, having received a *feeling* of justice rather than its actuality for the boy, Don Quixote exits the scene, off to his next self-fulfilling, identity-affirming adventure as a Knight on the side of the people.

It appears, too, that the assimilationist racist is the only one of the triad “fooled” into thinking that he or she has done some good. Everyone else knows how the system works and, indeed, Andrew knows the price he will come to pay for Don Quixote’s braggadocio as do-gooder. Before Don Quixote exits the scene, Andrew beseeches of him, “the moment he gets me alone, he’ll flay me like a Saint Bartholomew,” (*ibid.*:20). To this, Don Quixote replies, “He will not do so...I have only to command and he will respect me and do my behest” (*ibid.*). In reality, the recipients of “White help” are usually much worse for the wear after that “help” is applied. Whether assimilationist racism is done with a tone of righteousness or guilt, neither is of any help to the person being systemically, inhumanly oppressed. It is a weak and cowardly way of fighting that is not fighting at all, but rather another one of the oppressor’s drugs of escape from the crime that leaves the suffering person to encounter increased waves of psychological, economic, and bodily violence. We see this, too, in Don Quixote. As soon as Don Quixote is out of earshot, the countryman says to the boy, whom we now know as Andrew,

‘Come here, my boy; I want to pay you what I owe you in accordance with the commands of that undoer of wrongs.’

‘So you shall, I swear,’ said Andrew, ‘and you will be well advised to obey the orders of that good knight—may he live a thousand years; he surely is a courageous and good judge. By Saint Roch, if you don’t pay me, he’ll be back and he’ll do what he threatened.’

‘Faith and I’ll swear too,’ answered the countryman, ‘and to show you my goodwill I’ll increase the debt in order to increase the pay.’ Catching the boy by the arm, he tied him again to the oak and gave him such a drubbing he left him for dead (*ibid.*:21).

What the assimilationist racist fails (aka refuses) to perceive is that by using the object of his or her activism for basic psychic and material self-interest, he is doing violence upon that body and life akin to that of the segregationist. Both the segregationist and assimilationist ultimately view the Body of Color as not only worthless but replaceable by another expendable, toiling body in a capitalist system. The segregationist uses the body for economic gain and psychological dominance. The assimilationist uses the body for psychic absolution and economic gain. Only the segregationist will admit this; however, the consequence is the same (see Kovel 1970, on the aggression of what he calls aversive racism). The perpetrators of assimilationist racism receive an illusion of good deeds. In this way they follow in the footsteps of Don Quixote, who takes on the special moniker *Knight of the Rueful Figure* to attest to all the “suffering” he endures for the so-called betterment of his fellow man.

Kendi defines anti-racism as basically three things:

- 1) Equity for all peoples now.
- 2) Humanity for all peoples now (i.e. all people, of all racial-ethnic groups possess the full range of human potential, good and bad).
- 3) Self-determination for all peoples now (this means voice—speaking for oneself and one’s group), and not in some distant future when White people have finally come to accept that there is nothing inferior about Black people as a people.

It seems that this shift may never occur in America collectively, because Black as lack was already so entrenched in the European mind prior to colonization. A commentator to *The Progressive’s* republishing of James Baldwin’s December 1962 “A Letter to My Nephew” stated, “[m]ost of the [B]lack progress of the last fifty years is not ‘black progress’ at all but [W]hite people’s progress at accepting black humanity” (JackAttack www.progressive.org/news 2014/12). Redefining the face of criminality in America from the stranglehold of my White socialization, James Baldwin wrote to his nephew in 1962,

I know what the world has done to my brother and how narrowly he has survived it and I know, which is much worse, and this is the crime of which I accuse my country and my countrymen and for which neither I nor time nor history will ever forgive them, that they have destroyed and are destroying hundreds of thousands of lives and do not know it and do not want to know it... but it is not permissible that the authors of devastation should also be innocent. It is the innocence which constitutes the crime (from “A Letter to My Nephew,” *The Progressive*, December 1962).

Baldwin tells his nephew about the price he is destined to pay for the innocence of Whites, which has been my (violently claimed) innocence. This is something, too, that Cervantes seemed to spotlight in Don Quixote's very first adventure as a knight, when he left a young man for dead and did not even know it. Don Quixote's adventures and his delusions were too precious to him to admit the cost paid by a mere youth for his imaginary dalliance. James Baldwin writes, "[p]lease try to remember that what they believe, as well as what they do and cause you to endure, does not testify to your inferiority, but to their inhumanity and fear" (*ibid.*).

What does White America fear? One thing that comes to mind is the truth, because as James Baldwin said, White reengagement with humanity requires the end of White innocence. This would necessitate truth, and a first truth with which to begin is one's name. Such knowledge represents a taking-account of—and responsibility for—who one is in this centuries-long and continuing history of murder so that it can be ceased. This too, Cervantes seemed to know. Don Quixote's death is also his deliverance because eventually Don Quixote shows that he is capable of what American Whiteness has proven itself yet incapable of in its perpetual madness. At the end of the novel's Part Two, Don Quixote decides to claim his own name.

Fool[ed] as noun not verb: Anti-racism in Don Quixote

Who are the anti-racists, according to Kendi? He never hid his answer; he explains it right in the Prologue of Stamped From The Beginning. It is a truth so beautiful and complex and simple and impossible that it cannot be hidden. It belongs to everyone, but we must choose to seek it:

Racist ideas are ideas. Anyone can produce them or consume them, as *Stamped from the Beginning's* interracial cast of producers and consumers

show. Anyone—Whites, Latina/os, Blacks, Asians, Native Americans—anyone can express the idea that Black people are inferior, that something is wrong with Black people. Anyone can believe both racist and antiracist ideas...[f]ooled by racist ideas, I did not fully realize that the only thing

wrong

with Black people is that we think something is wrong with Black people. I did not fully realize that the only extraordinary thing about White people is that they think something is extraordinary about White people.

I am not saying that all individuals who happen to identify as Black (or White or Latina/o or Asian or Native American) are equal in all ways. I am saying that there is nothing wrong with Black people *as a group*, or with any other racial group. That is what it truly means to think as an antiracist: to think

there is nothing wrong with Black people, to think that racial groups are equal (2016:11).

If there are parallels between the character of Don Quixote and the ways in which Kendi teaches us that the systemic and enduring racism of Whiteness works, then my reactions to Don Quixote's ending bear some witness. As much as I strive to be unlike Don Quixote in response to racism, murder, cultural and physical genocide, I must admit that everything that is described as perpetrated on the Jews in Exodus has also been perpetrated on Native Peoples and African peoples in America, and as a Euro-White, I have benefitted from that. It is mind-boggling then, that as a Euro-White, I also felt extremely sad when Don Quixote faced his deathbed and renounced all of his knight errantry. Most wrenchingly to my reading, in the last pages of the novel, Don Quixote renounces his very name—the name he had worked so hard for in Part One when he appointed himself *Don Quixote, Knight of the Rueful Figure*. This was because of all the physical pains he acquired including a broken jaw and some molars. In Part Two, Don Quixote took on his name *Knight of the Lions* after a caged and released lion that had been captured for a traveling circus refused to do battle with him. Yet here is what it sounded like when Don Quixote “changed,”

‘[m]y dear friends, welcome the happy news! I am no longer Don Quixote of La Mancha, but Alonso Quixano, the man whom the world formerly called the Good owing to his virtuous life. I am now the sworn enemy of Amadis of Gaul, and his innumerable brood; I now abhor all profane stories of knight-errantry, for I know only too well through Heaven’s mercy and through my own personal experience the great danger of reading them.’... ‘Those foolish tales,’ replied Don Quixote, ‘which up to now have been my bane may with Heaven’s help turn to my advantage at my death. Dear friends, I feel that I am rapidly sinking; therefore let us put aside all jesting. I want a priest to receive my confession, and a notary to draw up my will. Therefore pray send for the notary while the priest hears my confession (Cervantes 1605, 2003:523-24).

I can see the similarities in Don Quixote’s/Alonso Quixano’s fictional life history and my very real historical Whiteness. In our first generations from Europe, some of my ancestors lost legs or life working for (not building) the railroads and alcoholism and depression stalk my family right along with our loyalty and self-sacrificing love. What I am saying is that our ascension to Whiteness has cost us for what it has cost our fellow humans. Yet, like the deluded Don Quixote, we deny. We abstract. We pull the wool of a wizard over our eyes and say that we fought for these names—for these Anglicized versions of our names. After the innocent blood was spilled, we attained our

White, middle-class status. By the end of World War II and our usage of GI Bill benefits to [White] veterans, we achieved our paycheck to paycheck foothold, but perhaps most importantly to our survival, we became fully White. Like Don Quixote, we came to that part in the tale in which the caged lion would no longer fight with us, for if it did, we held the earthly, systemic power, the guns. We left behind the name *Knight of the Rueful Figure*, and like Don Quixote, became the smug but insecure *Knight of the Lions* instead. As Kendi argues,

Massachusetts authorities forbade interracial relationships, began taxing imported captives, and over Samuel Sewall's objections, rated Indians and Negroes with horses and hogs during a revision of the tax code. Virginia lawmakers made slave patrols compulsory for non-slaveholding Whites; these groups of White citizens were charged with policing slaves, enforcing discipline, and guarding routes of escape (Kendi 2016:68).

We were used—and because we chose not to admit that and to materially benefit from that, we “for mere meat barter[ed] [our] birthright in a mighty nation” (Du Bois 1904, 1973:45). We failed, and continue to fail, to grasp what Kendi and other anti-racists know: “If racism is eliminated, many White people in the top economic and political brackets fear that it would eliminate one of the most effective tools they have at their disposal to conquer and control and exploit not only non-Whites, but also both low-income and middle-income White people (2016:508).

Reclaiming my history and my names as an economically poor German, Bohemian, Norwegian-American woman has allowed me to see that the love that comes from American Whiteness is, in many ways, a love forged through coercion. There is a twisted, conditional component to White love that will love me only *if*. For example, *if*, as White woman, I am quiet enough, skinny enough, sexually desirable enough, pliant enough to gain a White man's protection. Is White love merely and supremely *control*? Perhaps. Because I cannot adequately put into words exactly what made Don Quixote stop being the tough buckle of his imagined knight errantry, but Kendi can. Kendi writes,

[h]istory is clear. Sacrifice, uplift, persuasion, and education have not eradicated, are not eradicating, and will not eradicate racist ideas, let alone racist policies. Power will never self-sacrifice away from its self-interest. Power cannot be persuaded away from its self-interest. Power cannot be educated away from its self-interest” (*ibid.*:508).

As for me, trying to awake from the disastrous fiction, it's once again James Baldwin who lays bare the crisis of American Whiteness, this time through his analysis of Black English in America:

A language comes into existence by means of brutal necessity, and the rules of the language are dictated by what the language must convey. There was a moment, in time, and in this place, when my brother, or my mother, or my father, or my sister, had to convey to me, for example, the danger in which I was standing from the white man standing just behind me, and to convey this with a speed and in a language, that the white man could not possibly understand, and that, indeed, he cannot understand, until today. He cannot afford to understand it. This understanding would reveal to him too much about himself and smash that mirror before which he has been frozen for so long (1979, 1990:86-87, emphasis in original).

If an American White person survives the looking glass, though, what does that mean for the end of American racism? Surely, it does not mean that we, Whites, are good fighters yet. It means that we are delayed elders, delayed adults. It means we have so much work to do. It means to me that I must continue learning how to fight ably *with*, not *for* (and if for anyone, it must be for myself), because as Kendi argues, “altruism is wanted, not required” (2016:504) for the work of anti-racism. Furthermore,

[a]ntiracists should stop connecting selfishness to racism, and unselfishness to antiracism...Antiracists do not have to be selfless. Antiracists merely have to have intelligent self-interest, and to stop consuming the racist ideas that have engendered so much unintelligent self-interest over the years (*ibid.*).

From both Kendi and Cervantes I was reminded that birth, like death, requires pain to get us out to something new, something needed and longed for. This is something too, that my body taught me—that the land that is the body taught me—when I became a mother, twice. Believe me; that child was not going to be born with me folding up and pretending that I couldn't, though it was my daughter's own power that allowed her to be born whether I knew it or not that I belong to a Creator as an able person, through all my beauty and destruction.

Conclusion: Educational equity in the here and now

Midway through the final chapter of his book, Kendi brings us to the point in which Angela Davis reacted to Martin Luther King's murder, and in

true heroic fashion, he still keeps teaching a reader about the typology as he does so:

King's death transformed countless doubly conscious activists into singly conscious antiracists, and Black Power suddenly grew into the largest antiracist mass mobilization since the post Civil-War period, when demands for land had been the main issue. The Godfather of Soul noticed Black America's brand new bag. With segregationists saying they should not be proud, with assimilationists saying they were not Black, James Brown began in August 1968 to lead the chant of millions: 'Say it Loud—I'm Black and I'm Proud,' a smash hit that topped the R & B singles chart for six weeks. All these Black Power chants caused some African Americans to trash their racist color hierarchies within Blackness (the lighter, the better)... Antiracist Black Power compelled the controversial search for new standards, for Black perspectives, for Black people looking at themselves through their own eyes (*ibid.*:406).

The joy is not in the scholarly symmetry of Don Quixote and Stamped From The Beginning, but in hearing with fresh ears the voices of people defining themselves, through their own eyes, and thus battling racism head-on.

Tribal College Institutions (TCI's) and Historically Black Colleges and Universities (HBCU's) have practiced this kind of anti-racism for years and are vanguards of equitable education models to this moment. Diverse magazine reports that "[a] program at Miami University in Ohio offering language and cultural revitalization for members of the Miami Tribe of Oklahoma has led to graduation rates more than double the national average for Native American college students" (Elfman 2016:12). Student-led educational equity movements seem to get it right, too, and American society has seen a swell of them in recent years, including Being Black at Michigan (#BBUM) and the "I, too, am Harvard" project. "I, too, am Harvard" project founder, Kimiko Matsuda-Lawrence, said that she started the self-defining movement after encountering the #BBUM campaign: "[t]o hear our stories echoed in each other's voices, you feel your feelings are valid and legitimate" (Leonard 2014:22). The Crisis Magazine reports that,

[t]hese students turned to social media to document and disrupt existing narratives about post-raciality or diversity, to demand accountability. Beyond conversations, the students successfully leveraged the social media campaign and organizing on campus into action. While issues surrounding enrollment, housing, and curriculum remain, university officials ultimately agreed to increase funding for the BSU, to expand its recruitment of students of color, to create a scholarship for undocumented students, and to fund renovation of the campus multi-cultural center (*ibid.*:21).

Campaigns similar to Harvard's are currently underway at “Ohio State University and Lehigh University, at UC Berkeley, Northwestern, SUNY New Paltz, University of Cape Town, University of Oxford, University of Sydney, McGill University and more than thirty other universities” (*ibid.*:22).

Historically-aware, identity-centered resistances seem to happen in places where people decide to enact change right where they are. The people’s very fight reclaims the sanctity of lives and land alike in these spaces. The Standing Rock Water Protectors and all of their allies who fought against the Dakota Access Pipeline (DAPL) in 2016 have breathed this knowledge anew for the world on American soil. For those people affecting change ably in a place: Kendi’s typology can reinforce that work. For those Whites tired of fighting windmills, newly awake to fighting windmills, and wanting to say their names at the end of a wicked spell, cast by such an able enchanter as the Capitalist White: Kendi’s typology can help any one of us navigate more ably toward anti-racism. Wherever we find ourselves and whenever we claim ourselves.

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Can Interfaith Research Resolve the Global Conflicts Based on Faith?⁵⁴

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Abstract:

Interfaith issues are quite central in the contemporary life as they had often been in ancient times. In the light of political striving, violence, and deep global concerns for the world order and peace, a great many people have been increasingly inspired to know about religions of the world, their similarities and differences, the roles they may play in conflict and conflict resolution, and the ways most desirable to get their members to know one another in justice and peace, regardless of the size of followers a religion enjoys or the tenets of faith they enjoy. Judaism, Christianity, and Islam maintain ancestral ties with a unique origin, namely the Abrahamic scriptural and spiritual heritages the Talmud, the Bible, and the Qur'an literally contained. These holy books contain a great wealth of knowledge about God and His messengers who enlightened mankind with the wisdom of religion to pursue the good life with perseverance and moral values. The discourse of interfaith ideals and practices has been in great demand globally, despite a few endeavors to enhance authentic knowledge about religion, in general, and the monotheistic religions, in particular. The need of the world is largely felt to appreciate the true meanings of religious life for individuals and social groups in order to advance the cause of peaceful co-existence between peoples of the world, especially in areas suffering deep ideological hostilities or prolonged violence through the negative influences of religious intolerance.

Keywords: Interfaith, monotheistic religions, Islam, ideological conflicts, global resolutions

Introduction

Interfaith issues have always acquired great interest from the people of faith who wanted to know possible commonalities between different systems

⁵⁴ This paper was prepared introductory part of a long-term research on Judaism, Christianity, and Islam interfaith knowledge to enhance the peaceful co-existence between peoples of faith in the contemporary life and global peace.

of faith, besides the politicians who sought to assess the strength of religious beliefs among the public at large and the scholars who searched, in earnest, for new facts about religion as a concrete life experience. These socio-academic and professional interests in interfaith issues were quite central in the contemporary life, as they had often been in ancient times. The escalation of political striving, violence, and deep concerns for the world's healthy environment and peaceful stability inspired concerned parties in the local and global levels to acknowledge the roles religion might play in conflict and conflict resolution, and the ways most desirable to utilize scientific research to advance the cause of justice and peace, regardless of the size of followers a religion enjoyed or the tenets of faith enjoined.

We were motivated by the ongoing scholarly needs to conduct a long-term project to explore, ascertain, and publish authentic comparative works on Judaism, Christianity, and Islam to: 1) make available comprehensive comparative studies on the three religions; 2) authenticate the similarities and differences between them; and 3) provide sufficient facts about their origins, jurisprudences, and interpretations to enhance authentic knowledge about religion, in general, and these religions, in particular. The research would enhance authentic knowledge about religion, in general, and the Abrahamic religions, in particular. It would unfold in detail the meanings of life for audiences of the Abrahamic religions with a view to increase the peaceful co-existence between them and the other groups and communities of faith. It was understandable that scholarly research on the interfaith issues of the three Abrahamic religions would meet challenges of 1) the scarcity of comprehensive comparative studies in the epistemologies of these religions; 2) the lacking of authentic knowledge over their similarities and differences; and 3) the missing of sufficient facts on the origins, jurisprudences, and interpretations of their sources and heritages.

Emphasizing the leading role of academic research in conflict resolution, the project was proposed with due respect to the fact that the research on Judaism, Christianity and Islam would require active access to a broad corpus of knowledge in high institutes of religious education, as well as spiritual and scriptural temples. The research proposed to explore the comparative origins of the Abrahamic religions, Hebrew, Christian, and Muslim sources of which the Hebrew College, Vatican, Ethiopian and Coptic churches, and al-Azhar – among others - represented gate-keepers to collect authentic data on the religious heritages. Our proposed research would utilize complex methods of anthropological and sociological field studies, professional interviews with religious and spiritual leaderships, and archival work on the rich sources of the three religions. Assistant researchers with necessary skills on the areas of research would be assigned in the prospective

stages of the plan. *At this juncture, the paper relied heavily on Muslim accessible sources to this writer than the Jewish and Christian sources.*

Religion and the Abrahamic Religions

“All religions fulfill numerous social and psychological needs...Indeed, we know of no group of people anywhere on the face of the earth who, at any time over the past 100,000 years, have been without religion... A traditional religion reinforces group norms, provides moral sanctions for individual conduct, and furnishes the substratum of common purpose and values upon which the equilibrium of the community depends.”⁵⁵ Judaism, Christianity, and Islam constituted the major world religions that maintained ancestral ties with a unique origin, namely the Abrahamic scriptural and spiritual heritages the Torah, the Gospel, and the Qur’an literally contained. These holy books contained a great wealth of knowledge about God and His messengers who enlightened mankind with the wisdom of religion to spread about His Commandments for humanity to pursue the good life with perseverance and moral values.

“Torah, in Judaism, in the broadest sense the substance of divine revelation to Israel, the Jewish people: God’s revealed teaching or guidance for humankind. The meaning of “Torah” is often restricted to signify the first five books of the Old Testament, also called the Law (or the Pentateuch, in Christianity). These are the books traditionally ascribed to Moses, the recipient of the original revelation from God on Mount Sinai. Jewish, Roman Catholic, Eastern Orthodox, and Protestant canons all agree on their order: Genesis, Exodus, Leviticus, Numbers, and Deuteronomy.”⁵⁶ “In 1 Corinthians 15:1-8, the apostle Paul summarizes the most basic ingredients of the gospel message, namely, the death, burial, resurrection, and appearances of the resurrected Christ.”⁵⁷ “The Qur’an comprehends the complete code for the Muslims to live a good, chaste, abundant and rewarding life in obedience to the commandments of Allah, in this life and to gain salvation in the next. It is the "chart of life" for every Muslim, and it is the "constitution" of the Kingdom of Heaven on Earth.”⁵⁸

The subsequent sections highlighted commonalities in the moral unity of the messengers of God in Judaism, Christianity, and Islam. These sources addressed, from the most part, similar issues and offered similar solutions to the messengers of God: “*15. Has the story of Moses reached thee? 16. Behold,*

⁵⁵ Haviland, William A, 2000. *Anthropology*. Fort Worth: Harcourt College Publications (Ninth ed.), p.692.

⁵⁶ “Torah”: <https://www.britannica.com/topic/Torah>

⁵⁷ “What is the Gospel?”: Bible.org

⁵⁸ Ali, Anwer, “*Preface to the Holy Qur’an*”: <https://www.al-islam.org/articles/what-is-the-quran-anwer-ali>

thy Lord did call to him in the sacred valley of Tuwa: 17. Go thou to Pharaoh for he has indeed transgressed all bounds” (*Al-Nazi’at*).⁵⁹ “14. O ye who believe! Be ye helpers of Allah. As said Jesus the son of Mary to the Disciples, "Who will be my helpers to (the work of) Allah." Said the disciples, "We are Allah.s helpers!" then a portion of the Children of Israel believed, and a portion disbelieved: But We gave power to those who believed, against their enemies, and they became the ones that prevailed” (*Al-Saf*). “2. It is He Who has sent amongst the Unlettered an apostle from among themselves, to rehearse to them His Signs, to sanctify them, and to instruct them in Scripture and Wisdom,- although they had been, before, in manifest error 3. As well as (to confer all these benefits upon) others of them, who have not already joined them: And He is exalted in Might, Wise” (*Al-Jum’a*). “15. We have sent to you, (O men!) an apostle, to be a witness concerning you, even as We sent an apostle to Pharaoh” (*Al-Muzzamil*).

The Qur’an addressed the entirety of mankind in these verses as one soul: “2. Verily We created Man from a drop of mingled sperm, in order to try him: So We gave him (the gifts), of Hearing and Sight. 3. We showed him the Way: whether he be grateful or ungrateful (rests on his will)” (*Al-Dahr*). The Qur’an revealed clear dictates for Muslims to interact in the best manners with the People of the Book, the Christians and Jews: “125. And argue with them in ways that are best and most gracious” (*Al-Nahl*). It sufficed to mention the verse: “46. And dispute ye not with the People of the Book, except with means better (Than mere disputation), unless it be with those of them who inflict wrong and (injury)” (*Al- ‘Ankabout*). “125. And argue with them in ways that are best and most gracious” (*Al-Nahl*).

Moses, Yeshua, and Muhammad:

Moses, Yeshua ‘Isā ibn Maryam, and Muhammad were God’s messengers for missions of monotheism, humanity and mercy. The Holy Qur’an required all Muslims to believe equally in the Books and Messengers of God: “285. The Messenger believeth in what hath been revealed to him from his Lord, as do the men of faith. Each one (of them) believeth in Allah, His angels, His books, and His apostles. ‘We make no distinction (they say) between one and another of His apostles.’ And they say: ‘We hear, and we obey: (We seek) Thy forgiveness, our Lord, and to Thee is the end of all journeys”” (*Al-Baqara*). The Prophet of Islam said that he and Yeshua Jesus Christ “are brothers.” This Hadith was rather ignored by commentators on the Judo-Christian-Muslim commonalities which were deeply rooted in the same

⁵⁹ See the translation of these verses and the other verses mentioned from the Qur’an in this paper in:

Ali, Abdullahi Yusuf, 1946. *The Holy Qura’n Translation and Commentary*, <https://archive.org/details/HolyQurAnYusufAliTranslation1946Edition>

spiritual and ancestral sources - Abraham, the father of both Isaac and Samael of whom 'Īsā and Muhammad were grand descendants, as well as a great many Prophets and messengers of God.

Muhammad's coming to the world as a Prophet of God was foretold by Jesus "6. And remember, Jesus, the son of Mary, said: 'O Children of Israel! I am the apostle of Allah (sent) to you, confirming the Law (which came) before me, and giving Glad Tidings of an Messenger to come after me, whose name shall be Ahmad.' But when he came to them with Clear Signs, they said, 'this is evident sorcery!'" (*Al-Saf*). This was earlier foretold by Moses: "10. Say: See ye? If (this teaching) be from Allah, and ye reject it, and a witness from among the Children of Israel testifies to its similarity (with earlier scripture), and has believed while ye are arrogant, (how unjust ye are!) truly, Allah guides not a people unjust" (*Al-Ahqaf*).⁶⁰

Muhammad's first meeting with a knowledgeable monotheist occurred when his wife Khadija told him about her Christian relative, Waraqa Ibn Nufal who would ascertain to Muhammad that the meeting he had with *al-Namous*, Archangel Gabriel, at the Cave of Hara in Mecca occurred as well to Moses and 'Īsā. Nufal then told Muhammad he was undoubtedly the Prophet whom 'Īsā predicted would be the upcoming messenger of God.⁶¹ Muhammad had been closely interacting with the Madina Jewish communities as the Hebrew jurists investigated his Prophetic mission, its signs, and authenticity. In all these sophisticated talks, it became clear to the most knowledgeable Hebrew, 'Abduhlahi ibn Salam, that Muhammad was the promised messenger of God.

What was more; the godly origins the three Prophets disseminated to their peoples carried the same commandments; as stated in the Qur'an: "44. It was We who revealed the law (to Moses): therein was guidance and light. By its standard have been judged the Jews, by the prophets who bowed (as in Islam) to Allah's will, by the rabbis and the doctors of law: for to them was entrusted the protection of Allah's book, and they were witnesses thereto: therefore fear not men, but fear me, and sell not my signs for a miserable price. If any do fail to judge by (the light of) what Allah hath revealed, they are (no better than) Unbelievers. 45. We ordained therein for them: "Life for life, eye for eye, nose or nose, ear for ear, tooth for tooth, and wounds equal for equal." But if any one remits the retaliation by way of charity, it is an act of atonement

⁶⁰ Yusuf Ali note 4783 read: "Among Israel there are men who understand the previous scriptures, and who find the Qur'an and its Preacher a true confirmation of the previous scriptures. They accept Islam as a fulfillment of the revelation of Moses himself! (See Deut. 18:18-19)" <http://www.quran-explained.com/p/Sura-46.html>

⁶¹ Earlier, a Christian monk named Bahira recognized signs predicting Muhammad's Prophecy by biblical sources when he was 12 years old with Abu-Talib, his father's brother, in South Syria. See, Mohamed Nasir al-Albani, 2011: <http://www.aahlalheeth.com/vb/showthread.php?t=236065>.

for himself. And if any fail to judge by (the light of) what Allah hath revealed, they are (No better than) wrong-doers.”

“46. And in their footsteps We sent Jesus the son of Mary, confirming the Law that had come before him: We sent him the Gospel: therein was guidance and light, and confirmation of the Law that had come before him: a guidance and an admonition to those who fear Allah.47. Let the people of the Gospel judge by what Allah hath revealed therein. If any do fail to judge by (the light of) what Allah hath revealed, they are (no better than) those who rebel. 48. To thee We sent the Scripture in truth, confirming the scripture that came before it, and guarding it in safety: so judge between them by what Allah hath revealed, and follow not their vain desires, diverging from the Truth that hath come to thee. To each among you have we prescribed a law and an open way. If Allah had so willed, He would have made you a single people, but (His plan is) to test you in what He hath given you: so strive as in a race in all virtues. The goal of you all is to Allah. It is He that will show you the truth of the matters in which ye dispute” (*Al-Maida*).

The Justice and Mercy of Monotheistic Religions

“The Torah taught: “And Elokim (G-d of Justice) spoke unto Moshe saying: I am YHVH (G-d of Mercy)” (6:2). “Hear O Israel! YHVH (the G-d of Mercy), our Elokim (the G-d of Justice), G-d is One” (Devarim 6:4).⁶² “As Moses begins his great closing addresses to the next generation, he turns to a subject that dominates the last of the Mosaic books, namely justice: “*I instructed your judges at that time as follows: “Listen to your fellow men, and decide justly [tzedek] between each man and his brother or a stranger. You shall not be partial in judgment. Listen to great and small alike. Fear no one, for judgment belongs to God. Any matter that is too difficult for you, bring to me and I will hear it.”* Tzedek, “justice”, is a key word in the book of Devarim – most famously in the verse: “*Justice, justice you shall pursue, so that you may thrive and occupy the land that the Lord your God is giving you*” (16: 20).

“The false contrast between Jew and Christian in *The Merchant of Venice* is eloquent testimony to the cruel misrepresentation of Judaism in Christian theology until recent times. Why then is justice so central to Judaism? Because it is impartial, Law as envisaged by the Torah makes no distinction between rich and poor, powerful and powerless, home born or stranger. Equality before the law is the translation into human terms of equality before God. Time and again the Torah insists that justice is not a human artefact: “Fear no one, for judgment belongs to God.” Because it belongs to God, it must never be compromised – by fear, bribery, or favouritism. It is an

inescapable duty, an inalienable right. Judaism is a religion of love: You shall love the Lord your God; you shall love your neighbour as yourself; you shall love the stranger. But it is also a religion of justice, for without justice, love corrupts (who would not bend the rules, if he could, to favour those he loves?). It is also a religion of compassion, for without compassion law itself can generate inequity. Justice plus compassion equals tzedek, the first precondition of a decent society.”⁶³

The Gospel taught:⁶⁴ “God will bring into judgment both the righteous and the wicked, for there will be a time for every activity, a time to judge every deed” (Ecclesiastes 3:17). “The Lord will judge his people” (Hebrew 10:30). “But you must return to your God: maintain love and justice, and wait for your God always” (Hosea 12:6). “He reveals the deep things of darkness and brings utter darkness into the light” (Job 12:22). “When justice is done, it brings joy to the righteous but terror to evildoers” (Proverbs 21:15). “Whoever says to the guilty, ‘You are innocent,’ will be cursed by peoples and denounced by nations. 25 But it will go with those who convict the guilty, and rich blessing will come on them” (Proverbs 24:24-25). “Evildoers do not understand what is right, but those who seek the Lord understand it fully” (Proverbs 28:5). “You have heard that it was said, ‘Eye for eye, and tooth for tooth.’ 39 But I tell you, do not resist an evil person. If anyone slaps you on the right cheek, turn to them the other cheek also” (Matthew 5:38-39). “24 But let justice roll on like a river, righteousness like a never-failing stream!” (Amos 5:24). “Turn from evil and do good; then you will dwell in the land forever. 28 For the Lord loves the just and will not forsake his faithful ones. Wrongdoers will be completely destroyed; the offspring of the wicked will perish. 29 The righteous will inherit the land and dwell in it forever” (Psalm 37:27-29).

“19 Do not take revenge, my dear friends, but leave room for God’s wrath, for it is written: ‘It is mine to avenge; I will repay,’ says the Lord” (Romans 12:19). “... the Lord is a God of Justice” (Isaiah 30:18-19). “... what does the Lord require of you? to act justly and to love mercy and to walk humbly with your God” (Micah 6:8). “For I, the Lord, love justice” (Isaiah 61:8-9). “And will not God bring about justice for his chosen ones, who cry out to him day and night?” (Luke 18:1-8). “Learn to do right; seek justice. Defend the oppressed. Take up the cause of the fearless; plead the case of the widow” (Isaiah 1:17). “Blessed are those who act justly, who always do what is right” (Psalm 106:3). “This what the Lord Almighty said: ‘Administer true justice; show mercy and compassion to one another’ (Zechariah 7:9). “26

⁶³ Britain's Former Chief Rabbi, Lord Jonathan Sacks, undated. “Tzedek: Justice and Compassion.”

Torah.org:https://www.ou.org/torah/parsha/rabbi-sacks-on-parsha/tzedek_justice_and_compassion/

⁶⁴ www.biblestudytools.com/topical-verses/bible-verses-about-justice/

Follow justice and justice alone, so that you may live and possess the land the Lord your God is giving you” (Deuteronomy 16:20). “7 The righteous care about justice for the poor; but the wicked have no such concern” (Proverbs 29:7)... “do not pervert justice; do not show partiality to the poor or favoritism to the great, but judge your neighbor fairly” (Leviticus 19:15). “The Lord loves righteousness and justice; the earth is full of unfailing love” (Psalm 33:5).

Islam, the Last Abrahamic Religion

The Quran taught that all Messengers of God were men upon whom God bestowed “knowledge and wisdom” to provide His missions of monotheism to humanity for justice and mercy. The apostles were refined models of leadership with perseverance to complete the missions for which they were tested by huge hardships and enormous difficulties. All apostles were believers in God and their missions as a whole: “285. The Messenger believeth in what hath been revealed to him from his Lord, as do the men of faith. Each one (of them) believeth in Allah, His angels, His books, and His apostles. ‘We make no distinction (they say) between one and another of His apostles.’ And they say: ‘We hear, and we obey: (We seek) Thy forgiveness, our Lord, and to Thee is the end of all journeys’” (The Cow, *al-Baqara*). The value-orientations underlying the missions of God were strictly meant to direct humanity to the wisdom of creation: worshipping the Creator and living peacefully the good life He most graciously prescribed.

Both Muslim and non-Muslim sources revealed clear evidence on foretelling the prophet of Islam. “6: And remember, Jesus, the Son of Mary, said ‘O Children of Israel! I am the apostle of God (sent) to you confirming the law (which came) before me, and giving Glad Tidings of an Apostle to come after me, whose name shall be Ahmad’” (*Al-Saff*). Yusuf Ali commented: “Ahmad”, or “Muhammad”, the Praised one, is almost a translation of the Greek word *Periclytos*. In the present Gospel of John, xiv, 16, xv, 26, and xvi, 7, the word “Comforter” in the English version is for the Greek word “*Paraceitos*”, which means “advocate”, one who called to the help of another, a kind friend”, rather than “Comforter”. Our doctors contend that Paraceitos is a corrupt reading for Periclytos, and that in their original saying of Jesus there was a prophecy of our holy Prophet *Ahmad* by name. Even if we read Paraciete, it would apply to the holy Prophet, who is “a Mercy for all creatures.”⁶⁵

In the Gospel of Barnabas: “Then answered Jesus... ‘I therefore say unto you the messenger of God is a splendor that shall give gladness to nearly all that God hath made, for he is adorned with the spirit of understanding and of counsel, the spirit of wisdom and might, the spirit of fear and love, the spirit

⁶⁵ Ali. 1983. *The Holy Qur’an Translation and Commentary*, op. cit., p. 1540, note 5438

of prudence and temperance; he is adorned with the spirit of charity and mercy, the spirit of justice and piety, the spirit of gentleness and patience, which he hath received from God three times more than he hath given to all his creatures. O blessed time, when he shall come to the world! Believe me that I have seen him and have done him reverence, even as every prophet hath seen him: seeing that of his spirit God giveth to them prophesy. And when I saw him my soul was filled with consolation, saying: O Mohammed, God be with thee...' And having said this, Jesus rendered his thanks to God."⁶⁶

"The Islam revealed to Muhammad was not different in context from the Islam of Noah, Moses, 'Īsā, or the other Messengers of God. The form was different; but the context remained the same monotheism of the only God. The form of Muhammad's Islam was different for an important reason... it was a universal and eternal humane message, not limited to the Arabs, a certain tribe, people, land, environment or time; more specifically, it was a call on the human mind whenever or wherever it may be. This universality was not known in the old heavenly messages since each was addressed to a specific people in a certain time. For this, magnificent miracles were timely supportive of the messages. But when Islam came to the human rationality to take off, there was no justification for the extraordinary miracles to occur as one word "Read!" was sufficient."⁶⁷

"The simplicity of Islam and its appeal both to reason and to the heart accounts for its tremendous appeal. With teachings about God, human responsibility and the life hereafter which are very similar to those of Judaism and Christianity, it insists on the necessity of living a pure, God-centered life following the natural dictates of a balanced mind and conscience, following the guidance transmitted through the last prophet of God, Muhammad... It honors the previous great prophets of the Bible, Noah, Abraham, Moses, David and many others, and also reiterates the belief of early Christian communities concerning the prophetic mission of Jesus, ascribing divinity to the Creator alone."⁶⁸

The impact of Islam emphasis on spirituality and the good mannerism was crystal clear in Muslim societies. For example, the Sudanese African homeland, which maintained a Christian kingdom for five centuries before the advent of Islam, adopted Islam and continued to maintain "a great body of social values that help the population to live with the difficulties of life. People

⁶⁶ The Gospel of Barnabas, 1907. Edited and translated from the Italian MS. in the imperial library of Vienna by Lonsdale and Laura Ragg, Oxford at the Clarendon Press, p. 104

<https://archive.org/stream/thegospelofbarn00unknuoft#page/104/mode/2up/>

⁶⁷ Bahgat, Ahmed. 1973. *Anbiya Allah*, Dar al-Shuruq, Cairo, 23rd print

⁶⁸ Siddiqui, Elisabeth. 1998. *A brief history of Islam in the United States*, <http://w.w.colostate.edu/Orgs/MSA/docs/iaa.html> (2/9/98)

are strongly related to collective activities and the respect of the status and role of the elderly with full respect to the individual rights to act independently from the group... The prevalent values in the different parts of the country include generosity and veneration of the spiritual leaderships... The adherence of people to the codes of honor and the respect of promise are equally recognized in the everyday life.”⁶⁹

Exploring the extent of achievement of these ultimate ends, the pursuit of scholars never ceased to discover new facts on religions by spiritual contemplation, or to ascertain the discourse of interfaith ideals and practices by scientific methods of research. This pursuit acquired a great attention, particularly the eminent efforts of Pope Paul and Pope Francis to strengthen sisterly relations between the Middle East interfaith groups, in addition to the promotion of religious ties with both the Azhar high institute of Muslim jurisprudence and the Hebrew spiritual leaderships including the African Hebrew Israelites. To consolidate these efforts for the stability, peace, and mutual cooperation of a region so deeply entrenched in national ideological, political and religious hostilities, scientific research would expectedly provide authentic knowledge about religion, in general, and the monotheistic beliefs, in particular.

Faith and Social Change

Despite the concreteness and authenticity of fundamental principles in the religious heritages, and a long history of civic and social intimacies, the Abrahamic interfaith relationships experienced violent political rivalries and national disputes that persisted actively in recent times with the Israeli-Palestinian warring life and the jihadist violence in Syria, Iraq, Sudan, Egypt, Myanmar, Afghanistan, Pakistan, and Nigeria to mention a few. Additionally, doctrinal disagreements continued unabated between the Sunni and the Shiite Muslims. The latter culminated, furthermore, in large-scale wars led by the Islamic State of Iraq and the Levant Syria (ISIL or ISIS) which turned to be a ruthless indiscriminate looting and killing of the Muslim and non-Muslim populations of these nations. ISIS and Al-Qaida guerilla wars in Sinai, Yemen, Libya, Nigeria, Afghanistan and Pakistan, etc., were waged against all ruling systems to impose totalitarian caliphates by force. The brutalities of this ultra-violence were tragically extended to non-Muslim societies in many parts of the world, which motivated the International Community to launch a global military effort to eradicate the al-Qaida, ISIS, and their followers. These conflicts sabotaged the right of humans to exercise freely the desirable interfaith dialogues.

⁶⁹ Mahmoud, Mahgoub El-Tigani. 2009. *Mawsoua Sudaniya lil-'adala al-jinaiya wal-ijtima'iyah* [Sudanese Encyclopedia of Criminal and Social Justice], Cairo: Al-Fatima Press, pp. 307-8

In Sudan, almost all of the Muslim population in Darfur was victimized by crimes against humanity for a prolonged armed conflict escalated by the ruling junta whose Omer al-Bashir presidency and his top military and political leaderships were indicted by the International Criminal Court for massive extra-judicial killings and the criminal misappropriation and destruction of the natives' property, added to rapes, tortures, and a large-scale displacement of the indigenous people to perish in the Sahara. In Iran, the Bahá'í tradition, regardless of many similarities with Islam, claimed a prophetic leadership after the Prophet of Islam Muhammad who, for Muslims, was the last Prophet and Messenger of God. "The essential message of Bahá'u'lláh is that of unity. He taught that there is only one God, that there is only one human race, and that all the world's religions represent stages in the revelation of God's will and purpose for humanity. In this day, Bahá'u'lláh said, humanity has collectively come of age. As foretold in all of the world's scriptures, the time has arrived for the uniting of all peoples into a peaceful and integrated global society. 'The earth is but one country and mankind its citizens,' he wrote."⁷⁰ This faith, however, was violently outlawed in Iran, its homeland.

The political interests and the strategic military and security agenda of authoritative regimes and/or intolerant groups of faith and counter insurgents had often counteracted the spiritual goals of interfaith. Not only in the Middle East; but equally in Pakistan where "Historical Christian communities exist openly, but have to put up with stringent rules and constant monitoring, while Christian converts from Islam suffer the brunt of persecution from both radical Islamic groups and families and neighbors. Protestant Christian communities are under close scrutiny and suffer frequent attacks, especially when they are active in outreach amongst Muslims. Violent persecution is common. Christians are targets for murder, bombings, abduction of women, rape, forced marriages and eviction from home and country. Unjust and arbitrary blasphemy laws are used to punish Christians and prevent evangelism."⁷¹

In the case of the Rohingya Muslims of Myanmar who have been consistently persecuted, murdered, and exiled forcibly in tens of thousands, Kyaw Min, Chairman of the Democracy and Human Rights Party in Burma, informed that "Burma has a Buddhist majority. Less than 9 percent of the population is Muslim but we are more than a million people." The Burmese leader then urged, "It is sad but now the U.S. is considering military and financial aid to its newest friend: Myanmar. Before that happens, Americans should demand that the Rohingya, Myanmar's most vulnerable people, receive

⁷⁰ Baha'i Community of Nashville, 2017. "What is the Bahá'í Faith?" <http://www.nashvillebahai.org/the-bah%C3%A1-i-faith/>

⁷¹ Open Doors, 2017. *Pakistan*, <https://www.opendoorsusa.org/christian-persecution/world-watch-list/pakistan/>

full citizenship and equal protection under the law.”⁷² The collaboration of democracy and human rights’ political and religious entities would be an invaluable asset in all regions suffering deep ideological hostilities or prolonged violence through the negative influences of religious intolerance.

Embracing hundreds of non-monotheistic religions, a great many people shared with the Abrahamic religions the concerns for the good life of all humans and the world’s justice and peace. The possibilities of closing religious and cultural gaps between these populations was never made available as it became today by the abundance of mass media and the facilities of individual and collective communications all over the world. Unfortunately, the problem rested with the unwillingness of different parties to develop in peace meaningful dialogues: “I think that we succumb to attitudes that do not permit us to dialogue: domination, not knowing how to listen, annoyance in our speech, preconceived judgments and so many others.”⁷³

Apparently, the possible solutions to help resolve the Israeli-Palestinian chronic conflict, the Saudi-Yemeni Gulf-Iranian mounting crisis, the insurgency in Darfur and Sinai, the religious-based Nigerian Boko-Haram and Taliban battlefields in Afghanistan, etc., might well be advanced if a popular interfaith movement would be independently undertaken by leaderships of the Abrahamic religions and the human rights and democracy groups with equal representation of the concerned parties and logistical support from the United Nations, African Union, the Arab League, European Union, United States, and the other global entities.

The Need for Mutual Respect

The call on mutual respect by intellectual dialogue between the competing doctrines of each faith as an essential procedure to guarantee close understanding and collaboration was reluctantly met by authoritative governments and/or dogmatic institutions. In Muslim nations, for example, the dialogue between the majority billion+ Sunni groups and the 200 million Shiite adherents was unrelentingly discouraged. Back in the 1930s, a famous dialogue occurred between Imam Saleem al-Bishri, Chief of the Azhar, and the Shiite Imam ‘Abd al-Hussain Sharafadeen.⁷⁴ These intellectual discussions clarified much of the differences were based on jurist preferences, rather than differences in the mainstream faith; but the dialogue was not consistently pursued. Instead, political and armed confrontations evolved between Sunni governments and the Shiite in Iran, Iraq, the Gulf, and Lebanon, etc.

⁷² Kayaw Min. 2017. “10 Things You Need to know about the persecution of Muslims in Myanmar (Burma). http://www.huffingtonpost.com/kyaw-min/myanmar-muslims-rohingya_b_4274852.html

⁷³ Pope Francis Quotes. https://www.goodreads.com/author/quotes/7034628.Pope_Francis

⁷⁴ ‘Abd al-Hussain Sharafadeen, undated. *Al-Muraga’at*, Beirut: al-Wafa.

The interfaith inter-and-intra doctrinal discrepancies continued for different reasons: On the top factors, we placed the struggles between conservatives and reformers within the Abrahamic groups on the issues of scriptural interpretation and indoctrination of which the women's right to enjoy eradication of all forms of discrimination increased over time. There was always a great concern to bring about consensus between the Sunni and Shiite Muslims; the Catholic and Protestant Christians; and several Jewish groups. But the interfaith activities even by continental and international organizations, including the United Nations, European Union, and the African Union, Vatican and Organization of Islamic Cooperation seemed to be negatively affected by the forces of globalization which expanded trade imbalances in the world's economy; irreconcilable military conflicts versus militant foes; urbanization hazards; and the ensuing crises of poverty, destitution, community breakdowns, morbidity, and infant mortality.

The religious relationships in between different groups of faith were often stringent, although they might share major principles of humanity and unity. The differences between the exegesis of Shari'a *Madhahib* or schools of Islamic law, for example, entailed a wide range of critical thinking. A great many jurists adhered to the inherited schools of Malik ibn Anas, Abu Hanifa el-Nu'man, Ahmed ibn Hanbal, and al-Shaf-'iyi who fixed the mainstream Shari'a as the Prophet explained and his companions maintained. Contemporary thinkers, nonetheless, thought creatively about new exegesis of the scripture. For example, Mahmoud Mohamed Taha taught that the Meccan verses of the Qur'an were addressed to humanity as a whole so that they were suitable in the twentieth century compared to the Medina verses of the Qur'an which, in his opinion, ceased to be applicable in modern times with respect to the status of women, the advancement to socialism, and other challenges. The unlawful trial and assassination of Taha by a dictatorial regime was a terrorizing show of religious intolerance⁷⁵

Referring to Diana Eck's emphasis on pluralism as "involvement in an active engagement with one another; active attempt to arrive at an understanding; and engaging in the very differences that we have to gain, to gain a deeper sense of each other's commitments," Amir Hussain (2003) praised "the example of the religious tolerance that occurs in North America," and advised: "In order to properly do interfaith dialogue, one must have not only a deep understanding of one's own faith, but an understanding and appreciation of the faith of the dialogue partner... God speaks to us in the Qur'an about God willing our differences and our disputes. Our differences

⁷⁵ Taha ideas were mainly detailed in a number of books he personally authored in Sudan, in addition to writings by critics of Shari'a Law. See for example: Abdullahi An-Na'im, 1996. *Toward an Islamic Reformation: Civil Liberties, Human Rights, and International Law*. Syracuse.

(and ensuing disputes) are not to be feared, denied, or eradicated. God teaches us through our differences. It is through dialogue that we learn about ourselves, about others, and, in so doing, perhaps also about God.”⁷⁶

The Reversed Interfaith

The performance of peoples of faith in the Abrahamic religions passed over times of mutual respect and collaboration, as well as times of hostilities and violence over the centuries; destructive wars broke between the three groups, in addition to bilateral disputes. The holy commandments to abide by “*the best ways*” were not implemented for long periods of time. The local and national levels of the disputes were enlarged and deepened in the international arena by global interests of power and control, rather than beliefs and faith. Consequently, the possibilities of peaceful reconciliation between the contending groups were often diminished as the roles to be played by interfaith leaderships and loyalties retreated to occasional conferences and individual activities.

Manipulating religious banners, many faith communities and local neighborhoods fought ferocious battles under national and international banners in all continents, notwithstanding their interfaith bondages, leaving behind millions of deaths and victims of war. Amidst the withering cities and decaying ecologies, the danger of ending the whole life by nuclear weapons encompassed the planet from corner to corner. It became true that not a single spot on earth could be safe from extinction by the polluted environments and the falling ozone. The humans, for whom God enabled a glorious destiny in peaceful universality, might have well destined themselves to a final destruction. The situation posed enormous difficulties of which extremist activities evolved by the hate groups that raised the banners of religious beliefs, only to pre-empt the genuine contexts of the God-fearing humanity. There was hardly an exception in our present time, as extremist forms of intolerance infiltrated the world by one faith or another: “Islamic fundamentalism in countries such as Afghanistan, Algeria, and Iran; Jewish fundamentalism in Israel; and Hindu fundamentalism in India” or “Christian fundamentalism represented in the dramatic growth of evangelical denominations in the United States.”⁷⁷

Pope Francis had eloquently lamented the impoverishment of world populations for the very simple fact that “Not to share one’s wealth with the poor is to steal from them and to take away their livelihood.”⁷⁸ Little wonder,

⁷⁶ Ami Hussain, 2003. “Muslims, Pluralism, and Interfaith Dialogue,” in *Progressive Muslims on Justice, Gender, and Pluralism*, edited by Safi Omid, Oxford: One World, pp. 252; 266-67.

⁷⁷ Haviland, William A, 2000. *Anthropology*, op. cit., p. 693.

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Pope

Francis

Quotes:

all efforts to combat extremism were never effective in societies ravaged by abuses of authority and poverty; thus unescapably vulnerable to exploitation by the powerful or manipulation by the insurgent. Moreover, unavoidable conflicts erupted versus the fundamental right to privacy and the freedoms of movement and expression, in addition to the risk of conducting biased investigations by faith, ethnic origin or race. “Far-right extremists are responsible for more deaths in the United States than Islamic extremists in recent years... Obama administration’s CVE – countering violence extremism - in 2011 to partner with communities to develop anti-radicalization programs... should be expanded beyond the Muslim community. A lot of the risk factors towards radicalization are common across ideological groups,” Barbara Mantel (2015).⁷⁹ The impact of a free, democratically-oriented public opinion in North America and Europe, however, uncovered the sources of threat and criticized the forces of hate to protect the tranquility of people. These popular efforts restricted the policy to segregate a specific faith with suspicion and harassment.

Furthermore, the tragic crimes against humanity by war toys syphoned off billions of dollars that exacerbated terminal morbidity rates and death production, instead of improving life for the billions needy and impoverished all over the world. The most costly peace making and peace keeping operations to save lives and maintain the property were operated with a blind eye to the interfaith principles of the good life. Evidently, the short-lived peace agreements between the concerned parties in the Middle-East or the other warring societies failed to meet conditionality of the powers overseeing them or to sooth the contending rivalries. This negativity never compared to the wisdom and patience of God’s messengers, Moses, Yeshua, and Muhammad that guided the necessary steps to repulse the evils of competition and the lust of control. Muhammad’s reconciliation with the Quraish warring group by the *Hudaibiya Pact* in March 627 went as far as recognizing the unbelievers’ condition to obliterate from the text his name as “Messenger of God.” The pact curbed violence. It magnified the wisdom of humility vis-à-vis the arrogance of power. The success of the agreement by this refined diplomacy demonstrated the need to exercise mutual respect by direct equalitarian relations to end hostilities.

The Integration of Interfaith and Secular Thought

In earlier times, the potentialities of secular thought that developed in Europe’s Renaissance came about through the striving for private and public freedoms by rational thinking independently from repression of the religious

https://www.goodreads.com/author/quotes/7034628.Pope_Francis

⁷⁹ Mantel, Barbara, 2015. “Far-Right Extremism,” in: *Global Issues Selections from Co-researchers*. London: Sage (2017 edition), pp. 25-34.

institution. In modern times, the outcome of the Enlightenment Era converged apparently with original dictates of religion: The International Bill of Rights, the secular movement to secure fundamental freedoms and genuine rights in the post-World War Era by the vital provisions of the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights, the International Covenant of Economic, Social and Cultural Rights, and the rest of the international legal arsenal. Amnesty International, Human Rights' Watch, and the other NGOs continued to document gross human rights violations of the international laws. But these secular safeguards were not immune from the obstacles of resolving arguments or excesses of human behavior.

Besides the brave stands of human rights and democracy activists, who embraced among their leading ranks religious thinkers and spiritual leaders throughout the world, the struggles of these activists unmasked the gross human rights' violations and abuses of authority, especially those committed by anti-democratic regimes. The collaboration of secularist and religious activists in the principled areas of justice and humanitarian support encouraged scientific research. In the multi-religious, multi-ethnic, and pluralist societies of our times, the competencies of authenticated inquiry made it possible to replace the atrocities of authoritative regimes with proper law enforcement, tolerance, and peaceful existence.

The discourse of interfaith ideals and practices via international and national organizations of faith has been in great demand globally, despite a few endeavors that enhanced relatively the authentic knowledge about religion, in general, and the monotheistic religions, in particular. The largest space possible to cross-fertilize both of the secular and religious thought might be progressively developed on the basis of scholarly dialogues on the international human rights' norms and the scriptural and spiritual sources of faith. This essential demand would be sufficiently supplied if the world's eminent leaderships of Abrahamic faith, Pope Francis and the Christian leaderships; al-Azhar's Grand Imam Ahmed al-Tayeb; the Mufti of Jerusalem; the Shiite and Sunni 'Ulama; the Copts' Pope; and the Chief Rabbinate of Israel would closely work with the Hindu and Buddhist clergy and the other leaders of faith. From all over the world, the diversity of religious beliefs would accordingly pump the venerated wisdoms unto the global soul.

To illustrate, God's revelations emphasized the eminence of intellectual thinking, contemplation, and rationality in life. The Qur'an urged the human mind to reflect, think, and work for the good life by the conscious awareness of the glorious creations of God (*Al-Room*; *Al-Ra'ad*:3,45; and *Al-Gathiya*:12-13). Ghatani (2011) noted that the Qur'anic methods to contemplate the Universe urged all humans to look into the skies and earth (*Yunis*:101); to see the fruition of plants (*al-An'am*:99); look into food

(‘*Abasa:24*); think about the creation of man (*Al-Qiyama*); the raining phenomenon (*Al-Nour:43*); the flying birds (*Al-Nour:79*); benefits from cattle (*Yasin: 71-73*); the Kingdom of God (*Al-A’raf:185*); the heavens (*Qaf:6*); camels (*Al-Ghashiya:17-20*); and the mention of many names of creations: the sun, the moon, night, day, stars, man, the cow, birds, spider, bees, earthquake, thunder, and rains, etc.⁸⁰

Interestingly, natural sciences were founded on the methods of systematic observation and experimentation. The possibilities of applying the discoveries of scientific research in humanities, social sciences, and natural sciences to strengthen the cross-fertilization of all different sources of knowledge were never attainable as was made available in the present times by advanced technology and the information revolution. Within this intellectual framework, which could be actively applied to overcome the mutual anti-science/antireligious bias, successful scientific interfaith dialogues might contribute largely to resolve a variety of global crises. “Of approximately 1,600 religions and denominations in the United States, about 800 were founded after 1965... Science, far from destroying religion... has fostered this religious boom by removing many traditional psychological props while creating, in its technological applications, a host of new problems: threat of nuclear catastrophe; health threats from pollution; unease about the consequences in biotechnology...; and fear of loss of economic security.”⁸¹

The interrelationships of faith and secular thought would be useable in the search for all-encompassing solutions, rather than piecemeal approaches. Towards this far-sighted strategy, interfaith and human rights’ research would have to encourage the efforts exerted by a few thinkers and professional researchers to incorporate all schools of faith in integrated perspectives to mold doctrinal differences. Because the principles of scientific research emphasized neutrality and the mutual respect for all schools and doctrines in the comparative studies of faith, the governments interested in interfaith *must* not exercise supervisory authority over research by planned agendas or political dictates. Scientific research on human rights and interfaith issues *would have to be* fully protected from all security intrusions on the identities of researchers or the contents and findings of research, regardless of the financial support some governments or groups of faith might generously provide.

Interfaith Conferences

“The attacks of September 11, 2001 instantly heightened the American public's sensitivity toward matters of religious difference. Many Americans

⁸⁰ Al-Gahtani, Nora Mohamed, 2011. أساليب القرآن الكريم في دعوته الى التفكير في الآيات الكونية. [The methods of Qur’anic Call to Contemplate the Universe] <https://fikrslamy.wordpress.com> (28 September 2011)

⁸¹ Haviland, William A, 2000. *Anthropology*, op. cit., pp. 693-4.

realized not only that non-Muslims need to learn more about Islam, but also that Muslims must better understand and articulate their own faith to themselves and others. Jane Idleman Smith examines the current American Christian-Muslim dialogue ... since 9/11 a few Muslim scholars in the West have also begun to write about these issues. Now, many Christians and Muslims are expressing their desire to move beyond theological discussion into what is often called the "dialogue of engagement" (OUP, 2007). "While many of the encounters between Islam and Christianity over the past 14 centuries have been peaceful, Americans know little about the history of religious interaction beyond the Crusades or the fear Europe felt in the face of the invasions of the Turks. (Smith's) volume is intended to educate Americans about the great diversity of Muslims in this country while illustrating how Christians and Muslims are coming together, not only to talk to each other, but to work together for the common good."⁸²

Many interfaith conferences played important roles in the striving of communities to live in peace. In the United States, for example, the Interfaith Conference of Metropolitan Washington's "theological underpinnings that form the foundation of our principles and values have, at their root, our responsibility to serve humanity and these values call us into community. The truth of our common humanity is shared by all, including atheists, agnostics, and those who claim no particular religious affiliation. These values are in harmony with the best of the values undergirding the founding documents of the United States. This interfaith vision for our community is founded on the hope that leaders and citizens alike might use this fundamental truth as the basis of particular practices of citizenship and express these values legislatively across all the governmental, civic, corporate and not-for profit organizations that make up our diverse community. First and always, we are neighbors... regardless of creed, religious affiliation or non-affiliation, race, gender, gender identity, country of origin, political party affiliation, mental or physical ability, or socio-economic condition."⁸³

"Founded in 1970, the Interfaith Conference of Greater Milwaukee is a non-profit organization through which the regional leaders and adherents of 17 member denominations and faiths dialogue to build relationships conduct educational programs to foster public understanding and tolerance, and work together on social-justice issues to improve the quality of life for everyone. Several non-member faiths also participate in the planning and running of many of our events and activities. The Conference's underlying emphasis is

⁸² Smith, Jane Idleman. 2007. *Muslims, Christians, and the challenge of interfaith dialogue*, New York: OUP.

⁸³ <http://ifcmw.org/wp-content/uploads/2017/01/Faith-Leaders-Vision-Statement-1.30.17.pdf>

“to uphold the dignity of every person and the solidarity of the human community.”⁸⁴

The 12th Doha Interfaith Dialogue Conference (2016) under the theme "Spiritual and Intellectual Safety in the Light of Religious Doctrines," discussed the issue of religion as a humanitarian unity for spiritual and intellectual security of human societies:⁸⁵ “At present, the conference is designed to promote understanding, respect and cooperation among women of all faiths and to facilitate opportunities for dialogue. The ultimate goal is to involve all faith groups in the crafting of the annual conference. The program allows women of faith to examine the ways that different religious affiliations shape a person's view of the world and opinions on contemporary issues.”⁸⁶ This international forum persuaded jurists and many spokespersons for the institutes of learning to participate. But the Doha Interfaith Conference was perfectly silent vis-à-vis the Darfuri participants who spoke out for the adoption of workable resolutions to the global crisis of Darfur, which the International Criminal Court pursued legally versus Omer al-Bashir and his military and political accomplices for the sake of justice and the human rights of millions victimized by the jihadist regime in Sudan.

Conclusion

Interfaith issues received central attention in modern life, as they had in ancient times. The diversity of faith in North America, as well as other continents, exhibited increased believers of Islam, Buddhism, and Hinduism side-by-side with the dominant Christian groups. The need of the world was largely felt to appreciate the true meanings of religious life for individuals and social groups in order to advance the cause of peaceful co-existence between peoples of the world, especially in areas suffering deep ideological hostilities or the prolonged violence of religious intolerance. A great many people were inspired to know about religions of the world and the ways most desirable to get their members to know one another in justice and peace, regardless of the size of followers a religion enjoyed or the tenets of faith enjoined. To fulfill this global need, scientific research *should* be fully supported to help resolve the global conflicts of faith in the first place.

Our paper argued that the interfaith ideological and organizational entities would probably ensure successful results were the interfaith dialogue actively operated via a popular movement by non-governmental intellectuals assisted by professional scientific researchers. Hansen (2015) concluded in his research on the established society and religion discourse influencing interfaith dialogue on the Christian-Muslim relations in Egypt: “the two major discourses found to have impact on the dialogue were national unity and

⁸⁴ <http://interfaithconference.org/cms-view-page.php?page=mission-statement>

⁸⁵ <http://qatarconferences.org/interfaith2016/>

⁸⁶ <http://www.womeninterfaithstl.org/>

monopoly of religious faith.” This dialogue, however, was “preventing many of the interviewees from realizing or admitting the obvious discrimination and violent incidents between Muslims and Christians.” The implication was clear: monopolizing and manipulating religious faith, the authority intrusions that emphasized national unity affected negatively the popular nature of the dialogue.

Quite evidenced in the national level, it was equally clear in the global dialogues that the imposition of political agenda and military strategies above the interfaith concerns for the momentous needs of human rights and fundamental freedoms would inevitably damage the dialogue. Yes, interfaith research could possibly help to resolve the global conflicts based on faith. Whenever academic research would be provided with the necessary requirements of scientific research and conscientious approval by the contending parties, it would help to accomplish peace and justice to the peoples victimized by wars, social ills, and the power jealousies and monopolies. By firm reduction of the massive budgets allocated for the global production of destruction by the huge trade of armament to the detriment of world peace and human progression, there would be a real opportunity to move on with intellectual and spiritual life for the betterment of humanity.

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Preferred Leadership Styles Within Minor League Baseball Organizations' Front Offices

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Abstract

Due to the importance of leadership within athletics, this study set out to measure self-reported preference of leadership styles within Minor League Baseball (MiLB) organizations' front offices. The Revised Leadership Scale for Sport (RLSS) was administered to MiLB front office employees at the AAA and AA levels. This instrument previously had been used to measure current athletes' preferences for their coaches' leadership styles. Four hypotheses focused on respondents' preferences for their supervisors' uses of autocratic and democratic leadership styles based on respondents' gender and history with team or individual sport competition. Hypothesis testing revealed only one significant finding, that male front office employees had a higher preference for autocratic leadership style than did female front office employees.

Keywords: Revised Leadership Scale for Sport (RLSS), autocratic behavior, democratic behavior, Minor League Baseball (MiLB)

Introduction

Leadership is an important aspect of successful management that has been the focus of ongoing discussions within the sport business arena for several decades. However, most of the conversations regarding leadership have pertained to the business (working) environment. Only in the past few decades has assessing leadership (coaching) in the sporting industry emerged. This study was designed to examine both the sporting and business sectors by

surveying AAA and AA front office employees in Minor League Baseball (MiLB) organizations to determine their preferred leadership style. There is limited research on front office employees and as yet, no available discussions of the preferred leadership styles within sport organizations; therefore, no studies have been designed to look at the preferred leadership styles within MiLB organizations' front offices. Previous studies have looked at preferred leadership/coaching styles of collegiate athletes, so by looking at the preferred leadership styles of these employees, it will be determined if sports organizations' employees preferred similar styles to their student-athlete counterparts.

Therefore, the purpose of this study was to determine if former athletes prefer leadership styles similar to their current athletic counterparts through an examination of the preferred leadership styles of employees within MiLB organizations' front offices at the AAA and AA levels. Research about preferred leadership styles is crucial for the efficient operation of front office enterprises and could contribute directly to understanding front office dynamics. The front office of a sport organization is seen as an extension of the on-field product, hence the working relationships among the front office staff can be seen as similar to the workings of the athletic team on the field. Thus, the discourse initiated by and findings from this study will be of interest to all sport organizations and of particular interest to MiLB organizations.

I.

Leadership styles

The majority of current research focuses on six main leadership styles. These leadership styles include: autocratic (authoritarian), democratic (participative), laissez-faire, eclectic, Total Quality Management (TQM), and transformational (Quarterman & Li, 2003; Bucher & Krotee, 2002; Horine & Stotlar, 2004).

Autocratic leadership

The term autocratic can be used interchangeably with "authoritarian" and refers to a task-oriented and leader-centered approach to running an organization or workplace. Horine and Stotlar (2004) described these types of leaders as those who "act like a boss, not a leader" (p. 9). These leaders hold few meetings that allow for little debate; instead a meeting's main function is issuing announcements and directives. This type of leadership is often productive in the armed forces, as well as industrial settings that require uniformity (Horine & Stotlar, 2004).

Democratic leadership

According to Horine and Stotlar (2004), democratic leadership is characterized by the utilization of successful group dynamics strategies in order to run an organization more effectively. Leaders who embrace this style consult with subordinates and groups to gain a consensus on what the group believes is the best course of action. The advantages of using this leadership style include: staff members having their voices and opinions heard; group members collaborating to make programs successful; and eliminating poor ideas by group input (Horine & Stotlar, 2004).

Laissez-fair leadership

This leadership style is referred to as “let alone” (Horine & Stotlar, 2004, p. 9) because of the low profile that the leader holds to allow the organization to operate on its own. Bucher and Krotee (2002) consider laissez-faire as an extension of the democratic style. Decision-making is made by group members, and little guidance is provided by the person in charge. Typically this style is not recommended because of the actual lack of observable leadership, or the presence of leadership is often not positive; however, this style is successful in some situations, such as allowing new, young leaders to discover new ideas from discussion and obtain experience at a quicker pace than the autocratic style (Horine & Stotlar, 2004).

Eclectic leadership

This leadership style is perhaps one of the more desirable because it takes specific situational context into consideration and is also mentioned as similar to the Contingency Theory (Bucher & Krotee, 2002). Horine and Stotlar (2004) sum up the term best when they state that the eclectic leadership style:

...selects parts of several different forms of administration that will best fit a particular situation. Effective administrators often adopt a democratic style as a cornerstone and mix in needed amounts of the laissez-faire and autocratic approaches as special situations arise. (p. 10)

By using a democratic leadership style as a base and adding autocratic style behaviors secondarily, the leader is able to make the final decision alone (autocratic) even after gathering all the necessary information (democratic).

Total Quality Management (TQM)

TQM was first discussed by philosopher Deming in the 1950s (Bucher & Krotee, 2002) and utilizes an extreme dependence on individuals and team work to create continuous improvements throughout an organization (Bucher

& Krotee, 2002). TQM leaders put a great deal of responsibility and decision making in the hands of those carrying out a process and those who work directly with the customers (Bucher & Krotee, 2002; Horine & Stotlar, 2004). TQM leaders relinquish their authority to well-trained staff that is more knowledgeable in certain fields (Bucher & Krotee, 2002).

Transformational leadership

This leadership style centers on the impact of the leader on the organization rather than on individuals or groups within the organization (Quarterman & Li, 2003). Transformational leadership was a term coined by Bass in 1985 (Bass, 1997) in which "...leaders recognize what followers want and promise to help them get what they want in exchange for support" (p. 21). Transformational leadership is comprised of four main components, or factors: charisma (idealized influence), inspirational motivation, intellectual stimulation, and individualized consideration (Bass, 1997; Quarterman & Li, 2003).

Measuring leadership in sport

Measuring the effectiveness of leaders started in the businesses sector and did not move into the sport setting until the 1970s when the effectiveness of coaches became an area of interest (Beam, 2001). According to Zhang, Jensen, and Mann (1997), early primitive measurement tools focused only on measuring sport leadership behaviors rather than considering whether situational characteristics play a role. Some of these early instruments were developed through the Ohio State Leadership Studies (Hemphill & Coons, 1957; Stogdill, 1948, 1963; Stogdill & Shartle, 1955, 1956). Other early tools used for measuring sport leadership behavior include the Coach Behavior Description Questionnaire (CBDQ) (Danielson, Zelhart, & Drake, 1975), the Coaching Behavior Assessment System (CBAS) (Smith, Smoll, & Hunt, 1977), and the Coach Evaluation Questionnaire (CEQ) (Rushall & Wiznuk, 1985). The CBDQ and CEQ required student-athletes to identify the behaviors of their coaches within certain leadership categories. In contrast, the CBAS utilized trained individuals to observe and report coaches' behaviors within selected behavioral dimensions. Although these early instruments were useful in measuring the presence of defined leadership behaviors, there was no relevance to the field. The lack of sport-related measuring tools led to the creation of sport-specific instruments that included situational characteristics to better understand leadership behaviors in the sport setting.

LSS and RLSS

To seek to address the lack of a sport-specific instrument, Chelladurai and Selah (1980) developed the Leadership Scale for Sport (LSS). This

instrument included five dimensions of leadership behavior: democratic, autocratic, training and instruction, social support, and positive feedback. These five behaviors were sorted into three separate categories: decision-style factors (composed of democratic and autocratic behaviors), direct task factors (composed of training and instruction behavior), and motivational factors (composed of social support and positive feedback factors) (Chelladurai, 1990).

Developed by Zhang et al. (1997), the Revised Leadership Scale for Sport (RLSS) is a more applicable measurement device than the LSS used by the NCAA for intercollegiate student-athletes (Beam, 2001). The RLSS included the addition of two new dimensions: group maintenance behavior and situational consideration behavior. Group maintenance behavior is defined as the way a coach clarifies the relationship among team members, coordinates athletes' activities and improves team cohesion; whereas, situational consideration behavior refers to the way a coach reacts to circumstances based on situational factors (time, the individual involved and environment surrounding the event). Input was collected from intercollegiate coaches, and the instrument was pilot tested by a sample of 696 intercollegiate student athletes from NCAA Division I, II, and III level institutions in Massachusetts and 206 intercollegiate coaches. In its current format, the RLSS consists of sixty items in the following dimensions: democratic behavior (12 items), autocratic behavior (8 items), positive feedback behavior (12 items), situational consideration behavior (10 items), social support (8 items), and training and instruction behaviors (10 items).

Uses of the LSS and RLSS

A number of researchers have used both the LSS and RLSS to investigate the preferred leadership styles of current student-athletes. The preferences of these student-athletes were compared across two factors of relevance to the present study, gender and type of sport participation—team (i.e., baseball, softball, football, volleyball) or individual (i.e., wrestling, cross country, golf). Table 1 summarizes relevant findings from seven studies. Six of seven studies found that male student-athletes preferred autocratic leadership behaviors more than female student-athletes. In the four studies where team versus individual sport participation was considered, team sport participants preferred autocratic leadership styles more than individual sport participants did. When considering preference for democratic leadership based on gender, past researchers in four studies found that males had a higher preference for this style than did females. Females reported the higher preference in two studies, and the preference of male and female student-athletes did not differ in one study. In the four studies that considered

individual versus team sport participation, individual sport student-athletes in each of the studies reported a preference for the democratic leadership style.

Methods

The current study utilized the Revised Leadership Scale for Sport (RLSS) developed by Zhang et al. (1997). The questionnaire utilized a Likert scale ranging from 1(*Always*)-5 (*Never*), where a lower score indicated a stronger preference for a leadership style than did a higher score. Respondents used this scale to rate statements pertaining to specific leadership styles. The instrument contained eight statements pertaining to preferences for autocratic behavior and twelve statements pertaining to democratic behavior by leaders. Each statement began with the words "I prefer my supervisor to." Responses to these statements were combined and divided by the number of statements to produce a composite score for preference for autocratic behavior and preference for democratic behavior. In each instance a lower mean score indicated a higher preference for a particular leadership style.

The eight autocratic statements were: Present ideas forcefully, Disregard employee's fears and dissatisfactions, Keep aloof from employees, Dislike suggestions and opinions from the employees, Prescribe the methods to be followed, Refuse to compromise on a point, Plan for the team relatively independent of the employees, and Fail to explain his/her actions. Responses to these autocratic behavior questions were summed and divided by eight to produce a mean score per individual.

The 12 statements to measure preference for democratic leadership style were: Let employees share in decision making and policy formulation, Put the suggestions made by team members into operation, Let employees decide on strategies to be used in a deal, Give the employees freedom to determine the details of conducting a task, Get approval from employees on important matters before going ahead, Ask for the opinion of employees on important leadership matters, Let employees try their own way even if they make mistakes, Ask for the opinion of employees on strategies for specific details, Encourage the employees to make suggestions for ways to conduct work, See the merits of employees' ideas when they differ from the supervisor's, Get input from the employees at daily team meetings, and Let employees set their own goals. Each individual's responses to these statements were summed and divided by 12 to produce a mean score for each individual.

The RLSS was administered as an online questionnaire to the target population--current employees within front offices of MiLB organizations in the United States. The population studied included 60 organizations throughout the contiguous United States. The levels of organizations in the study range from AAA to AA, and 30 teams are represented at each level of

competition. Front office employees were invited to participate via email, and each team's public website was used to obtain front office employees' email addresses. At the AAA level, 750 employees' email addresses were available (out of 859 total employees), while 558 were available at the AA level (out of 601 total employees). Each employee whose address could be obtained received an initial email with a link to the survey (via *Qualtrics*). Follow-up emails were distributed twice, and the survey remained open for seven weeks after the initial email distribution.

Results

Of the 1308 total employees invited to participate, only 96 (11.2%) at the AAA level and 74 (12.3%) at the AA level completed the survey for a total of 170. Male ($n=112$, 66%) respondents outnumbered females ($n=58$, 34%). Almost all respondents ($n=167$, 98%) indicated that they had played competitive sports when younger, and within this group 94 individuals (56%) reported their highest level of competitive sport play to be high school or lower, while 73 (44%) had played college or professional sports. Most respondents ($n=142$, 85%) had played team sports (i.e., baseball, basketball, football, soccer), and the remainder ($n=25$, 15%) had played individual sports (i.e., cross country, track and field, golf, tennis).

New variables were created to be used in hypothesis testing to evaluate preferences for autocratic and democratic leadership styles. The eight statements to assess preference for autocratic leadership style were summed and divided by eight to create a measure for each respondent. The overall mean score for autocratic leadership preference was 3.35. Similarly, each respondent's ratings for the 12 democratic leadership statements were summed and divided by 12. The overall mean score for preference for democratic behavior was 2.41.

In order to test the four hypotheses under consideration, independent two sample *t*-tests assuming equal variances were utilized to compare the composite scores across demographic characteristics. The first two hypotheses dealt with the relationship between gender and preference for certain leadership styles; whereas, the third and fourth hypotheses addressed the role of employees' athletic backgrounds (as playing team or individual sports) in their preferences for leadership styles.

The first hypothesis investigated whether or not the gender of front office employees was related to the preference for the democratic leadership style. To test this hypothesis an independent samples *t*-test was conducted and was not significant, ($t=0.139$, $p=0.889$), indicating that there was not a relationship between gender and preference for democratic leadership. Indeed, the mean scores for males (2.41) and females (2.42) were nearly identical.

The second hypothesis considered the relationship between gender of front office employees and preference for autocratic leadership style. To ascertain whether differences existed, an independent samples t-test was utilized. The test was significant ($t=-3.399$, $p<0.001$), indicating that males working in the front office (mean=3.46) had a higher preference for the autocratic leadership style than did females working in the front office (mean=3.66).

The third hypothesis dealt with the relationship between individual versus team sport background and preference for the democratic leadership style. An independent samples t-test ($t=1.031$, $p=0.303$) revealed that there was no significant difference in preference based on whether an individual had participated in a team or an individual sport. Respondents who played team sports reported a mean score of 2.43, while respondents who played individual sports reported a mean score of 2.37.

The final hypothesis examined the relationship between employees' athletic backgrounds (as playing team or individual sports) and preference for the autocratic leadership style. An independent samples t-test was conducted, and results were not significant ($t=0.307$, $p=0.759$). Thus, there was no preference for autocratic leadership styles based on whether or not participants had been involved in individual or team sports. In fact, mean scores for respondents who participated in individual (3.55) and team (3.53) sports were nearly identical.

Conclusion

Discussion

The present study revealed only one significant finding, which was a difference between males and females based on preference for autocratic leadership style. Male front office employees had a higher preference for autocratic leadership style than did female front office employees. Despite the significant difference, neither males ($m=3.46$) nor females ($m=3.66$) expressed a high desire for a supervisor to use this leadership style. On a Likert scale from 1 (*Always*) to 5 (*Never*) where 3=*Occasionally* and 4=*Seldom*, respondents did not express a strong preference for this style. Results of the present study do confirm findings from previous studies which indicated that male student-athletes exhibited a higher preference for autocratic leadership styles (Beam, 2001; Holmes, McNeil, Adorna, Procaccino, 2008; Suruljal & Dhurup, 2010; Terry, 1984; Terry & Howe, 1984; and Witte, 2011).

Hypothesis one, three, and four reveal that respondents did not differ in preference for democratic leadership style based on gender (hypothesis one) or individual versus team sport background (hypothesis three) or preference for autocratic leadership style based on individual versus team background (hypothesis four). Mean responses for each group (gender and type of sport

participation) tested were slightly more favorable for democratic than for autocratic leadership behavior.

Previous studies examined leadership behavior that current, collegiate student -athletes preferred their coaches utilize; whereas, respondents in the present study were not competing in competitive athletics, and only 44% of current study population played collegiate or professional sports. Furthermore, the present study asked respondents to consider the preferred leadership styles of their supervisors, not coaches. Relationships between collegiate athletes and their coaches and MiLB front office employees and their supervisors are different in a number of ways, including duration of and expectations from the relationship. Therefore, it is difficult to compare the present study to previous studies. Furthermore, it must be noted that there has not been any previous research within sport organizations and preferences for leadership behaviors based upon the RLSS or LSS.

Implications for future research

In future research there should be some comparisons with the sport setting and other corporate settings. More research is needed in order to determine if these findings are reliable and repeatable within the same business of sports. While leadership measurement has been studied through the years thoroughly, leadership measurement within the business side of a sport franchise is absent. Furthermore, almost all respondents (98%) in the present study previously had played competitive athletics at some level. Present perceptions of desirable leadership styles for their supervisors to use may be influenced by the styles respondents' coaches used. A comparison of behaviors preferred in current supervisors and remembered in past coaches may allow future researchers more insights into the leadership preferences of sport organization employees.

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Table 1. Summary of Findings from Previous Studies of Student-Athletes' Preferred Leadership Styles

Researchers	Instrument	Demographic	Expressed Higher Preference for Autocratic	Expressed Higher Preference for Democratic
Terry (1984)	LLS	Gender Type of Sport	Male Team	Male Individual
Terry & Howe (1984)	LLS	Gender Type of Sport	Male Team	Male Individual
Sherman, Fuller, & Speed (2000)	LLS	Gender Type of Sport	Female Not included	Male Not included
Surujlal & Dhurup (2010)	LLS	Gender Type of Sport	Male Not included	Female Not included
Beam (2001)	RLSS	Gender Type of Sport	Male Team	Male Individual
Holmes, McNeil, Adorna, & Procaccino (2008)	RLSS	Gender Type of Sport	Male Not included	Female Not included
Witte (2011)	RLSS	Gender Type of Sport	Male Team	No difference Individual

Benzene Uptake onto Modified Tea Waste: Perspective Applicability of Empirical Sorption Kinetic Models

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Abstract

The uptake of Benzene onto modified solid materials have been reported most commonly with abrupt peripheral application of the defining models based chiefly on regression parameter validation. This paper considered a perspective application of mainly the empirical kinetic models of predetermined applicability as well as their parent nature to contemporary kinetic models. Verification of the applicable kinetic mechanisms defined by the models were based mainly on interpretations of the model parameters other than the statistical regression parameters. The Tea waste used was modified by impregnation using iron salt and carbonized at 500°C. The modified Tea waste (TW) of average particle diameter of 0.09mm was used in the batch sorption of benzene dissolved in methanol. The $Z_{(t)}$ plot predetermined the applicability of the Diffusion, Elovichian and Quasi first order models. The linearity change in the Elovich plot illustrated the energetic heterogeneity typical of heterogeneous sorbents. Though the PFO showed lower error and lesser deviation of the estimated and observed uptake, the authentication coefficient ($\alpha = 1.06$) indicates that the PFO may not really be applicable at the process time (60min). However, the PSO gave higher correlation (0.999), significantly low error and deviation, and a higher rate constant. Hence, based on time effect of rate constant and the equilibrium coefficient ($f_2 \rightarrow 1$), the Langmuirian uptake is better in the PSO domain. The transfer of benzene sorptive for uptake was complementarily controlled first by internal diffusion then by film diffusion.

Keywords: Sorption Kinetics, uptake, Diffusive Transfer, diffusion

Introduction

Over three decades, environmental concerns have been on its contamination with toxic and carcinogenic organic and inorganic pollutants and subsequent viable remediation. Sorption has remained the most popular technique studied. The reasons have been the high energy consumption, expensive synthetic resins and chemicals (Chatterjee et al., 2009), application difficulty, inefficiency especially at low concentration (Chakraborty et al., 2003; and Blackburn, 2004) relative to the effluent volume, non-eco-friendliness (Mondal 2008 and Gadd 2009) and the expertise associated with other remediation techniques. Sorbent uptake capacity is widely known as a function of the sorption process factors: time, sorbent dosage, sorptive concentration, pH, particle size, temperature, etc easily applicable in batch systems. As a result of its physical and superficial nature, unlike chemisorption, the entropy of physisorption is often negative which conform to the associative uptake that leaves sorbent intact during and after the sorption. Generally, physisorption in contaminant removal is an effective method of quick lowering of the contaminant concentration.

Benzene is a very potent class of environmental pollutant that occur both naturally and can be released via anthropogenic activities. Besides its prime carcinogenic (Rogers, et al., 1980) and mutagenic effects, it is culpable of other adverse health and environment effects making its presence in the environment of serious concern, even at low concentrations. As a major and popular member of petroleum hydrocarbons: Polycyclic aromatic hydrocarbons (PAHs) and Volatile organic compounds (VOCs), Benzene can naturally be released to the environment via natural and anthropogenic activities. Some common means include volcanic eruptions, crude oil and coal deposits, forest fires, residential wood burning, exhaust from auro-engines, automobiles and trucks; and components in industrial solvents and raw materials waste discharged in the environment. Being a recalcitrant VOC (Ritter et al., 1995) of numerous derivatives, its environmental ubiquity via wet and dry atmospheric deposition, hydrocarbon spillages and hydrocarbon/crude effluent discharge, have made its elimination from the environment practically infeasible. However, it is requisite to keep their terrestrial and aquatic concentrations as low as possible. Generally, sorption provides a simple but effective approach for organic pollutants removal from aquatic environments (Cabal et al., 2009 and Derylo-Marczewska et al., 2008).

Though literature has widely reported on non-conventional, low cost and locally available sorbents carbonized and non-carbonized Bio-wastes are continuously being applied in the extensive sorption studies. Various sorbents have been applied in the contaminant removal from fluids. Rasheed Khan et

al, (2005) used Wool Fiber and Cotton Fiber while Chitosan was applied as sorbent for dye removal (Chatterjee et al., 2009). Neem (*Azadirachta Indica*) Husk has been used by Alau et al (2010), Kadirvelu et al (2003) studied adsorption with Coconut tree sawdust, and Singh and Srivastava (2001) and Guo et al (2003) studied Rice husk. Studies has also been reported on dye uptake on Rice husk (Singh and Srivastava, 2001; Guo et al, 2003), Tuberose Sticks (Ahsanhabib et al, 2006) and Tamarind Fruit Shell (Saha 2010). Studies have also been reported for hydrocarbon uptake; Brezovska et al. (2004) studied the sorption of benzene vapor onto bentonite, Akhtar et al. (2006) considered sorption potential of *Moringa oleifera* pods for aqueous Benzene. Also Aivalioti et al. (2010) have adsorbed Benzene and its derivatives onto raw and modified diatomite while Osagie and Owabor (2015) investigated Benzene uptake onto Clay and Sandy Soil.

Tea waste as used in this study, common littery of the contemporary Nigerian society, have not been reported for benzene uptake. Attributive to the medicinal value of its brew, Green tea consumption is recording exponential growth making for the abundance and availability of its waste.

Chemical and thermal reforms are the most common and frequent techniques applied on sorbents. Chemical treatment in sorbent modification is to enhance particle disaggregation, surface cleaning, removal of mineral impurities, partial dissolution of external layers and free silica generation (Gonzalez et al., 1989; Bhattacharyya and Gupta, 2009). Thermal reform of sorbent, that is, carbonization (biomass) or calcination (clay) improves its porosity hence the sorption capacity. Therefore, the application of chemical and thermal treatment on tea waste may alternate the over use of commercially activated carbon sorption processes. This work overviewed an insight on sorption kinetics using the uptake of aqueous benzene on modified Tea waste.

Theoretical Framework

Sorption Kinetics

Knowledge of sorption kinetics will continue to be major leitmotif in soil science and engineering (Sparks, 1998) owing to the persistent interest in predicting the fate of contaminants and controlling their presence in the environment. It provides valuable insights into sorptive interaction pathways and the mechanism involved (Thajeel et al 2002) for predicting the rate parameters for treatment techniques and designs. Sorption kinetics explains the time dependence of the extent of sorptive transfer and interactions at the surface of the sorbent. As time progresses, sorbate increases, sorptive concentration decreases, and sorption rate slows down.

Several kinetic models have been proposed in the unending quest to describe the rate of sorbate transfer and interaction in sorbents. The kinetic models encompasses the ordered (zero, first and second) equations, Elovich

model, Bangham or fractional-power equation, parabolic, particle or internal diffusion model and film diffusion model. The mechanisms of some of these models are not well understood and mechanistic conclusions, till date, have primarily been based on macroscopic and kinetic studies (Sparks, 1998). Yes, experimental data has always fitted to one empirical kinetic model or the other however, the significance and interpretation of the parameters obtained, especially as reported in most papers, have not really been clear. Some authors have not appropriately applied these models, resultant of inadequate understanding of the models' theory or principle (Ho, 2004). Owing that chemical kinetics like transport processes are rate mechanisms; solely time dependent, description of holistic uptake process within completion time is an integral of rate models predominant at certain limited time ranges. The finding that diffusion accounts for the slow interactions at the sorption interface indicated that interaction mechanism alone cannot proffer complete description of sorption kinetics (Sparks, 1998). Therefore, only a simultaneous application of transport phenomena and interaction kinetics can give a holistic kinetic description and understanding of any sorption process. These complementary mechanisms describing sorption kinetics on solid surfaces can be categorized as physical non-equilibrium: film and particle diffusion models and chemical non-equilibrium: ordered and Elovichian kinetic equations typical of surface interactions. Because mass transfer in the mobile liquid phase is not rate limiting, physical non-equilibrium models focus on diffusion into the immediate vicinity of the solid phase of the system.

The fitness of the Pseudo first order (PFO), Elovich and parabolic models are restricted to certain time limit and range: consequent of their being approximations of a more general model expression (Pavlutou and Polyzopoulos, 1988; Aharoni et al., 1991; Sparks, 1998). That a particular kinetic model best describe the sorption mechanism denotes that, most likely, the experiment and data collection was done within the time limit where the model is predominantly operational.

Kinetic studies in the recent past revolves around the assumption that only two sorption sites exist. The instantaneous interaction site typical of fast sorption is described using isotherm models and time dependent interactions site, slow sorption is described using kinetic models. These models are characterized by two fitting parameters – fraction of site occupied at local equilibrium consistent with uptake (q_t) and rate constant k_{ad} . Due to the complex heterogeneous nature of most sorbents and their modified forms, there are still many unknowns as regards to sorption onto these solid materials (Sparks 1998). This accounts why simple kinetic models like the PFO equation may not appropriately describe the entire sorption mechanism.

As most commonly reported in sorption studies, fitness of the kinetic models have been based on the statistical parameters: plot linearity, coefficient

of determination (R), correlation coefficient (R^2), normalized standard deviation (Δq) (Ölenera Şölener Şölener et al., 2008) and the estimated standard error (χ^2). However, due to the empirical nature of the simple kinetic models, statistical parameters alone cannot give complete authentication of the operational mechanism(s). It is worthy to note, despite the wide applicability of the kinetic models to various experimental results, there is no consistent correlation between the equation of best fit and the physicochemical and mineralogical properties of the sorption system (Aharoni et al. 1991). Therefore, Sparks (1989 and 1998), Aharoni and Suzin (1982a,b), Pavlatou and Polyzopoulos (1988) and Aharoni et al. (1991) criticized the use of statistical data fitness parameters as the sole tool for deducing the sorption mechanism. Critical examination of the inconsistencies and problems associated with the application of the simple kinetic equations and the ambiguity in the use of the statistical fitness parameters have revealed that the $Z_{(t)}$ plot is a better test tool that authenticates the applicability of the PFO, Elovich and Parabolic models. Statistics verifies how well the data fits the choice models, therefore, is better applied as the experimental data test tools after the findings of the $Z_{(t)}$ plot.

In recent studies, the empirical sorption models: Freundlich, Langmuir, PFO, Pseudo second order (PSO), and Elovich have been modified. Considering factors and conditions that describe the aggregative and combinative representation of the different features of the models, other models have been derived from them. The derived models include the Marczewski's Integrated Kinetic Langmuir equation (IKLE) (Marczewski 2010) from the Langmuir model, the Fractional power (two-constant rate) equation derived from Freundlich model. From the PFO and PSO equations comes the mixed 1,2-order rate equation (MOE) (Marczewski, 2010). The Ward et al. Statistical Rate Theory (SRT), one of the derived models describes interfacial sorption rate (Rudzinski et al. 2000, 2006; Panczyk et al., 2004; Azizian et al., 2008 and Plazinski et al., 2009). Other derived models comprise the Avrami's kinetic model of particle nucleation for sorption at solid/solution interface (Lopez et al., 2003), Brouers and Sotolongo-Costa's universal fraction, fractal kinetics for sorption kinetics at solid/solution interface using statistical concepts (Brouers and Sotolongo-Costa, 2006) and the Fractal-like forms (Haerifar and Azizian, 2012). A comparative critical survey of the above empirical sorption models' derivatives would show not more than a mirror of each other different only with the introduction of descriptive constants and special conditions. The reflection of the derived model in one another is evident in the obvious similarity in IKLE, MOE and their fractal-like forms and also with their common dependence on the parameters of their parent models. Accordingly, a derived model can authenticate the statistical definition of the parent and controlling empirical model. The empirical

models, their modified forms and/or derivatives can proffer independent or concomitant description of sorption and its kinetic mechanisms.

In using the ordered equations, the implied general assumption holds that all the surface sites are potential reactants at any time and they have an opportunity of participating in the sorption process. The PFO equation proposed by Lagergren (1898) and the subsequent PSO equation proposed by Ho (1995) are often the bases of the contemporary proposed sorption kinetic models. Unlike the true (reaction) ordered rate equations which are based on solution concentration, sorption rate equations are based on the sorbent uptake. The rate equations applicable in sorption kinetics comprises of the PFO (Lagergren, 1898), the PSO (Sobkowsk and Czerwinski, 1974; Ritchie, 1977; Blanchard et al., 1984; Ho, 1995), the Elovich model (Zeldowitsch, 1934; Low, 1960 and Chien and Clayton, 1980), and other modified form. The Azizian theoretical analysis on Langmuir rate equation relative to the Marczewski's derivation of MOE has revealed that the Langmuir model can be a primo foci in the derivation of the PFO and PSO models (Haerifar and Azizian, 2012). Although satisfactory kinetic descriptions have been reported using one or a combination of these models, none has been proved universally valid (Pavlatou and Polyzopoulos, 1988). While Lagergren, Boyd et al, Blanchard et al and Ho considered liquid-solid systems; Zeldowitsch, Sobkowsk and Czerwinski, and Ritchie worked strictly on gas-solid systems. However, the gas-solid based equations like the liquid-solid based equations were also proposed based on reactive sorption and in recent studies, have been applicable in liquid-solid systems.

To verify the model that dominates at a considered time limit, the S-shaped $Z_{(t)}$ plot has been reported to illustrate different mechanism by interpreting the different portions of the plot. The plot shows convex within small time interval where the parabolic law is operational; linear inflation at intermediate time range where Elovichian kinetics is determinate; and at larger time, shows concave typical of first order model (Pavlatou and Polyzopoulos, 1988; Sparks, 1998; Aharoni et al. 1991):

$$Z_{(t)} = (\Delta q / \Delta t)^{-1} = (dq / dt)^{-1} \quad (1)$$

The power function equation and the first order equation representing the initial and final portions of the $Z_{(t)}$ plot respectively are typical of homogeneous diffusive sorbate transfer. While intermediate linear portion, representing the Elovichian kinetics is typical of heterogeneous diffusion. Therefore, diffusional transfer to and through heterogeneous surface is operational when the Elovich model predominates. This is n by a larger linear part of the S-shaped curve. However, when either or both fractional power and/or first order model predominate the plot, homogeneous diffusion is operational (Pavlatou and Polyzopoulos, 1988; and Sparks, 1998).

The $Z_{(t)}$ plot's remedial inclination to the criticisms of statistical deduction of kinetic mechanism and its embodiment of the Elovichian mechanism made it the best tool to examine the applicability of the simple kinetic equations. From the characteristic models of the $Z_{(t)}$ plot, physically meaningful parameters appropriate for the prediction of the sorption phenomena can be calculated (Aharoni et al. 1991). Therefore, though various models may appear to describe sorption, the simple kinetic models that gives description of the overall sorption process are those characterized by the $Z_{(t)}$ plot.

First order equation

Lagergren (1898) described rate in terms of the amount of the entity adsorbed on the surface of the sorbent rather than the amount in the bulk fluid. This predicated his rate equation being termed quasi and reported as Pseudo. The model considered sorption of sorptive on the mathematical principle of the first order rate equation. Though driven by the sorbent affinitive capacity at the process time, it is given by the difference in the reference capacity (maximum/equilibrium) of the sorbent and the amount adsorbed at any time, t ($q_{\infty} - q_t$). Most often than not, in actual experimental runs, large time: in hours may be needed in sorption process to attain true equilibrium. Therefore, in the time considered in most studies, sorption actually tends to equilibrate and the equilibrium plot likely gives a pseudo equilibrium uptake. Also, worthy to reckon is the dynamics of equilibrium especially in a prolonged sorption that is susceptible to noise effect of fluctuating factors like temperature, pressure and concentration. More so, most studies have used low process time limits that may not really be enough to attain the true equilibrium uptake of the sorbent as requisite for application in the PFO model. Thus, the $Z_{(t)}$ plot is pertinent; to help support the applicability of the PFO model for the time range. Though data for low time limit may conform, with or without extrapolation and/or manipulation, the model may not give useful uptake result and information. This follows from the possible quasi equilibrium uptake typical for low process time range. Due to the adsorption-desorption nature of physisorption, the state of equilibrium uptake (q_e), must often than not, is dynamic and can be best reported experimentally as tending/approximate value. These limitations often disallow the attainment of sustainable true equilibrium; making the PFO model, in contemporary, best useful as basic model for sorption analysis rather than applicable model for useful design results and information. Therefore, in accordance with notations of Boyd et al (1947) this uptake is better reported as uptake (q_{∞}) as time tends to infinity ($t \rightarrow \infty$). Otherwise, for the equation to fit the experimental data, the equilibrium uptake, q_e must be known:

$$\frac{dq_t}{dt} = k_1(q_\infty - q_t) \quad (2)$$

To use the actual uptake at equilibrium, which may not be attainable within the experimental time considered, there is need to extrapolate the data or treat q_e as an adjustable parameter determinable by trial and error. The parameter $\ln q_e$ is an adjustable parameter; often, contrary to a true first order process, it is found not equal to the intercept of the $\ln(q_\infty - q_t)$ vs t plot. This informs the introduction of an authentication coefficient, α which corresponds to a time constant, t_0 considered for a pseudo-first order process to make up for the time sufficiency for equilibrium attainment. Generally, at applicable time regime, $\alpha = 1$ and $\alpha \gg 1$ when the time regime is sufficiently small for the first order equation to be valid (Aharoni et al., 1991). Integration of equation (2) at boundary conditions $q_t = 0$ at $t = 0$; $q_t = q_\infty$ at $t = \infty$ gives the integrated form:

$$\frac{q_t}{q_\infty} = 1 - \alpha \exp(-k_1 t) \quad (3)$$

Linearizing to get:

$$\ln(q_\infty - q_t) = \ln \alpha q_\infty - k_1 t \quad (4)$$

Where q_t is uptake at time t (mg/g); k_1 is the first order rate constant (min^{-1}), q_∞ is the equilibrium uptake as time tends to infinity, and $q_e = \alpha q_\infty$.

Elovich

This model, primly proposed by Roginsky-Zeldowitsch (1934) for chemisorption on an energetically heterogeneous solid surface has widely been applied and in several contemporary works has been peripherally applied or just mentioned as a model. Basically, the model proposed that as the sorption progresses, surface coverage increases, rate of sorption decreases and the energy requirement at sorbent surface varies leading to sorption heat varying inversely with the sorbent surface coverage. Sorption heat is usually high at low surface monolayer coverage and decreases steadily with an increase in uptake (Saha and Chowdhury, 2011). This is usual with film diffusion controlled sorption. It follows therefore that the sorbent surface during uptake is energetically heterogeneous, giving an implicit character of giving information on the degree of sorbent heterogeneity and capacity. Though proposed on the basis of a gas-solid system, the Elovich model has widely been applied in liquid-solid systems: Sparks and Jardine (1984), Pavlatou and Polyzopoulos (1988), Ho (2006) and is expressed as (Low, 1960):

$$\frac{dq}{dt} = \alpha e^{-\beta q} \quad (5)$$

Integrating equation (5) for $q_t = 0$ at $t = 0$ gives (Sparks and Jardine, 1984)

$$q_t = \frac{1}{\beta} \ln(1 + \alpha\beta t) \quad (6)$$

Where α [mg/g.min] is initial sorption rate and β [g/mg] is desorption coefficient for any one experiment. Sparks and Jardine assumed that before actual uptake that started at a certain time, τ there was an instantaneous uptake (q_o) at a rate α just before equation (5) begins to apply. The time from zero to the instantaneous time τ , is given as t_o where $t_o = \frac{1}{\alpha\beta}$ and $\tau = t_o e^{\beta q_o}$ making equation (6) becomes

$$q_t = \frac{1}{\beta} \ln(t + t_o) - \frac{1}{\beta} \ln t_o \quad (7)$$

Considering the instantaneous uptake, q_o at time, τ and at a rate α ,

$$q_t = \frac{1}{\beta} \ln(t + \tau) - \frac{1}{\beta} \ln t_o \quad (8)$$

Assuming the boundary conditions of $q_t = 0$ at $t = 0$, $q_t = q_t$ at $t = t$ and that τ is negligible in comparison with t gives:

$$q_t = \frac{1}{\beta} \ln(\alpha\beta) - \frac{1}{\beta} \ln t \quad (9)$$

The constants α and β are obtainable from q_t vs $\ln t$ plots. If $\alpha\beta t \gg 1$ (Chein and Clayton, 1980 and Sparks and Jardine, 1984), then $(1 + \alpha\beta t) \approx \alpha\beta t$ and equation... becomes:

$$q_t = \frac{1}{\beta} \ln(\alpha\beta) \quad (10)$$

Although attempt has been made to find q_e from the Elovich equation, the value obtained is an approaching value; arbitrarily identified, not the real, q_e .

Using the Elovich equation to describe kinetics was criticized by Parravano and Boudant (1955) on the grounds that it does not describe a specific process, rather it is applied in a number of different processes such as bulk or surface diffusion, activation and deactivation of catalytic surfaces. Fitting experimental data, the Elovich model can reveal irregularities that ordinarily, other models would not notice or consider. Although the improved Elovich model (Ungarish and Aharoni, 1983) does account for the generally observed sigmoid plots, it does not usefully suggest the nature of the rate determining step in sorption (Pavlatou and Polyzopoulos, 1988). What seems more important about this model is that its conformity to sorption kinetics might be taken as evidence that the rate determining step is diffusional in nature (Pavlatou and Polyzopoulos, 1988). It also points that the diffusion is heterogeneous and the diffusional transfer is through a heterogeneous sorption surface. Any break in the linearity of the Elovich plot could indicate a changeover not in the kinetic consideration rather from one type of binding

site and/or energy to another (Low 1960; Atkinson, et al. 1970; and Chein and Clayton, 1980). Due to heterogeneity in sorbent surfaces, the Elovich model is fervently applicable in situations of wide variation in activation energy and surface complexity.

Though the $Z_{(t)}$ plot and the Elovichian q vs Int plot are characteristic of producing S-shaped (sigmoid) plots their curvatures are reversed (Aharoni et al., 1991). Besides the characteristic portions of the sigmoid $Z_{(t)}$ plot corresponding to the various equations, the applicability of the equation can also be verified by the differential slopes of the Elovich equation; $dq/dInt$. In the plot, the region corresponding to the parabolic law gives increasing slope, the regions conforming to Elovich model giving a constant slope while the region consistent with the quasi first-order equation shows decreasing slope (Aharoni et al 1991). The region where the slope $d[q/q_e]/d\ln t < 0.24$, Elovichian mechanism is obeyed and it reflects sorption in a heterogeneous medium (Aharoni et al 1991).

Second order equation

Considering the pitfalls of the Lagergren first order equation, Ho (1995) pitched on the works of Sobkowsk and Czerwinski (1974), Ritchie (1977), Blanchard et al. (1984), hence proposed the pseudo second order rate equation using liquid-solid systems. In many studies, this equation has always been applied even when the pseudo first order showed a good statistical fitness. It may have been predicated on the basis that the first order equation uses observed equilibrium uptake. More so, in most studies, the time considered may not have been enough to attain true equilibrium. On the other hand, the second order uses the uptake at time, t to determine the estimated equilibrium uptake. Consequently, verifying the rate model fitness based on statistical fitness parameters has been criticized and considered inappropriate (Aharoni and Suzin, 1982a,b and Pavlatou and Polyzopoulos, 1988). Though the validity of the second order equation cannot be verified with $Z_{(t)}$ plot, studies have shown that the closeness of observed and calculated uptake values ($q_{\infty} = q_{exp}$ and $q_c = q_{cal}$) is a good validation for the statistical fitness. The second order equation has been expressed by Ho (1995) or Haerifar and Azizian (2012) respectively as:

$$\frac{dq_t}{dt} = k_2(q_c - q_t)^2 \quad \text{or} \quad \frac{dF}{dt} = k_2 q_c (1-F)^2 \quad (11)$$

At boundary conditions of conditions $t=0, t=t$; $q_t=0, q=q_t$ integration yields

$$q_t = \frac{k_2 q_c^2 t}{1 + k_2 q_c t} \quad \text{or} \quad F = \frac{k_2 q_c t}{1 + k_2 q_c t} \quad (12a)$$

$$\frac{t}{q_t} = \frac{1}{k_2 q_c^2} + \frac{t}{q_c} \quad \text{or} \quad \frac{t}{F} = \frac{1}{k_2 q_c} + t$$

(12b)

The $\frac{t}{q_t}$ vs t plot, independent of q_c gives a slope from where q_c can be calculated and an intercept where k_2 can be estimated. Contrary to the first-order equation that has been verified to be applicable mainly at large time range, the second order model predicts the sorption behavior over the whole sorption time (Ho, 2006).

Marczewski used the Taylor's series to expand the Pseudo second order equation introducing equilibrium coefficients f_1 and f_2 which express the contributions of the pseudo ordered models; describing the extent of the dominant mechanism. The coefficient f_2 tends to zero when the uptake mechanism is less of PSO and more of PFO and vice versa giving that $f_1 + f_2 = 1$ (Marczewski 2010):

$$\frac{dF}{dt} = \frac{k_1}{1-f_2} (1-F)(1-f_2 F) = \frac{k_1}{f_1} (1-F)(1-f_2 F) \quad (13)$$

Integrated to give

$$\ln\left(\frac{1-F}{1-f_2 F}\right) = -k_1 t \quad \text{or} \quad q = q_e \left(\frac{1 - \exp(-k_1 t)}{1 - f_2 \exp(-k_1 t)} \right) \quad (14)$$

Where k_1 is rate constant accounting for PFO, q and q_e are the uptakes (mg/g) at time t and at equilibrium, $f_2 = \frac{k_2 q_e}{(k_1 + k_2 q_e)}$, $f_1 = \frac{k_1}{(k_1 + k_2 q_e)}$, k_2 is the PSO rate constant F is the equilibrium coefficient describing the fractional attainment of equilibrium. Linearizing the above equation gives:

$$\ln(1-F) = -k_1 t + \ln(1-f_2 F) \quad (15)$$

Marczewski further considered uptake solely at equilibrium using the Langmuir model that measured sorbent capacity, q_m hence replacing f_2 with f_{eq} in the MOE above giving:

$$\frac{dF}{dt} = \frac{k_1}{1-f_{eq}} (1-F)(1-f_{eq} F) \quad (16)$$

Thus giving the integrated and linearized form:

$$\ln(1-F) = -k_1 t + \ln(1-f_{eq} F) \quad (17)$$

Where $f_e = v_e \theta_e$ is the Langmuir batch equilibrium coefficient, $v_e = \frac{C}{C_o} = (1 - \frac{C}{C_o})$ is the relative equilibrium uptake, $\theta_e = \frac{q_e}{q_m}$ is the surface coverage at equilibrium. In the Fractal-like form as postulated in Haerifar and Azizian (2012), the IKLE and MOE are given respectively as:

Diffusive Transfer

Aharoni et al (1991) have assumed that sorbent constituents (minerals) are mainly responsible for uptake and that rate controlling mechanism is often diffusion of sorptive into the sorbent and its vicinity. In the interpretation of kinetic data from a mechanistic point of view, prediction of the mass transfer rate-limiting step is an important factor to be considered (Vadivelan and Kumar, 2005). The overall mass transfer in solid/liquid system, apart from that influenced by the moving liquid, revolves around diffusive mass transfer, intra-particle transfer, interaction at the sorbent surfaces/sites, and desorption from surfaces/sites/vicinities into bulk solution. The diffusive mass transfer entails transfer through a thin liquid film to the sorbent immediate vicinity while the intra-particle transfer defines diffusive transfer in and through openings between sorbent particles. The transfer can best be governed by slowest of the above steps. However, interaction has rarely been reported as rate limiting in uptake processes (Michelson et al. 1975) because it is highly dependent on the transfer of sorptive to the sites. Depending on the concentration existing in the aqueous phase, the rate of sorptive uptake can be controlled either by diffusional transport across a thin liquid film enveloping the sorbent particles or by internal diffusion. The film diffusion controls the mass transfer of the sorptive from bulk phase to external sorbent surface while the internal diffusion, on porous solids, controls transfer in and through the sorbent particle. It is possible however, that both film and particle diffusion can play contributory roles with neither of them having sole control of the transfer. In a rapidly stirred batch sorption, the diffusive mass transfer can be related by an apparent diffusion coefficient, which will fit the experimental sorption-rate data.

Film diffusion

To ensure constant sorbate concentration at the solid/liquid interface, vigorous mixing has always been employed, mainly for powdery sorbents. However, it is presumed a concentration gradient is maintained at the thin liquid film surrounding the sorbent particles forming the boundary and resistance to diffusive transfer. At equilibrium, the distribution of sorptive between the solid and liquid phases can be estimated. This distribution is constant within experimental error on the assumption that the sorptive is a micro-component of the system i.e., infinitely dilute sorptive solution (Boyd et al., 1947). The magnitude of the distribution coefficient (κ) indicates a measure of the efficiency of the sorbent for the uptake.

$$\kappa = \frac{c_s^e}{c_l^e} \quad (18)$$

c_e^s and c_e^l are the equilibrium sorbate and sorptive concentrations. Following that equilibrium at the surface of the sorbent particle is assumed at all times as constant (Boyd et al., 1947):

$$c^l = \frac{c^s}{K} \quad (19)$$

If film diffusion is rate limiting, then the rate of transfer from the Fickian theory: permeation (quantity transferred/unit time/unit area of unit thickness under a standard concentration difference) holds that (Boyd et al. 1947):

$$p = V \frac{dc}{dt} = -D^l \frac{\delta c}{\delta r} \quad (20)$$

Where D^l is the diffusion constant in the liquid phase, r is the radius of sorbent particle. Particles of porous sorbent are often considered spherical (Boyd et al. 1947) hence;

$$q = \frac{4}{3} \pi r^3 c^s \quad (21)$$

For mass transfer to the sorbent external surface through a bounding liquid film, total rate of transfer of sorptive across the film:

$$\frac{dq}{dt} = -4\pi r^2 p = 4\pi r^2 D^l \frac{\delta c}{\delta r} \quad (22)$$

The above equation for linear gradient where radial effect is constant is given as:

$$\frac{dq}{dt} = 4\pi r D^l (c^l - c^f) \quad (23)$$

c^f , the concentration within the film around sorbent; hence with $c = 3q / 4\pi r^3$ we have

$$\frac{dq}{dt} = (3 D^l / \kappa r^2) (q_e - q) \quad (24)$$

$K_f = 3 D^l / \kappa r^2$ being the film transfer rate constant, integration at $t = 0$ and $q_t = 0$ gives

$$q = q_e (1 - e^{-K_f t}) \quad (25)$$

Taking natural log and considering the fractional attainment of equilibrium,

$$F = \frac{q}{q_e}$$

$$\ln(1 - F) = -K_f t \quad (26)$$

Equation (1.33) is similar to the integral form of PFO equation: this verifies that the empirical sorption models play complimentary and *validative* rule in sorption kinetics.

Internal/Particle diffusion

Earlier works that reported transfer kinetics in the internal vicinity of sorbents include Bingham and Burt (1924), Barred, (1941) and Boyd et al., (1947), and Weber and Morris (1963). For Fickian diffusion: the diffusion in

and through solid (Boyd et al., 1947) and the Two-constant equation or Parabolic law (Spark, 1989; Spark and Jardine, 1991). In recent works, these models are reported as Internal diffusion model and Intra-particle diffusion equation (Weber and Morris, 1963) or Particle diffusion model, the parabolic law where the power of t tends to 0.5. The Weber and Morris model has been the most applied, though superficially in most works. Internal transfer as presented by Barrer, (1941) and Boyd et al., (1947) considered constant sorbate concentration in a liquid-solid system where the fractional attainment of equilibrium, F for internal diffusion is given as:

$$F = 1 - \frac{6}{\pi^2} \sum_{n=1}^{\infty} \frac{1}{n^2} e^{-n^2 K_{in} t} \quad (27)$$

It follows that for sorption governed by diffusion, the estimated slope $\left(\frac{d(-\ln(1-F))}{dt}\right)$ varies between infinity initially and $-K_{in}$:

$$\frac{d(-\ln(1-F))}{dt} = -K_{in} \frac{\sum_{n=1}^{\infty} e^{-n^2 K_{in} t}}{\sum_{n=1}^{\infty} \frac{1}{n^2} e^{-n^2 K_{in} t}} \quad \text{otherwise, it is constant for sorption controlled}$$

by Chemical reaction (Boyd et al., 1947). Numerically, the series in (27) converges slowly for small values of $K_{in}t$ suggesting the use of an approximate equation. Thus, for small values of $K_{in}t$ which corresponds to small fractional equilibrium attainment ($F \leq 0.7$), uptake is low. The low uptake is applicable only on the external surface of the sorbent, relating mainly, the parabolic rate law valid in small time range of the $Z(t)$ plot postulate. Boyd et al (1947) expressed this situation as:

$$F = \frac{6}{r} \sqrt{\frac{D^i t}{\pi}} = 1.08 \sqrt{K_{in} t} \quad (28)$$

Where, $K_{in} = \frac{D^i \pi^2}{r^2}$ ($\text{mg/gmin}^{0.5}$) is the diffusion rate constant; D^i is the internal diffusion coefficient, equation (28) can be related to the Parabolic law:

$$q = K_i t^{0.5} \quad (29)$$

Where $K_i = 1.08 q_{\infty} K_{in}^{0.5}$, hence it follows that for $F > 0.05$, (29) may not be suitable to describe diffusion determining uptake. However, particle diffusion have often been described using the expression that considered the effect of boundary layer (film thickness, I):

$$q_t = K_i t^{0.5} + I \quad (30)$$

The Boyd curve obtainable from the F vs $K_{in}t$ plot of table 2 below can be applied for graphical estimation of $K_{in}t$ conforming to any observed value of F , enabling the calculation of K_{in} for the corresponding contact time.

Otherwise, Tsibranska, and Hristova, (2011) have applied Fourier transform on (27) forming expressions for $K_{in}t$ where K_{in} can be arithmetically estimated for agreeing contact time:

$$0.05 < F < 0.85: K_{in}t = (\sqrt{\pi} - [\pi - (\pi^2 F/3)]^{0.5})^2 \quad (31)$$

$$F > 0.85: K_{in}t = -0.498 - \ln(1-F) \quad (32)$$

When K_{in} is constant within the same time range where K_f varies, then internal diffusion controls the rate of sorptive uptake, else permeation through a thin, enveloping liquid film determines the rate of uptake. However, if film diffusion is rate controlling, the slope ($K_f = \frac{-\ln(1-F)}{t}$) will vary inversely with the particle size, the film thickness and/or the distribution coefficient, κ . More so, if the data highly obeyed the internal diffusion, K_f would vary directly with particle size (r), film thickness (Δr) and/or distribution coefficient (κ) (Boyd et al. 1947) otherwise film diffusion is significantly involved. Where internal diffusion is rate determining, average D^i can be calculated from $K_{in} = \frac{D^i \pi^2}{r^2}$ knowing the particle size, r . Also, the film diffusion coefficient D^f can be determined from the diffusion rate constants ($K_f = \frac{3D^f}{r\kappa\Delta r}$). Film coefficient, D^f falls between 10^{-6} - 10^{-8} cm^2/sec while D^i falls between 10^{-11} - 10^{-13} cm^2/sec (Michelson et al. 1975; and Bhattacharya and Venkobacher, 1984). Semi-quantitatively, the ratio $\frac{K_{in}}{K_f} = \frac{D^i \kappa \pi^2 \Delta r}{3D^f r}$ would give value $<$ unity for internal diffusion controlling sorption rate, otherwise film diffusion would be the determining mechanism (Boyd et al. 1947).

Table 1: Solutions to Equation 27: The values in the first three columns were obtained from the approximate equation (28). The values of F are given to three significant figures, but the last figure may be in error (Boyd et al., 1947)

F	$K_f t$	F	$K_f t$	F	$K_f t$	F	$K_f t$	F	$K_f t$
0.035	0.00	0.225	0.06	0.555	0.40	0.720	0.80	0.970	3.00
0.090	0.01	0.265	0.08	0.605	0.50	0.775	1.00	0.980	3.50
0.125	0.02	0.300	0.10	0.650	0.60	0.818	1.20		
0.155	0.03	0.365	0.15	0.690	0.70	0.865	1.50		
0.180	0.04	0.462	0.25			0.915	2.00		
0.205	0.05	0.497	0.30			0.950	2.50		

Materials and Method

Adsorbent preparation

About 100 grams of the Tea waste (TW) was soaked in distilled water for 2 hours to purify it of fine dusty particles and other adhered impurities. The TW was dried in the oven at 100°C after mesh-drained and partially air-dried. The oven-dried sample was cooled in a desiccator. 30 grams of TW was mixed with 2 grams of iron (III) nitrate dissolved in 200 ml of ethanol solution to prepare a 10 wt. % impregnated TW. The impregnation mixture was heated in an oven at $80 - 100^\circ\text{C}$ for 12 hours and the dry impregnated TW was carbonized at 500°C for 3 hours. The carbonized TW was sieved with 140-200

ASTM sieve to ascertain the average particle size of the TW sorbent. Having a uniformity coefficient of 50/80 the 140-200 ASTM gave an average TW particle diameter of 0.09mm.

Preparation of Sorptive

To prepare the Benzene stock, 22.74 μ L of Benzene was discharged below the surface (to prevent volatilization) of about 80mL of the methanol in a 100mL flask and the solution was made up to 100mL. The flask was capped and inverted 3times to mix. The stock stored in the refrigerator in septum vials was brought to room temperature then diluted to 0.5mg/L solution. 0.25mL of stock was discharged below the surface of 90mL of distilled water in a 100mL flask and made up to mark with distilled water then inverted 3 times to mix and allowed to stabilize for 5 minutes.

Batch sorption

The solution in the neck of the flask was discarded and 10 mL of the diluted solution was transferred immediately to four (4) test tubes containing 0.5g TW each. The test tubes were capped airtight with a stopper after stocking the headspace above the liquid with cotton wool wrapped in a foil. The test tubes were placed on the test tube rag in the thermostatic shaker water bath for the uptake at room temperature ($\approx 25^{\circ}\text{C}$) and time interval of 15 to 65 mins. At the elapse of time, mixtures were centrifuged ($\sim 15\ 000$ rpm) for 10min. and the supernatant solutions were drawn for chromatographic analysis.

Amount adsorbed

Amounts adsorbed (mg/g) were calculated using the mass balance equation:

$$q_i = \frac{(C_o - C_e)V}{m} = \frac{VC_{ae}}{m} \quad (33)$$

Where q is the amount adsorbed (mg/g), C_o , C_e and C_{ae} : initial, equilibrium and adsorbed Benzene concentration (mg/L); V is solution volume (L), and m is dry Benzene weight (g).

Error Analysis for the adsorption models

The Correlation coefficient (R), Coefficient of Determination (R^2), standard error of the estimate (SE), and Normalized standard deviation (Δq) were determined applying the respective expressions below using Microsoft Excel.

Standard error of estimate (Spiegel and Stephens 2008)

$$\chi^2 = \left(\frac{\sum (q_{s,exp} - q_{s,cal})^2}{n} \right)^{0.5} \quad (34)$$

The deviation of the calculated uptake from the experimentally observed can be estimated by the Normalized standard deviation (Sölener, et al, 2008; Nagashanmugam and Srinivasan, 2011) or the Hybrid fractional error (Gulipalli et al, 2011) given respectively:

$$\Delta q = 100 \left(\frac{\sum (q_{s,exp} - q_{s,cal})^2}{q_{s,exp}} \right)^{0.5} \quad (35)$$

Where $q_{s,exp}$ and $q_{s,cal}$ are measured and calculated equilibrium uptakes, and n is the number of data points.

Result and Discussion

Generally, analysis of the sorption data helps in the development of equations which considerably describe the interactive behavior between sorbent and sorbate. From the uptake curve, (Fig. 1a), the uptake did not equilibrate at the max. time limit considered: 60min hence giving not the equilibrium value, rather the uptake at max. time (q_s as $t \rightarrow \infty$).

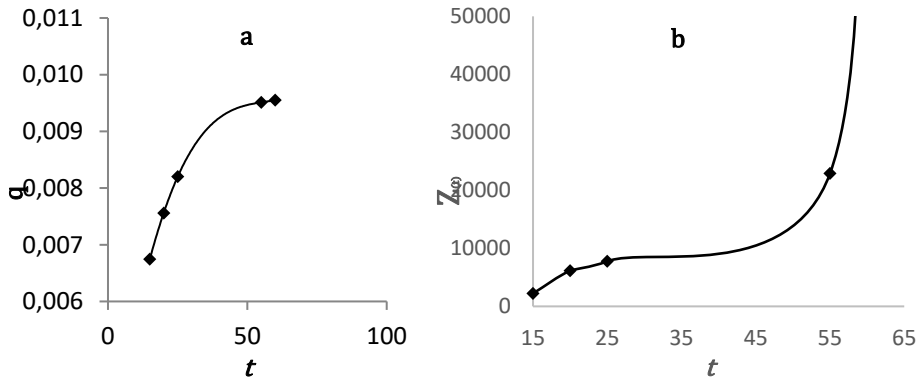


Figure 1: (a) The equilibrium uptake curve; (b) The $Z(t)$ plot for the Benzene uptake

The application of the $Z(t)$ plot ascertains the valid empirical model that is best applicable. Even when the first or second order gives better statistical fit to the data while the $Z(t)$ plot showed otherwise, the $Z(t)$ plot is considered (Pavlatou and Polyzopoulos, 1988). The $Z(t)$ plot, (Fig.1b), showed an S-shaped curve that conformed to the postulate of Pavlatou and Polyzopoulos (1988), Sparks, (1998) and Aharoni et al. (1991). The plot showed convex within small time interval (15-20min) where the parabolic law is operational. Within the intermediate time range (20-45min), the linear portion of the plot described the Elovichian kinetics. The concave portion marked by the time regime (45-60min) portrayed when the PFO mechanism is supposedly expected. By this dictate, the kinetics of the Benzene uptake was verified within the ambits of the reaction order mechanism, the energy related Elovich model and the influence of diffusion in the uptake process.

Table 2: Sorption kinetics and statistical parameters: Initial concentration (C_0) = 0.5mg/L. Benzene adsorbed, q_i (mg / g) ; Equilibrium uptake: observed, $q_{\infty,exp}$ (= 0.0096mg / g) and estimated, $q_{\infty,cal}$ (mg / g) ;PFO and PSO rate constants: k_1 (min⁻¹) and k_2 (g / mg . min) ; the dimensionless Marczewski MOE equilibrium coefficients: f_1 and f_2 . Elovich coefficients: α (g.min²/mg) and β (mg/min.g). Regression coefficient (R^2), Normalized standard deviation, Δq (%) and Standard error (χ^2).

Pseudo First Order		Pseudo Second Order	
$q_{e,cal}$	0.0102	$q_{e,cal}$	0.011
k_1	0.085	k_2	9.76
f_1	0.47	f_1	0.44
f_2	0.53	f_2	0.56
f_e	1.08	f_e	1.28
R^2	0.9956	R^2	0.9997
Δq	0.61	Δq	1.43
χ^2	0.0006	χ^2	0.0014

From Tab. 2, though the PFO equation gave a significant coefficient for good correlation of benzene uptake, the PSO equation showed a better correlation coefficient. On the other hand, the normalized deviation and the standard error showed that the value of the observed uptake is more approximate to the value calculated from the PFO than the value of the PSO equation. The $q_{e,cal}$ for both the first and second order are greater than $q_{\infty,exp}$ confirming the quasi state of q_{∞} being considered as equilibrium uptake. From the PFO plot, α obtained from the intercept gave $\alpha = 1.06$ indicating that q_{∞} is close to the true equilibrium uptake q_e . Also, it points that the time regime of 60min is not enough to attain the true equilibrium of benzene uptake onto the modified TW.

Clearly, the actual rate is dependent on the uptake capacity of the sorbent at the given time (t) and is qualified by the orders. It is however potential to get an idea about the rate by just observing the rate constant. At constant temperature, the higher the rate constant, k, the faster the interaction. Therefore, from Tab. 2, the rate constants showed that the uptake is faster in the second order than in the first order hence equilibrium may be attainable with the process time for a second order uptake.

In all cases, f_1 is lesser than its corresponding f_2 and the values of f_1 estimated from PFO and PSO are less than 0.5 hence tends towards zero while the values of f_2 are greater than 0.5 hence tends towards unity. It follows therefore that the uptake mechanism is less of PFO and predominantly PSO (Marczewski 2010). The higher values of f_e for both PFO and PSO compared to f_1 and f_2 showed that uptake at the entire process was predominantly Langmuirian that is, more of monolayer uptake, thus indicating physisorption.

The Elovich plot of Fig. 2a, showed a non-linear plot with the changes at 25min and at 55min indicating the likely changeovers from one type of binding site and/or energy to another (Low 1960; Atkinson, et al. 1970; and Chein and Clayton, 1980). This changeover illustrated energetic heterogeneity typical of heterogeneous sorbents. The regression plot of Fig. 2b gave a significant coefficient (0.9798) showing good correlation of the uptake data and fitness of the model to describe the uptake.

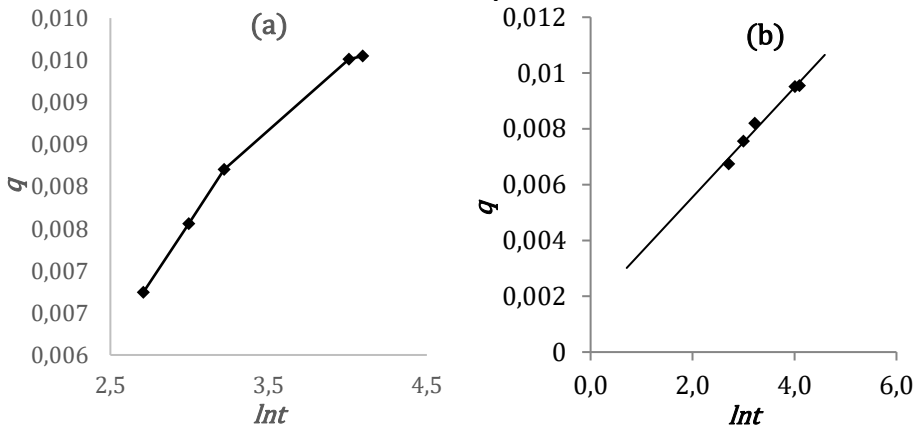


Figure 2: (a) The Elovich plot indicating the multilinear lines of the plot. (b) The Elovich regression plot.

The $Z_{(t)}$ plot (Fig.1b) showing a linear intermediate portion, the constant slope, $dq/d\ln t$ within the Elovichian time regime of the $Z_{(t)}$ plot and the significant R^2 (Tab.3) of the q vs $\ln t$ plot are evident of an Elovichian mechanism typical of Fickian diffusion. This illustrates that the rate determining step of the uptake kinetics is diffusional in nature (Pavlatou and Polyzopoulos, 1988) and on a heterogeneous sorption surface, that is, heterogeneous diffusion.

Table 3: Elovich Model parameters -

Elovich	
A	0.004
B	500
R^2	0.9798

The slope, $\frac{dq}{d\ln t}$ (Tab. 4), supported the kinetic postulates: increased slope define low time regime of the Parabolic law, constant slope typifies the Elovichian time regime, and the decreasing slope at higher time regime for the PFO (Aharoni et al 1991). The slope as shown increased at $t \leq 20$ min, maintained constancy at time, $20 < t < 55$ min and decreased at time, ≥ 55 min.

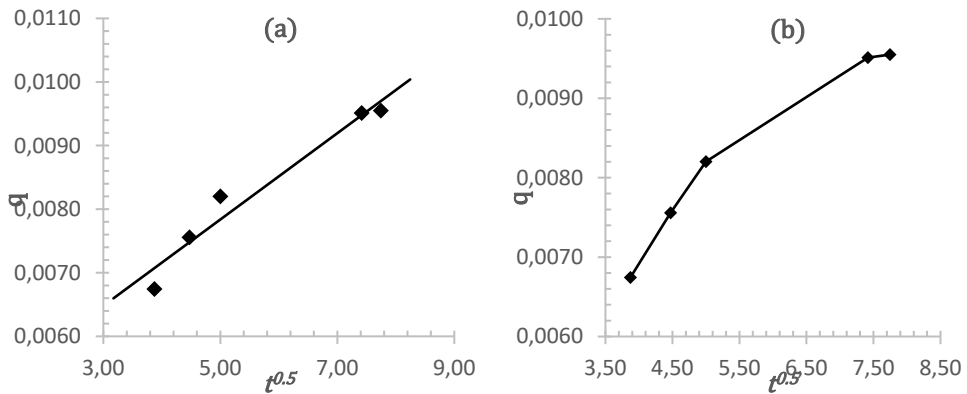


Figure 3: (a) The Regression plot of the Parabolic law. (b) The Multilinear plot of the Parabolic law

The diffusion based models were tested to verify the diffusion mechanism that best approximated the transportation of benzene sorptive to the sorbent surface sites. The regression line of Fig. 4.5a did not pass through the origin implying that the diffusion is not describe by the Weber and Morris Model. Moreover, uptake is not solely governed by particle diffusion. Fig. 3b showed a multilinear q vs $t^{0.5}$ plot which portrayed that diffusional transfer in the process is not solely particle diffusion. The first inclined portion represents the time regime of rapid uptake when the parabolic law (Weber and Morris particle diffusion) is applicable. The second inclined portion which prolong into the brief quasi horizontal portion corresponds to the regime of highest uptake characteristic of the film diffusion controlled uptake. Hence the diffusion mechanism that influenced the benzene transfer to the external and internal surface of TW is co-controlled (Sarici-Ozdemir, 2012; Gulipalli, et al., 2011). The intercept of the linear plot representing the film thickness (I) gave a value, 4.4×10^{-3} conforming to theoretical assumed value of 10^{-3} and significant enough to drive film resistance.

For sorptive transport from the solution phase to the sorbent surface sites, one or combination of the following steps would regulate the transfer process: transport of sorptive through liquid film to the sorbent exterior surface (film diffusion) and/or transport from the exterior surface to the interior surface, in and through the particles (particle/internal diffusion).

The film diffusion rate coefficient have values within the range 10^{-6} – 10^{-8} indicating film diffusion controlled uptake however, the magnitude of its negative power reduces as time and uptake increases. This illustrates that the film diffusion was more profound at higher time regime and at increased uptake conforming to increased uptake chararacteristic for film diffusion controlled mechanism. The higher negative power at low time regime potray that diffusion in and through particles could be the controller at the earlier

stage of the uptake. This dominant diffusion may have continued as portrayed with the more close constancy in the K_{in} values within time interval of 15 to 25 min., and the $\frac{K_{in}}{K_f}$ ratio of less than unity. The $\frac{K_{in}}{K_f}$ ratio was less than unity at the low time regime where internal diffusion is more predominant and tends to unity at higher time regime: 55 – 60 min. indicating the predominance of the film diffusion. While the negative slope, $\frac{d(\ln(1-F))}{dt}$ ascertained that uptake is diffusion controlled, the power of D^l that fall within 10^{-6} - 10^{-8} cm²/sec conform to the Michelson et al postulate for film diffusion controlling uptake. The film thickness was assumed as 10^{-3} cm (Helffrich, 1962). More so, the inverse variation of K_f with κ portrayed film diffusion controlled uptake.

Table 4: Kinetic data for Diffusion models – Particle diffusion: $q_t = K_i t^{0.5} + I$, Internal diffusion and film diffusion: $\ln(1-F) = -K_f t$; C_t : Benzene concentration in residual solution at time (t , min.), C_a : Concentration of Benzene adsorbed at time (t , min.), κ : distribution coefficient, q_t (mg / g) : uptake at time (t , min.), K_{in} : internal diffusion rate constant (average $K_{in} = 0.031 \text{ min}^{-1}$), K_f : film diffusion rate constant (average $K_f = 0.049 \text{ min}^{-1}$), D^i : internal diffusion coefficient, D^l : film diffusion coefficient, $K_i = 0.0007 \text{ mg / g} \cdot \text{min}^{-0.5}$: Particle diffusion rate constant, $I = 4.4 \times 10^{-3} \text{ cm}$: film thickness, $q_\infty = 0.0096$: uptake as $t \rightarrow \infty$ (equilibrium uptake), Average particle size (ASTM mesh): diameter, $d = 0.009 \text{ cm}$ ($r = 0.0045 \text{ cm}$). Initial concentration (C_0) = 0.5mg/L.

t	$t^{0.5}$	ln t	C_t	C_a	κ	q	$\frac{dq}{d \ln t}$	$\frac{d(\ln(1-F))}{dt}$	K_{in}	K_f	D^i	D^l	$\frac{K_{in}}{K_f}$
15	3.87	2.71	0.163	0.337	2.07	0.0067	0.0025	-0.063	0.033	0.063	2.1E-05	4.9E-07	0.53
20	4.47	3.00	0.122	0.378	3.10	0.0076	0.0028	-0.058	0.034	0.058	2.2E-05	6.8E-07	0.59
25	5.00	3.22	0.090	0.410	4.56	0.0082	0.0029	-0.055	0.034	0.055	2.2E-05	9.4E-07	0.64
55	7.42	4.01	0.024	0.476	19.48	0.0095	0.0017	-0.036	0.030	0.036	1.8E-05	2.7E-06	0.75
60	7.75	4.09	0.023	0.478	21.22	0.0096	0.0004	-0.034	0.025	0.034	1.6E-05	2.7E-06	0.74

However, the constant K_{in} at varied K_f values and the ratio of $\frac{K_{in}}{K_f} <$ unity depicts the control of internal diffusion. It follows therefore, within the time intervals of 15 to 25min, particle diffusion drives the gradient between the bulk and the sorbent making internal diffusion the uptake controller. However, at the bounds of 55 to 60min. showing highest uptake and weighty increase in κ , the diffusion to the sorbent surface is governed more likely by sorptive transfer through the thin boundary layer. The thin boundary transfer is consequent of the drastic reduction of the gradient within the film and between the internal/immediate external sorbent surfaces. It can therefore be inferred that the entire uptake mechanism is complementarily governed by both diffusion mechanisms: at low time regime, predominately internal diffusion; and at higher time and uptake, the film diffusion governs.

Conclusion

The $Z(t)$ plot, showed that the kinetic mechanism of the Benzene uptake can be described within the ambits of the reaction order mechanism, the energy related Elovich model and the influence of diffusion; illustrated by the empirical models: the Parabolic law, Elovichian kinetics and the Pseudo First Order equation. The uptake of the Benzene sorptive onto the impregnated TW was complementarily governed by the film and internal diffusion. However, the sorption followed second order rate mechanism predominantly driven by diffusional transfer within the internal surface of the heterogeneous TW sorbent.

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The Case of Local Administration in Turkey Within the Perspective of Participatory Democracy

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Abstract:

Today, democracy and local governments are emerging as concepts that are handled together. There is widespread belief that local governments, which meet the socioeconomic and cultural needs of the individuals in the local community and provide public goods and services at the local level, are the basic institutions of democratic organization.

With Turkey becoming the candidate country of the European Union in 1999 and the beginning of full membership negotiations in 2005, legal changes that will strengthen the local autonomy have accelerated. Local democracy does not even settle in Turkey, apart from the weakness of local governments and local autonomy. Although Turkey has signed the 'European Charter of Local Self-Government' in the EU harmonization process, it is clear that local democracy and local autonomy can not develop at the point where local awareness does not exist, although various policies are under the local government reform.

Keywords: *Local Administration, participatory democracy, European Union Membership of Turkey*

Introduction

The concepts most commonly spoken in today's information age, where the classical nation-state form has undergone great change, are 'globalization' and 'localization'. In the age of globalization, the forms of nation-state undergo a great transformation, while the irony of localization, which seems like an anti-globalization concept, is gaining strength.

Localization means that the elements that play a role in the development of a country are carried out by a large extent of local power and dynamics. So at this point, it can be argued that the development dynamics of the country are largely dependent on local forces (Eryılmaz, 1995: 90).

In general, decentralization is used for the definition of localization. In a modern sense, decentralization refers to the transfer of some of the authorities in the monopoly of the central government – fields of security, justice, cultural services, education, healthcare - to local governments. (Çelik et al., 2008: 87). While decentralization has reduced the burden on the central government, local authorities have been strengthened in order to provide much more efficient service from the other side. In today's democracies, it is important that the central state power is transferred to the local governments and that civil society organizations take much more initiative in matters related to local government.

Concepts of Local Democracy and Local Autonomy

Along with globalization, the strictly decentralized nation-state structure is weakening while trying to create a new source of legitimacy through the means of participatory democracy at the local level. In today's world, "participatory democratic understanding" is more accepted, as non-governmental organizations and individuals are more active in the decision-making process and they take more initiative in the political arena.

In this new understanding, local governments are regarded not only as effective service producing units but also as political and democratic governing bodies (Eryilmaz, 1995: 90). In this context, local governments can be redefined as public institutions, where citizens' relations with public authorities are carried out directly and citizens take initiative in the decision-making process.

In today's globalizing world, two points of presence of local governments come to the forefront. The first is the effective provision of local public services in the context of local autonomy. In other words, public services should be delivered to the citizen from the first hand and local governments should be equipped with certain authorities for this purpose.

The second is to encourage people to actively participate in the management of public affairs in the context of local democracy and to promote a democratic understanding that promotes participation.

Two important parts of the locality, 'local Democracy' and 'local Autonomy' are often confused. Although these two terms are closely related to each other, they express different concepts. 'Local Autonomy' separates 'local Democracy' from the point of independence from the central government, freedom to perform certain acts, and reflection of local identity in the official domain. (Pratchett, 2004: 358). In order for this difference to be better understood, it would be useful to examine the concepts of 'local Democracy' and 'local Autonomy' in detail.

Localization and Local Democracy

It is difficult to talk about a definite content and clear definition of the concept of democracy. However, with its classical meaning, democracy is expressed as the rule of the people. Today, democracy and local governments are emerging as concepts that are handled together. There is widespread belief that local governments, which meet the socioeconomic and cultural needs of the individuals in the local community and provide public goods and services at the local level, are the basic institutions of democratic organization (Pustu, 2005: 121).

According to J.S.Mill, a prominent advocate of representative democracy, one of the indispensable institutions of a democratic state system is local governments. According to Mill; Local administrations provide citizens with the opportunity to participate in the administration while at the same time functioning as a school of politics and educating the people in the context of democratic rights struggle (Mill, 2000: 178). J. S. Mill put forward the idea of democracy as a result of the investigation of American administrative system. One of the most important advantages of the American political system, according to him, is that the political will is not concentrated in one center. In this way, the strong structure of local governments gives self-confidence to the citizens and enables them to reach a political dimension that can manage themselves by resolving the common problems at the local level (Yayla, 1998: 53-64). According to Mill, the less information, and experience in politics, the more difficult it is to reconcile. The resulting solutions are also so sharp that it creates an unhealthy model for both individuals and society. According to him, citizens' participation in governance allows them to better understand the political decisions and the political decision-making process, making it easier to settle their obligation to law. Because, if concepts that are not meaningful in the mind have no function in the life of the individual, it is difficult to find the application field (Mill, 2000: 178).

Local governments are the administrative units in which the closest relationship with the citizen is established. The principle of self-governance in local governments is accompanied by the principle of participation. It is possible that democracy can become operative and sustain its existence in a stable manner by increasing public participation in the political process. For this reason, it is important to remember the democratic and participatory understanding of local government for the development and consolidation of democracy. To be expressed in a short way, it can be said that "local governments are institutions that allow democracy to spread from the public base to the management summit".

D. M. Hill argues that democracy is about tools, not goals. According to Hill, local democracy requires democratization of the local government system. Local democracy; The adoption of democratic values by local

governments, and the participation of people in decision-making processes either directly or through their representatives. Another essential element of local democracy is the necessity of processing the political processes in the local area in a way that everyone can see, not hidden (Pustu, 2005: 128). The recent dynamics of globalization and regionalization have weakened the means of representative democracy that J.S. Mill and D.M. Hill have expressed in defining local democracy. The negativities created by the concept of representative democracy at national and local levels have brought the concept of participatory democracy to the forefront.

It can be said that the understanding of participatory democracy is a reformist quality rather than revolutionary. Participatory democracy, in practice, has largely assumed the role of creating a more democratic society in its functioning and filling the gaps in the political arena which are created by the representative democratic approach. One of the main criticisms of the liberal representative democracy is concerned with its form. Politics through political parties led to the existence of a group of elites who functioned politically professional politicians. This leads to an inadequate representation of masses or no representation at all. Preventing the participation of individuals into the political and administrative sphere leads to the birth of a typology of a passive citizen. Another criticism of the representative democracy is the neglect of democratic building and practices in economic, social and cultural spheres, focusing only on the administrative and political spheres (Yilmaz, 2008: 43).

The incuriousness of the people to the political process has an effect of reducing the legitimacy of political decisions and political institutions. As a matter of fact, 43% of the electoral participation rate in the European Parliament elections held in June 2009 and 2014 is a sign that the representative democracy has weakened (Kaymaz, 2014: 2). Just as Rousseau, the creator of the concept of participatory democracy, advocates the direct involvement of the people in the decision-making process, as well as raising public awareness (Rousseau, 1987: 109), it also serves as a political school for the people. This democracy model actively participated by the people at the local level will contribute to the consolidation of democracy at the national level as long as it can be implemented. In the context of the relationship between democracy and local government, democracy can be considered as a process in which conflicting interests are reconciled. So that, elected local governments require special importance and emphasis as the most important democratic institution at the local level (Pratchett, 2004: 361).

The concept of local democracy, which is shaped in the direction of globalization and regionalization trends, takes place in international documents and contracts. There are three important documents about local democratic rights:

1-) The first of these is the 1985- European Charter of Local Self-government. The main theme of the Charter is the strengthening and dissemination of the understanding of autonomous local government by ensuring the participation of all citizens in the process of submitting local public services.

2-) Another important document is the European Union agreement signed in 1992 in Maastricht. In this document, the principle of better representation of local communities in decision-making processes, as well as the provision of public services at the closest level to the public, has come to the forefront.

3-) Another important document is the European Urban Charter. This declaration covers the following; Increasing the quality and effectiveness of local services, creating economic and socio-cultural opportunities for the local people, increasing the political consciousness of the local people and ensuring active citizen participation in the political process (Yıldırım,1994:153-154)

Local Autonomy

The concepts of local democracy and local autonomy are often perceived as the same thing. However, local democracy is a broader concept that also includes local autonomy. The prerequisite for local democracy is the existence of an autonomous local government structure. It is a necessity in terms of democracy that local governments must have autonomous governance as a place where politics occurs and where various interests conflict and reconcile (Pratchett, 2004: 162). Therefore, 'local autonomy' should include the right of sovereignty on certain issues, even if not all of the administrative activities at the local level. During the use of this sovereignty, it is important for the local governments to carry out their activities independently from the central government in order to carry out democracy in a healthy way (Pratchett, 2004: 362).

However, the concept of local autonomy should not be confused with concepts such as political independence and sovereignty. The rights and authorities of local governments are different from the rights and authorities that federated states have in a federal state structure. Local governments are not partners in the sovereign right of the state. Their lack of legislative and judicial power is also the leading evidence of their lack of sovereignty (Keleş, 1982: 412).

A summary of Pratchett's various definitions and concepts of local autonomy will be useful as to what should be understood from local autonomy. Pratchett summarized the views on local autonomy in three articles.

a) According to the first view, 'local autonomy' can be defined and analyzed as independence from the central government. This approach refers to the sharing of legal and constitutional power between the center and the local government. At this point, local autonomy is primarily conceptualized as independence from the central government. According to G.L. Clark, who

advocated this view (1994); Local autonomy is basically based on two principles; taking initiative and immunity (p.195-200). 'Taking initiative' is the power to perform; 'Immunity' includes that actions can be made independently of the pressures and oversight of the central government (Pratchett, 2004: 363).

b) This view is important in that it shows that there may be various 'local autonomy' degrees within certain government models. According to this view, local governments, even if they are included in extended constitutional, legal, political and economic constraints, can effectively perform actions in their own regions. This view refers to the power of the local governments to influence the policies of the central government rather than the independence of the local governments from the central government. Given this emphasis, it may be called an incomplete understanding because it discounts the central government's oversight and pressure on local governments (Pratchett,2004:366).

c) The third opinion recognizes the formation and development of local consciousness through political and social interaction as local autonomy. According to this understanding, local autonomy does not strengthen or weaken according to the influence and pressure of the central government. However, they are strengthened or weakened according to the interactions in social life. At this point, much importance is attached to social activities and social awareness. The main idea of this view is as follows; 'Local autonomy' is strengthened when the local people who are aware of their autonomy defend their self-management right. This understanding of local autonomy combines 'local autonomy' with 'participatory democracy'. Local autonomy emphasizes not only the elected local government and its policies but also sociocultural and sociopolitical connections (Pratchett,2004:366).

Regarding the third view, a survey of local governments in Turkey has found supportive findings. In this research, it is determined that the local consciousness of the people in Turkey is very low and the reasons for this have been revealed. One of the most interesting findings of the research is that although people are not satisfied with the local government services, they do not react to this situation and should not be present in the public authorities. The main cause of this unresponsiveness is the belief that something will not change as a result of the complaint to be made. In addition, elements such as low public involvement and interest in the local government policies, lack of open channels to participate, and lack of representation of local people precisely in local elections are preventing the formation of local awareness in Turkey (Koseck and Sagbas, 2004: 379).

These findings show that local democracy does not even settle in Turkey, apart from the weakness of local governments and local autonomy. Although Turkey has signed the 'European Charter of Local Self-Government'

in the EU harmonization process, it is clear that local democracy and local autonomy can not develop at the point where local awareness does not exist, although various policies are under the local government reform.

Conclusion

Local governments are seen as the most appropriate institutions for democratic understanding in the 21st century. In order to transform local governments into effective and efficient service-producing governance institutions, the importance of basing democratic values on the structure of local governments is constantly emphasized. The modern local government structure, which enables local people to participate in the decision-making process, is clear that it will be able to carry out public services effectively and efficiently. In addition, it reinforces democracy by making a significant contribution to the development of democracy at the national level. For this reason, there is a tendency for local governments in Western countries to increase participation in the decision-making process and to strengthen local autonomy.

In parallel to European democracies, Turkey began to issue new laws in order to improve local autonomy just after signing European Charter of Local Self-Government in 1988. With Turkey becoming the candidate country of the European Union in 1999, and the beginning of full membership negotiations in 2005, legal changes that would strengthen the local autonomy have accelerated. However, the main problem in Turkey at the point of 'local autonomy', which is an integral part of local democracy, is the weakness of the local consciousness.

The main obstacles to the formation of locality consciousness in Turkey are; the channels of entry of the local people into the political decision-making process are closed, the representation in the local assemblies does not overlap with the expectations of the people, the local assemblies are weaker than the mayor, the local people do not trust the local administrations (Koseck and Sagbas, 2004).

These shortcomings also appear in the national context as obstacles to the development and consolidation of democracy. Indeed, in many types of research conducted at the national scale, the fact that the political institutions are in the lowest rank in the order of the most reliable institutions in Turkey shows that participatory democracy does not develop in Turkey. In other words, citizens are alienated from the political system in which they are not actively involved and do not know how to operate.

In order to develop democratic consciousness and locality awareness, it is necessary to develop local democracy at first hand and ensure active participation of the local people in decision-making process. With such operation of participatory democracy, it is clear that the democratic

consciousness of the citizens will increase. The fact that the citizens have the power to make decisions about their own issues with the opening of the channels of participation in the local policy process will contribute to the solution of social polarization and tensions in Turkey.

As a result, awareness of the local people and the provision of local political participation through democratic means will contribute to the development of democracy at the national level. At the point of increasing the awareness of locality in Turkey and consolidation of democracy with the facilitation of participation, the following suggestions can be passed:

a-) Citizens' interest can be increased by the active use of social media, especially regarding the activities of local governments.

b-) Non-governmental organizations, universities, city councils, associations should be actively involved in municipal assemblies. Even if these institutions are not given the right to vote, they should be able to monitor and present their opinions in parliamentary sessions.

c-) Communication channels should be established for ordinary citizens who are not members of any civil society organization so that their views and wishes can be communicated to the local authorities. In this context, it is important to organize regular meetings where the local government administrators can communicate the requests of the residents of the neighborhood.

d-) Urban transformation projects must be passed on in order to avoid the slum dwelling that may be an obstacle to local consciousness. Social and health benefits should also be provided to low-income citizens who need assistance in the context of social policies.

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‘The Improvement of Educational Standards of Academicians by Using Various Tools Offered by The Behavioural Change Matrix’

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Abstract

Within the bounds of behavioural economics, this paper offers some commitment tools for academicians by changing their behaviours in some specific issues to explore better way of improving educational quality. Increasing classroom participation, failure to assess students' exam papers fairly because of the false impression of the first answer, preferring complicated and confusing teaching methods due to reasons originating from heuristic knowledge; and lack of attention and available advisory bodies to students in nonclass time are considered among these. Depending on willingness and awareness of lecturer, behavioural change matrix offers some commitment tools that can change their behaviours for attaining higher overall academic performance.

Keywords: Behavioural Change Matrix, Behavioural Economics, Teacher's Performance

Introduction

People are born free. They are born not only with certain responsibilities and obligation but with certain rights. According to the liberal view; people can make their own decisions and recognize their interests. So any external intervention may deteriorate their position and subsequently leads the whole society worse off. On the other hand,, paternalism does not focus on personel freedom at most times but rather it views people as the working elements of the whole society from which they acquire their identity and recognition proving an organic relation in the society. The reflection of a different approach to human nature becomes visible in social relations even in the shop floor. Like countries follow different paths and sometimes use blend of them people can find a middle path in which they make fundamental

decisions about themselves and the world around them by receiving external support. The middle path is referred as 'Liberterian Paternalism'. People are not as rational as the assumption of the mainstream economic theory. They might hold irrational view to some extent. They might even be better utility maximizers under this condition. .

Heuristics and two systems in brain

Kahneman and Amos introduced two different systems in (system1 and system 2) brain which cause individuals to make different decisions. While the former requires fast and less effortfull thinking; the latter is slow and effortfull thinking process that provides a solid ground for high computational analysis.

Some neuro-scientists (Abed) suggest that brain operations functions through certain mechanism. That brain functions subject to certain mechanism. Brain tends to follow the way requiring the least effort that is, it usually chooses the solution that comes to mind first which is not necessarily be the right one. People could make rational or irrational decisions at the end of their thinking process; and do not usually act on behalf of their real interests.

Heuristics decision making takes part almost all dimensions of our daily life. For example, personal saving behavior of an individual would differ with respect to various phases along their life and this highlights changing personal attitudes of Heuristic Decision making. People may overweight their short-term interests heavily. Accordingly, a certain mechanism for overcoming psocrastination heuristic could be adopted to increase total saving.

People usually display proscraistinateeive behavior, however, in some situations requiring specific policies some undesired outcomes will be avoided. When an undone job is delayed to the future; it is usually because of short sightedness and myopic behavior of people. This is closely related with other heuristics like overconfidence and planning fallacy in which people usually overestimate their skills in certain tasks even if they are short of time for completing the task.

This commitment tool seems to work well in changing saving behavior in the US since it succeeded to reach numerous people. Further improvements on teacher's performance could be expected from behavioural tools and commitment tools naturally in this respect. This is what the present paper is all about, which aims academicians to be better equipped with certain commitment and behavioural tools.

In an empirical study conducted on three different classrooms, an academician requested three term papers with different set for different classrooms to be completed along the semester. Subject to the change on duration of the semester, the date of last course was postponed and accordingly students gained an impression that they have still enough time to complete all

papers whereas the deadline was the last day of the semester for the first classroom, students choose determined three different days for submission. In the last class, the academician determined a three distinct compulsory submission days for three-student assignments. As a result of the study, the average grades was higher in the third classroom in which lecturers set compulsory submission dates for students. Collecting of term papers was completely under the influence paternalistic rules set by the academician. The lowest average score was determined with the first classroom in which students were free to choose their deadlines for three papers until the last day of the semester. Two practices of paper deadline yielded different results. In the third classroom, students determined three different deadlines. Indeed, the average score of the classroom under the libertarian paternalism was very close to the score of the one in which students were given mandatory submission dates. ('Predictably Irrational, The Hidden Forces that Shape Our Decisions', Dan Ariely, chapter 7, p. 145).

In this paper, some hurdles with educational issues in institutions given in the empirical case conducted in the respective course such as preparing exam questions, assessing student's exam papers fairly, sparing non-classroom time efficiently for students are addressed and it was aimed to introduce some convenient behavioural tools for academicians. Awareness and willingness are substantially important concepts in this respect as introduced by the Behavioural Change Matrix which offers variety of measures and behavioural tools for different combinations of willingness and awareness whether they are taken together or not.

Some reminders can be useful to change teacher's behavior by placing it in one of the quadrants of the behavioral change matrix. Taking both academician's awareness and willingness into account it allows utilization from the measures most likely effective in achieving this behavioural change such as communication, education, attention shifting, positive and negative incentives.

Behavioural Change Matrix

Behavioural change matrix is comprised of four quadrants. In the first one, individuals are aware of the problem and they are willing to act responsibly as well. The main measure to address issues in this quadrant is 'Attention Shifting' that aims to direct their attention onto a certain issues.

When personal willingness is high but this is accompanied with low awareness for certain issues, the second quadrant is used. The main measure to address this issue is to educate and communicate so that problems could be solved on the best possible way by raising individual's awareness.

When personal awareness is high but this is accompanied with low willingness for these aforesaid issues, the third quadrant is used. In this group

of individuals, there is high awareness level but they are willing to change their behavior. Punishments and rewards are considered as measures to address these issues.

If person awareness and willingness levels are both low, the fourth quadrant offers some solutions. The main measure addressed for solutions is to offering incentives. Whereas

This paper addresses four problems that could be experienced by academicians. Whereas the two of them are about increasing efficiency and job satisfaction, the other two are related with classroom administration.

Since courses require certain percentage of attendance by course hours, students's attendance is usually based on only their obligation. As most of Academicians are aware of this fact, they might show poor interests to such students who are not eager to learn. Yet, it is still possible to attract their attention and to include them into the classroom environment by assigning them certain exercises and performing joint works. Some improvements are exactly possible thanks to teaching skills peculiar to every academician's store of knowledge. Academicians usually aware of this issue and usually show willingness to change it. This issue might consider the first quadrant in which awareness and willingness are highly important and accordingly 'shift of attention' is the prominent issue Attention shifting aims to change the behavior in the desired direction often subliminally and to influence willingness.

The second quadrant of behavioural change matrix includes behavioural tools for avoiding the risk of false assessment in cases where academicians begin assessment process with the first question followed by others in sequence. When the first comment of student on the first question is quite satisfactory, it is probable that it has positive effect on assessment of the following questions. In evaluation of exam paper of students, reading the first question of all exam papers first and then use the same method to other questions in sequence can be a rule of thumb in this respect.

The problem could be sorted in the second quadrant of the behavioural change matrix because while willingness level is high, the awareness level is considered at low level. Once this potential fault is realized, they are willing to change their behavior to lessen this risk as long as this situation does really exist. .

The issue that advisor academicians sometimes do not spare adequate non-classroom time for students and this could be an issue, the students in the third quadrant may ask questions about the lecture or they need their guidance especially regarding their future professional life. Their academic advisors could better use of time and assists them better if they are better informed about student histories.

Course-related knowledge is considered heuristic since the subjects are newly introduced and not fully comprehended by students, especially by

freshmen. Because academician’s interest of field and their course subject usually do not contain cognitive convenience. Academician’s laborious efforts may not bring success to students easily. For instance, an indifference curve is an analytical tool utilized by the consumer theory and its graphical illustrations may not make any sense for most of the freshmen. The teaching experience of well-known academicians could be valuable and beneficent in this respect.

Conclusion

Even the high quality they have, Academicians might still experience some problems. Although these reminders might bring minor improvements through small changes, academician’s classroom performance could reach their best to the adoption of these specific behavioural tools.

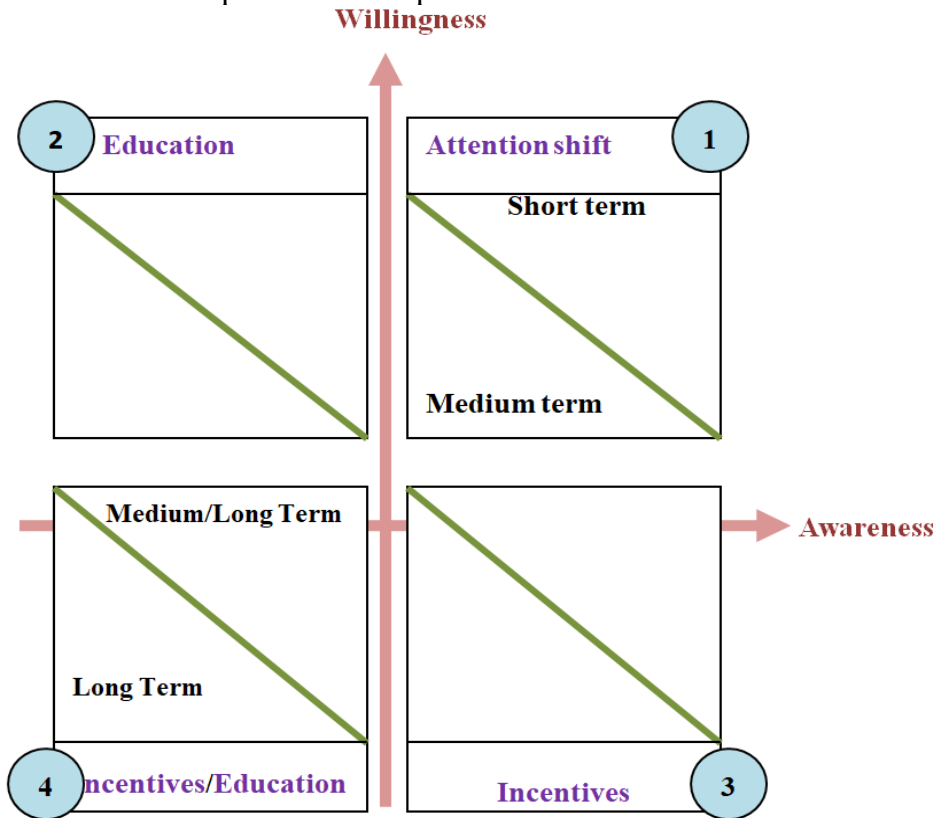


Figure 1: Behavioural Change Matrix

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Degree of Adaptation to International Financial Reporting Standards: The Case of Turkey

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Abstract

With International Financial Reporting Standards (IFRS) a contribution is made to create a common language between the countries in accounting science and to constitute accounting provisions. Our country has not stayed away from this common language and currently, the studies on accounting science are underway. Public Oversight Accounting and Auditing Standards Authority have the International Financial Reporting Standards (IFRS) Turkish Accounting Standards translated into Turkish and published such as Turkish Accounting Standards /Turkish Financial Reporting Standards (TAS/TFRS) are as published. These are the Turkish translation of International Accounting/ Financial Reporting Standards. Now, in our country, a binary system is still used as Uniform Accounting System as well as TAS/TFRS are in ongoing process. There are different approaches towards the economy in terms of the standards and the Uniform Chart of Accounts and it is required to improve the current system and harmonize the Uniform Chart of Accounts with the standards.

Keywords: Turkish Accounting Standards/Turkish Financial Reporting Standards (TAS/TFRS), International Financial Reporting Standards (IFRS), Uniform Accounting System

Introduction

In a globalizing World, there is a requirement for countries to use a common business language regarding the accounting science. This process of convergence has started and needed among the accounting systems of the participating countries.

Through the Norwalk Agreement, that was signed between the International Accounting Standards Board (IASB) and Financial Accounting Standards Board (FASB), a change began in the World through the Conformity Process of the Standards and the International Financial Reporting Standards (IFRS) have begun to be used. Since Accounting is a social science

the culture that it is included is quite functional in terms of affecting the accounting. Regarding the conformity of the countries to the International Financial Reporting Standards (IFRS), the cultural, political and economical reasons have been effective.

In Turkey, Public Oversight, Accounting and Auditing Standards Authority (POAASA), have been continuing its activities in respect of the Understanding and Implementing of Standards. Current International Financial Reporting Standards (IFRS) are not compatible with the Chart of Accounts which are in operation is needed by the Turkish Accounting Standards / Turkish Financial Reporting Standards (TAS/TFRS) which are used in Turkey. The accounts which are needed by IFRS do not exist in the Uniform Accounting Plan that is in operation in Turkey. Regarding the Uniform Accounting Plan, instead of making the business enterprises who are subject to report according to the standards free from the obligations; according to the needs, the actualisation of the completion of the harmonization process would be more easy by changing some account names and their positions within the Uniform Accounting Plan. Currently in Turkey, since both the Uniform Accounting Plan and the TAS/TFRS are in operation, a dual system is continuing at present. There are discrepancies regarding the approach of the Standards and the Uniform Accounting Plan to economic events. In the current system, there is a need for improvement and the harmonization of the Uniform Accounting Plan to the Standards.

International Financial Reporting Standards (IFRS) in the World and its Harmonisation Process

Regarding the Accounting the international harmonization has arisen due to the decreasing discrepancies between the Financial Reporting Implementation among the countries, the Comparability of the Financial Reporting, the need for the accounting standards which were accepted among all the countries (Hoyle vd., 2004: 537).

In Accounting Standards, there are a lot of factors that are required to provide the international harmonization and constitute the International Accounting Standards (Güney vd., 2012: 121):

- Internationalising of the capital markets,
- Increasing the number of the multinational companies,
- Increasing the efficiency of the independent auditing firms,
- Goals for constituting economic unions,
- Development of international regulations.

In accounting, the major organizations who studies for international harmonization; United Nations (UN), Organisation for Economic Co-operation and Development (OECD), International Organization of Securities

Commissions (IOSCO), International Accounting Standards Board (IASB) and European Union (EU) (Parlakkaya, 2004: 122).

In 1966 the USA, Canada, and England established the Accounting International Study Group in order to analysis the accounting discrepancies between them. In 1973 it gave place to International Accounting Standards Committee (IASC) that was established by the participation of the USA, UK, Holland, Germany, Japan, Mexico, Southern Ireland, Canada and Australia. The purpose of IASC is to constitute the basic accounting standards which can be implemented all over the World (Fritz and Lamle, 2003: 41).

Until 2000 the committee so-called International Accounting Standards Committee (IASC), was named as International Accounting Standards Board (IASB) within the frame of the restructuring studies. Although the standards that were being issued by the committee were bearing the name of International Accounting Standards (IAS) until 2000, they have taken the name of International Financial Reporting Standards (IFRS) after 2000. The Norwalk Agreement was signed on September 18, 2002, in order to study the removal of the discrepancies between the IAS/IFRS and American Generally Accepted Accounting Principles (US-GAAP) (Gücenme Gençoğlu vd., 2013: 19).

At the joint meeting that FASB and IASB carried out in the USA who started to work together in 2002 signed an agreement that includes the commitments for improving the high-quality and compatible accounting standards to be used in Financial Reporting. (Kaya, 2003: 11).

In 2002 the EU declared that beginning from January 2005 the implementation of IFRS is an obligation for companies which are in the securities exchanges of the member governments. Accordingly, beginning from the year 2005, 8000 big European companies have to submit their financial reports according to the IFRS (Aysan, 2008: 48).

Regarding Asian countries, the accounting system was changed and new regulations were issued particularly as a result of the settlement of Shanghai and Shenzen stock markets in China at the early 90's. In 1998 Chinese Accounting Standards were started using the IFRS as a model and beginning from 2007 stock market companies had started to implement it (Chen vd., 2002: 184).

A lot of countries in the World have completed or about to complete their IFRS transformation. European Union Member Countries, South Africa, Australia, Hong Kong, Singapore, Malaysia, Indonesia, and Thailand are among these. The transition process for IFRS is continuing in varied steps in Romania, Croatia, Greece, Macedonia, Slovenia, Bulgaria, and Albania.

The Harmonization Process of International Financial Reporting Standards (IFRS) in Turkey

In Turkey, the accounting cases are recorded by taking the General Communiqué on Accounting System Application which is the system in operation for a long time that was issued by Ministry of Finance on 26.12.1992, as the basis, and the Accounting is being carried out by taking the Uniform Accounting Plan that provides the standardization during the recognition, as the basis. In regard to accounting, the legal framework has an obligation for follow-up is being regulated by Tax Procedure Law, the accounting system that is based on the Uniform Chart of Accounts, and Turkish Commercial Code. The implementation of the Uniform Chart of Accounts has been applied for a long time both in the recognition of the cases and for the completion of the process of the financial reporting. The harmonization process to the existing system is continuing by coming into force through the International Financial Reporting Standards.

By the European Union Membership Process a need for the accounting standards that are compatible with all the markets arose for Turkey who had previously been affected by the German and French accounting systems because of its economic relationships. Due to this, the International Accounting Standards have become a current issue.

The first study in Turkey was started by the establishment of the Turkish Accounting Specialists Association (TASA) and the association has provided the publication of the translation of the International Accounting Standards into Turkish. Besides TASA has published the accepted 31 international accounting standards all together as a book (Parlakkaya, 2004: 130).

Turkish Accounting Standards/Turkish Reporting Standards (TAS/TRS) have the characteristics of a translation of the International Accounting Standards/International Financial Reporting Standards (IAS/IFRS). Along with the Norwalk Agreement that was signed in 2002 between International Accounting Standards Board (IASB) and Financial Accounting Standards Board (FASB), these studies for harmonizing the standards were begun.

The activity of TASA ended and 19 accounting standards which are compatible with the IFRS were issued by the newly-established Turkish Accounting and Auditing Standards Board (TAASB).

The activity of TAASB ended and the Turkish Accounting Standards Board (TASB) was founded in 2002 and has undertaken all of the activities of TAASB. By TASB 6 Turkish Financial Reporting Standards (TFRS) and 41 Turkish Accounting Standards (TAS) that are compatible with IFRS have been issued.

The Turkish Accounting Standards Board (TASB) has translated all of the IFRS into Turkish and has declared them as Turkish Financial Reporting Standards (TFRS). By mid-2008 the process of harmonization to the IFRSs was completed. However, since TASB has been authorized as the only authority regarding the observation, implementation, and interpretation of Uniform Accounting Standards, Republic of Turkey Central Bank and Ministry of Finance have been structured according to the IFRSs (Aysan, 2008: 48).

In 2011, the duties and authorities of TASB have been transferred to the Public Oversight, Accounting and Auditing Standards Authority (POAASA). The studies regarding the standards that are compatible with the IFRS are being carried out by POAASA. In time, some standards were abolished, some of them were combined and assignments were done regarding their new numbers. By IFRS Code new numbers have been given to the newly formed standards.

As a result of the studies done in the direction of harmonization, purpose, and rudiments with IFRS in Turkey, current Accounting Standards, and Financial Reporting Standards that were issued regarding the implementation of the Turkish (TAS/TFRS) of IFRS until today in Turkey are as follows (<http://kgk.gov.tr>):

TAS 1 Presentation of Financial Statements

TAS 2 Inventories

TAS 7 Statement of Cash Flow

TAS 8 Accounting Policies, Changes in Accounting Estimates and Errors

TAS 10 Events after the Reporting Period

IAS 12 Income Taxes

TAS 16 Property, Plant, and Equipment

TAS 19 Employee Benefits

TAS 20 Accounting for Government Grants and Disclosure of Government Assistance

TAS 21 The Effects of Changes in Foreign Exchange Rates

TAS 23 Borrowing Costs

TAS 24 Related Party Disclosure

TAS 29 Financial Reporting in Hyperinflationary Economies

TAS 26 Accounting and Reporting by Retirement Benefit Plans

TAS 27 Separate Financial Statements

TAS 28 Investments in Associates and Joint Ventures

TAS 29 Financial Reporting in Hyperinflationary Economies

TAS 32 Financial Instruments: Presentation

TAS 33 Earnings per Share

TAS 34 Interim Financial Reporting

TAS 36 Impairment of Assets

TAS 37 Provisions, Contingent Liabilities, and Contingent Assets

TAS 38 Intangible Assets

TAS 39 Financial Instruments: Recognition and Measurement

TAS 40 Investment Property

TAS 41 Agriculture

TFRS 1 First-time Adoption of International Financial Reporting Standards

TFRS 2 Share-based Payment

TFRS 3 Business Combinations

TFRS 4 Insurance Contracts

TFRS 5 Non-current Assets Held for Sale and Discontinued Operations

TFRS 6 Exploration for and Evaluation of Mineral Resources

TIFRS 7 Financial Instruments: Disclosures

TFRS 8 Operating Segments

TFRS 9 Financial Instruments

TFRS 10 Consolidated Financial Statements

TFRS 11 Joint Arrangements

TFRS 12 Disclosure of Interest in Other Entities

TFRS 13 Fair Value Measurement

TFRS 14 Regulatory Deferral Accounts

TFRS 15 Revenue from Contracts with Customers

In Turkey, only the "IFRS 16 Leases" standard has not come into force yet, however, it was prepared as a draft text.

The companies below are liable to implement the Turkish (TAS/TFRS) of IFRS (<http://www.denetimnet.net/>):

- Companies with share capital and their subsidiaries that are included in the scope of consolidation
- Public limited companies, intermediary institutions, portfolio management companies and the other business enterprises that are included in the scope of consolidation,
- Banks and their affiliated companies,
- Insurance and reinsurance companies,
- Individual pension companies,

By International Accounting Standards Board "IASB" the International Financial Reporting Standard (IFRS for SMEs) has been issued for the business enterprises who are staying out of the scope of TAS/TFRS and who do not have accountability to the Public and for small and medium-scaled business enterprises. This standard is a simplified form of a full set of IFRSs and it is formed by 35 chapters. Having the same system within the IFRSs that has been incorporated into our legislation as TAS/TFRS by de

facto, has played a significant role regarding the adoption of the IFRS for SMEs by TASB. IFRS for SMEs was translated into Turkish word for word has been issued under the name of SME TFRS (<http://www.behrendt.com.tr>).

There are business enterprises who prepare General Purpose Financial Statements for foreign users such as Credit Rating Agencies. In addition to the above-mentioned business enterprises there are business enterprises, who preferred to apply TMS/TFRS however they want to turn back again to the SME/TFRS application. Both of the business enterprises mentioned above are liable to apply "TFRS provisions" that are particular to SMEs.

Conclusion

IFRS is the body of rules regarding the preparation and presentation of the Financial Statements, and it is being issued by the International Accounting Standards Board (IASB). In order for the IFRS to be implemented by all the countries, the progress is being made within the process of the reconciliation. Many countries all over the World, also the European Union have passed this process and Turkey has got the edge on by transforming to IFRS.

Currently, in Turkey, the dual system is being used as an accounting system. The first of those is the "General Communique on Accounting System Application" which was in operation for a long time and was issued by the Ministry of Finance on 26.12.1992; another is the TAS/TFRS which is the Turkish translation of IFRS that is effectuated. The studies regarding the TAS/TFRS are continuous, and they are updated if required and new ones are being issued.

In Turkey in accounting the legal framework that the companies have to follow is being regulated by Tax Procedure Law, the Accounting System that is based on the Uniform Chart of Accounts, and Turkish Commercial Code. In Turkey, the entry of IFRS brought into force the existing system Tax Procedure Law, the Accounting System that is based on the Uniform Chart of Accounts and together with the Turkish translation of IFRS (TAS/TFRS) the companies have the liability to implement the Turkish version of IFRS that is TAS/TFRS. Implementation of this dual system in Turkey could cause a lot of chaos.

Within TAS/TFRS the First Recognition and the Period-end closing procedures of the transactions and the activities were identified. During this Recognition process, it has benefited from the accounts that take place within the Uniform Accounting Plan that is in operation since 1994. Only at the end of the period regarding the formation of the financial statements according to the TAS/TFRS, a situation arises such as one company has two financial statements and this causes a problem regarding the addressing of the presentation of the statements regarding the distribution of the Profit.

The distribution of the profits of the Companies bases on the Financial Statements that were prepared according to the TAS/IFRS regarding their transactions such as the merger. In cases of the discrepancy during the Court and Expert Examination, the decision is being upheld according to the Financial Statements that are organized according to the TAS/IFRS however the suitability of the Financial Statements that are the point in question only could be confirmed by the Book of Accounts. The determination of the ones that are non-conforming to the inventory and valuation provisions within the TAS/IFRS could only be carried out by means of the accounting records of the Companies.

The problems could disappear by ending the dual system regarding the Recognition in Turkey, by the Recognition of the records of the accounting events according to the TAS/IFRS by taking the Uniform Chart of Accounts that is based on the Uniform Accounting System which has been in operation for a long time into consideration, and by forming the Financial Statements according to the TAS/IFRS. In order to speed up this process first of all Restructuring of the Uniform Chart of Accounts that is forming the basis of accounting which is compatible with the TAS/IFRS constitutes the basis.

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The Impact of Multi-Layered Diffusionary Processes on Musical Evolution: The Global Nature, and Hawaiian, Spanish and African Roots of Delta Blues Culture

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Abstract

As a distinct musical form, blues music from the Mississippi Delta has been extensively studied by musicologists, ethnomusicologists, historians and folklorists. As has been the case with the larger public attracted to this intriguing musical genre, much of this academic attention has treated blues as just that - something one listens to. We argue that blues represents far more than just sound or entertainment, rather it represents a broad cultural milieu from which a distinctive musical culture evolved. Moreover, the musical evolution associated with blues did not occur in a vacuum, it was generated and facilitated by various forms of cultural exchange occurring over time and space. Further, the forms of cultural exchange responsible for the evolution of Delta blues culture were and continue to be truly global in scope. In this paper, by highlighting Hawaiian, Spanish and African influences, we discuss the geographical processes associated with the evolution of blues music and focus on the multi-layered forms of global diffusion responsible for what has been referred to as “Delta blues.” Through a discussion of this form of blues music, we focus attention on the complex inter-relationships evident between and among different people and different places, and highlight how global interactions generated a truly unique music form.

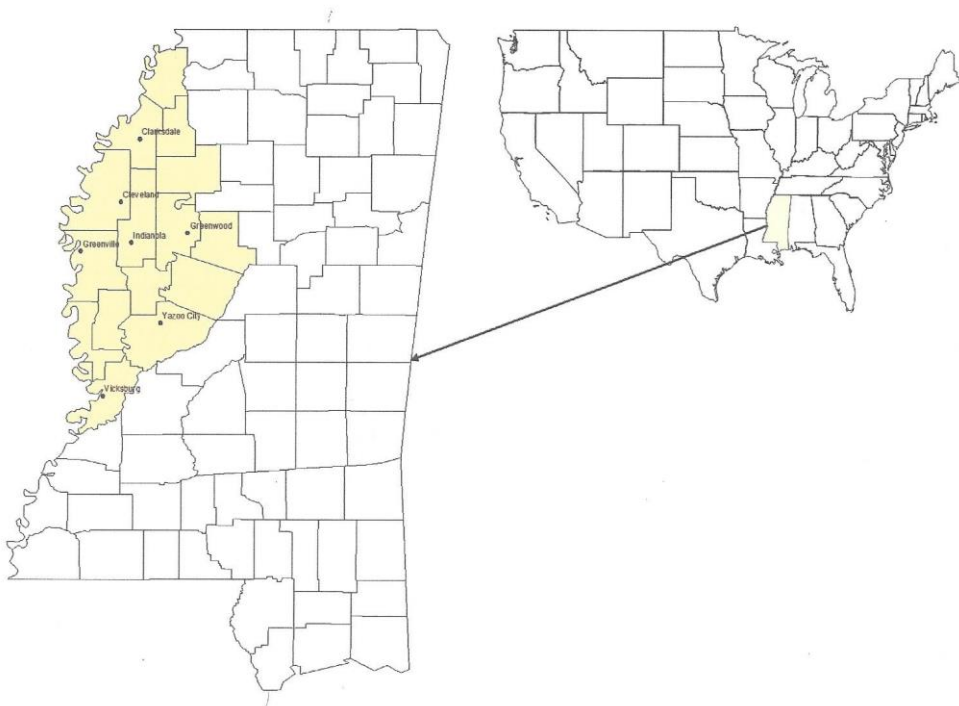
Keywords: Culture, diffusion, transcultural, music

Introduction

This research project has been partially motivated by our experiences directing a series of field courses that are interdisciplinary in nature. These courses focus on distinct geographical contexts – Hawaii, Spain, and/or the Mississippi Delta region of the U.S. - yet are similar in that they utilize

musical expressions as lenses to address the geographical dimensions of a broad array of social, cultural, economic and environmental processes (Strait 2009, 2010, 2012, 2014; Strait, Jackson, and Marcus 2011; Strait and Fujimoto-Strait 2017). By incorporating pedagogical themes around the concepts of migration, diffusion, and transculturation, and by placing particular attention on how these concepts pertain to music evolution, these courses encourage participants to consider how geographic distinctiveness can result from the complex ways in which different places interact with one another over space and time. The primary aim of this paper is to shed light on the complex geographical processes responsible for the evolution of blues music, specifically the blues forms that evolved in the Mississippi Delta (Figure 1).¹ We pursue this aim by exploring the complex cultural connections that exist between this region of the United States and both Spain and the Hawaiian Islands.

Figure 1: The Mississippi Delta (IN YELLOW)



Hawaii, Spain and the Mississippi Delta are certainly distinct places possessing exceptionally different cultural histories. Likewise, these three regions have been subject to very different arrays of external cultural influences, musically and otherwise. However, we demonstrate in this paper that these three regions possess two inter-related commonalities. First, they are similar in that their uniqueness directly stems from the fact that each region

has functioned as "cultural cross-roads" of sorts – i.e., the cultural uniqueness of each place is the result of having been impacted and influenced by diverse collections of other places. Second, in terms of musical culture, these three regions are linked to one another via an extensive and complex network of cultural exchange, one that has been responsible for the distinctive evolution of what we refer to as "Delta blues culture."

We do not endeavor to provide a complete historical and geographical dissection of the diverse cultural influences responsible for blues as a distinct musical genre. For example, a summary of the geographical and cultural roots of the variety of other regional sub-genres of blues lies beyond the scope of this work. Our main purpose here is to offer evidence that blues music itself, and the culture responsible for its evolution, is the result of multiple forms of cultural exchange and spatial interaction, some of which have been ignored in the literature. Accordingly, the same geographical and cultural processes discussed here would indeed be relevant to all forms of blues to some degree. The regional style referred to as Delta blues is given particular focus in this paper for two reasons. First, most musicologists agree that Delta blues had far more of a significant influence on subsequent development of a number of blues-influenced musical forms, such as Rock'N'Roll, than did other regional blues styles (Farris 1978; Palmer 1981; Gioia 2008). Second, we maintain that the uniqueness of "Delta blues", and its evolutionary significance, stems from its excessive trans-cultural nature. We argue that the very reason Delta blues has been so influential lies in the fact that its formation resulted from the convergence of diverse cultural influences from a variety of geographical sources, including places as far away from Mississippi as both Spain and Hawaii.

The remainder of this paper is divided into three main sections. The first section describes a series of commonly identified diffusionary mechanisms, the progression of which were collectively responsible for the evolution of North American blues, particularly Delta blues. Discreet subsections summarize each mode of diffusion separately in turn, yet we offer them as a collective network of cultural exchange. A second section includes two additional subsections that summarize more recently identified impacts that music from Spain and Hawaii had, respectively, on the Delta blues. The last section of the paper offers final remarks and conclusions.

The geographic evolution of delta blues

Delta blues music itself has been widely studied by scholars possessing a variety of backgrounds, including historians, musicologists, sociologists and folklorists. This regional style of blues is considered to be among the earliest forms of blues music. This probably explains why much of the previous research focused on this musical form has commonly relied on historical myth

and overly romanticized notions, particularly when it comes to identifying its geographic roots (Lomax 1993; Miller 2002; Wald 2004). For example, one blues scholar eloquently described the origins of Delta blues thusly, “the origins of the blues in the Mississippi Delta are as deep, wide, and muddy as the river that gives the area its name” (Miller 2002). The point here is not to overly criticize such scholarly works. In fact, in the sense that the origins of this musical expression are neither straight forward, nor clear, its origins are indeed “muddy.” Rather, in this this paper we are simply arguing that a significant re-evaluation of the geographic origins of Delta blues is badly needed.

It is widely known and undeniable that the deepest roots of blues music lead back to the African continent. It is equally well-known that the African musical culture that informed the blues diffused to North America via the forced relocation of millions of slaves during the 300-years of the Atlantic slave trade (Chernoff 1981; Roberts 1998; Kubic 2008).). For instance, scholars focusing on blues from the Delta have traditionally paid overwhelming attention to the music’s African roots, presuming that its distinctiveness is a direct result of the African-dominated folk culture that evolved within the region (Evans 1970, 1978; Palmer 1981; Cogdell DjeDje 1998). Yet, this simple one-step movement of culture from Africa-to-the-Delta is only part of a much more expansive story in need of further amplification. Figure 2, originally conceptualized by geographer and blues guitarist Alan Marcus, demonstrates a series of diffusionary pathways responsible for the evolution of “blues culture.”² The map, while overgeneralized, is used here to demonstrate a one-way flow of musical culture over time and space. For example, it conceptually demonstrates how African-rooted musical culture diffused back and forth across the Atlantic Ocean via the guise of related, yet slightly different musical forms. It should be acknowledged, however, that these identified pathways in reality functioned as avenues for cultural exchange between and among the geographic regions they connect. Moreover, as the musical culture in question progressed along these pathways, it both transformed and was transformed by the various geographical regions through which it circulated, the Delta included. In effect, we could consider this collection of diffusionary paths as the primary circulatory network through which a truly syncretic blues-influenced and exceptionally dynamic musical form evolved. Each of the diffusionary pathways identified on Figure 2 are summarized on Table 1, and are discussed in turn in the following sections.

Figure 2: Pathways Of Diffusion, Movement And Migration Associated With The Evolution Of Delta Blues

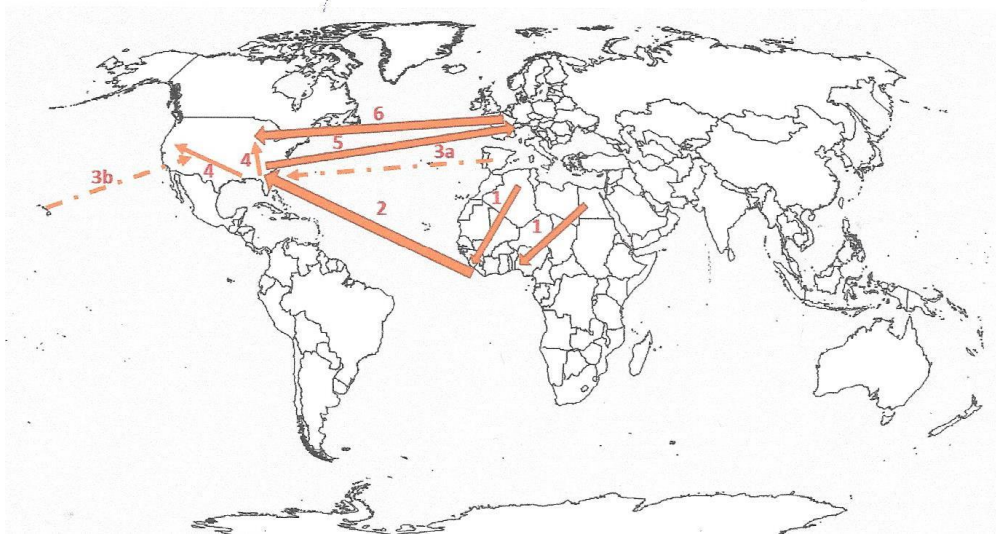


Table 1: Pathways Of Diffusion, Movement And Migration Associated With The Evolution Of Delta Blues (Pathways Correspond To Those Identified On Figure 2 Above)

<i>Pathway 1</i>	North African/Middle East/West Africa Musical Exchange
<i>Pathway 2</i>	Atlantic Slave Trade/Middle Passage
<i>Pathway 3a</i>	Influence of Spanish Fandango and Open Tuning
<i>Pathway 3b</i>	Hawaiian Influence via the Slide Guitar
<i>Pathway 4</i>	The Southern Diaspora/Great Migration
<i>Pathway 5</i>	TransAtlantic Musical Diffusion
<i>Pathway 6</i>	The British Invasion Brings the Blues Home

Diffusion Stream 1: North Africa/West Africa musical exchange

A major challenge encountered when tracing the roots of blues music back to its original African sources is the fact that the African continent exhibits considerable cultural diversity. The sub-regions that served as the primary sources for slaves brought to North America, a geographic milieu that only represents a subset of a vast, culturally complex continent, are themselves highly fragmented and culturally pluralistic. For example, these source regions have always been the home of multiple religions, languages, dialects and customs. Accordingly, they have also always exhibited considerable

diversity when it comes to song and dance, instrumentation, performance styles, and musically-related social practices and rituals (Gioia 2008). One key then to understanding the African roots of blues is to acknowledge the syncretic process responsible for their formation prior to their arrival in North America. Diffusion stream 1 on Figure 2 graphically illustrates the cultural exchange that occurred as early as the 7th and 8th century between North Africa, the Middle East and portions of West Africa. This exchange was responsible for the syncretic merger of West African animistic traditions with Arab and Berber musical traditions, many of which were intimately tied to practices of Islam. For example, Diouf (2013) and Kubic (2008) have demonstrated direct connections between the practice of melisma, a style of singing common to blues-influenced music involving the use of multiple notes in a single syllable, to Islamic calls to prayer practiced throughout the Maghreb region of North Africa. In time this style of singing, and the instrumentation associated with it, merged with musical traditions that mirrored the timbre and rhythm-based linguistic heritage of West Africa. West African percussion instrumentation essentially simulated these dialects and languages, and in combination with the practice of melisma, was responsible for infusing rhythmic and timbre subtleties into the blues tradition that evolved across the Atlantic (Palmer 1981, Scaruffi 2007).

Diffusion Stream 2: Atlantic Slave Trade

The relocation of African musical traditions into North America via the Atlantic slave trade is demonstrated by diffusion stream 2. The disproportionately large numbers of slaves relocated to the southern portions of the continent were ultimately responsible for the formation of a host of musical forms, including the genre that we now refer to as blues. Yet as influential as these African musical influences may have been in the region, it would be false to simply consider southern blues music a transplanted form of African folk culture. The experience of forceful relocation from home dramatically transformed the overall cultural heritage of the slave community, with the impacts of this process having significant influences on African musical traditions. Pioneering blues writer Samuel Charters, after decades of searching for the roots of American blues in Africa, came to the realization that blues could not solely be defined by African customs and traditions alone. His years of field work culminated in his seminal book *The Roots of Blues: An African Search*, within which he verified a host of African influences, yet he ultimately concluded that blues was essentially a "new" cultural product of the American South (Charters 1981).

The melding of the varied and previously distinct African cultures that had merged following relocation would undoubtedly explain this "new" music to a degree, yet a host of scholars have identified a variety of European musical

influences within blues (Djedje 1998, Scaruffi 2007, Gioia 2008). These influences were partially related to the need for African slaves to adapt their music to European instrumentation, but also stemmed from slaves adapting the harmonic and compositional structures common within Western music. For example, even the most traditional and oldest of American blues is centered around strong harmonic progressions that come directly from traditional European counterpoint. Overtime African and European musical traditions merged even further as slaves began performing European folk song styles, Christian spirituals and hymns, all of which had some influence on the development of blues.

The precise manner and circumstances in which African and European music traditions merged varied considerably throughout the South based on numerous factors, such as the exact source of slaves, the ethnic mix of European populations, and the cultural, social and economic context within which African slaves were assimilated into their "new world." Coincidentally, the blues music that evolved in North America exhibited considerable regional diversity. A number of regional styles have been identified, including at least two in Mississippi alone, yet the three most commonly referenced regional blues styles include Piedmont blues, Texas blues and blues from the Mississippi Delta (Bastin 1986, 1993; Evans 2008). The distinct genre of blues that developed in the Mississippi Delta certainly demonstrates European influences, yet its distinctiveness is characterized by the very strong presence of African influences, including syncretic instrumentation, and singing styles that incorporate melisma, referred to as field hollers and/or moans (Wald 2004, 2010).

Diffusion Stream 4: The Southern Diaspora/Great Migration

Diffusion stream 4 evident on Figure 2 is indicative of a geographical process that has been referred to as the Great Migration, or the Southern Diaspora (Grossman 1989; Leeman 1991; Holley 2000; Gregory 2005; Berlin 2010). This process unfolded during the first part of the 20th century, a time period when millions of southerners, both African-American and white, relocated from the rural south to the urban north and west. Labelling this migration the Southern Diaspora, and noting the widespread economic, political, social and cultural impacts it had on the United States, Gregory (2005) has considered this process to be "the most momentous internal population movement of the twentieth century." Perhaps most importantly for this paper, Gregory highlights how musical changes functioned as a lens from which to understand the broader transformations that were the outcome of this process. This migration witnessed the transformation of blues from a rural-based, acoustic musical form to one that was electrified and urban. The technological revolution that saw the electric guitar replace the piano as the

foundation of rhythm sections ultimately led to evolution of what became referred to as "urban" blues (Gioia 2008).

The raw and overly stark sound of the Delta blues was sonically situated such that it served as the perfect musical ingredient for the electronically enhanced blues that evolved as this diaspora unfolded. Urban blues styles emerged in a number of larger northern and western cities, such as Detroit, Los Angeles, San Francisco and New York. However, it was in Chicago, the primary urban destination of untold thousands of migrants from the Mississippi Delta, where a particularly gritty and distinctly raw form of urban blues was born. This process is best exemplified by the life and music of blues great Muddy Waters, a migrant from the Mississippi Delta who relocated to Chicago in the early 1940s, where he was responsible for the evolution of a sonically and emotionally expansive-style of electric blues, one that became known simply as "Chicago" blues (Gordon 2002).³ The broader social, political and cultural outcome of the Southern Diaspora was profound in several ways. Musically speaking, it was the diffusion of Delta culture from Mississippi to the urban north and west that provided the mechanism that enabled Delta blues to break away from its regional and racial confines and enter America's cultural DNA, and by doing so it reshaped the sound of popular music worldwide.

Diffusion Stream 5: Transatlantic Musical Diffusion

Diffusion stream 5 refers to a geographic process involving the diffusion of both rural and urban blues from the United States to Europe. These forms of diffusion occurred in two main ways. First, American music itself diffused rapidly and most immediately via radio and record sales during the on-set of World War II, a time period that coincided with the initial stages of the age of electronically mass distributed music. By 1940 a very large majority of Americans had regular access to radio and such high adoption rates of mass distributed music were mirrored in Europe (Fauser 2013; Winkler 2013). As the war progressed, radio listeners in Great Britain were increasingly exposed to American blues when the BBC broadcasted blues records as a means to soothe nerves rattled by Nazi bombing raids (Obrecht 2010). Moreover, both during and after the war American servicemen disembarking in port cities, such as Liverpool, brought blues recordings that quite often found their way into the hands of British record aficionados and radio programmers. The post-war economic boom experienced on both sides of the Atlantic, and the demographic booms that resulted from it, greatly increased the rate and volume of musical diffusion and exchange that occurred as the 1950s transitioned into the 1960s.

Beyond record sales and post-war radio, American blues musicians themselves eventually brought live music directly to European audiences via

concerts and festivals held throughout the continent during the post-war period, many of which featured such blues artists as headline acts. This music was highly received and became very popular among youth in the United Kingdom, especially within London, Liverpool and Newcastle, and this was particularly true when they were directly exposed to blues artists with Delta roots. For example, Muddy Waters' shockingly loud and amplified performance at the 1958 Leeds Festival has been widely identified as the primary motivating factor for the formation a number of British bands that ultimately forged their own raucous blues-based musical expressions, including the Animals, the Yardbirds, and the Rolling Stones (Gordon 2002; Gioia 2008; Denning 2017).

Diffusion Stream 6: The British Invasion brings the blues home

Diffusion stream 6 began occurring in earnest in the mid-1960s when the music associated with large numbers of the aforementioned British rock bands became increasingly popular in the United States. This process has been affectionately labeled the British Invasion and is one that is considered a primary social and cultural mechanism responsible for the for the eventual rise of the "counter-culture" on both sides of the Atlantic (Perrone 2004; Miles 2009; Whiticker 2015). The Beatles are often the first group mentioned in the public discourse concerning the British Invasion, yet the Rolling Stones perhaps best exemplify how this process pertains to the back-and-forth flow of Delta musical culture. For example, the latter group actually took their name from one of Muddy Water's signature songs (Rolling Stone), and eventually precisely reversed diffusionary pathway 4 when they trekked from London to the same South Side Chicago studio in order to record exactly where Muddy himself had recorded his early hits.⁴

The Rolling Stones, the Animals, the Beatles, and the Kinks were at the forefront of this invasion, but throughout the decade these acts were followed by a large variety of other blues-influenced bands, such as the Yardbirds, Led Zeppelin, and the Who. These particular groups, and more, were directly informed by blues musicians with links to the Mississippi Delta, thus it is accurate to state that they were largely responsible for re-exposing America to the Delta blues. For example, the career of Delta-born Muddy Waters had leveled off considerably by the late 1950s, largely due to the increased popularity of that era's Rock'n'Roll, best represented by the music of Elvis Presley. Yet his music, and his career, experienced a massive resurgence after it fully diffused across the Atlantic and returned from Europe in a modified form. The musical outcome of this diffusionary exchange was most accurately and pointedly summarized by Waters himself; "blues had a baby, and they called it rock 'n' roll" (Gordon 2002).

Missing diffusionary links from other cultural crossroads

The diffusionary processes identified in Figure 2 by numbers 1, 2, 4, 5 and 6 have indeed been treated in the literature, but are typically addressed individually, rather than being viewed as collective elements within a more extensive network of cultural exchange. Further, strict reliance on these processes alone, be they viewed separately or collectively, reinforces the persistent myth that Delta blues represents an art form nurtured in isolation from the modern world. Case in point, a simple interpretation of Figure 2 may lead to the conclusion that blues neatly transitioned from a folk idiom to a popular musical form only after progressing through the later stages of the circulation (e.g., diffusionary pathways 4, 5 and 6). In reality, Delta blues musicians were heavily influenced and informed by the sounds and trends of the mainstream music industry long before their art became popular outside the region (Wald 2004, 2010; Gioia 2008). The historical record actually suggests that early influences from two additional diffusionary streams, both intimately linked to the popular music industry, were necessary ingredients responsible for the full cultural circulation evident on Figure 2. These two external diffusionary influences were manifested within Delta music prior to its diffusion to the urban north and west (prior to diffusionary pathways 4 on the Figure 2).

The two additional cultural influences discussed here – musical influences from Spain via the Spanish Fandango (note Spanish), and from Hawaii via the slide guitar, respectively – have largely been ignored in the academic literature, and deserve amplification here for two main reasons. First, the precise musical ingredients contributed by these influences are themselves products of syncretic cultural exchanges and cultural diffusion that impacted their own respective cultural hearths or "birthplaces." Second, these musical influences both diffused globally, yet it was within the Delta where their impact were most significantly magnified. Upon diffusing to the region, and converging with one another, these musical elements contributed to critical signatures that came to define the very distinctiveness of Delta blues.

Diffusionary Stream 3a: Influence of the Spanish Fandango and Open Tuning

The European influences described earlier in this paper manifested within blues in various ways, but perhaps no aspect of European music impacted the evolution of Delta blues more than the form and sound of the Spanish Fandango. The Spanish Fandango originally referred to an up-tempo musical form that accompanied a lively couples folkdance style that emerged within Andalucía in the early 1700s. Its precise origins are unclear, although musicologists have identified a diverse array of Moorish, African, Gitano, Afro-Latin, and even Amerindian influences (Goldberg and Piza 2016). Thus,

it is undeniable that this cultural phenomena reflects the fact that Spain, particularly the region of Andalucía, historically occupied several crucial crossroads, providing cultural connections between Europe and Africa, the Mediterranean and the Atlantic, and Europe and the Atlantic World.

By 1800 the term "Fandango" was used to refer to the music itself, as opposed to the dance, and the popularity of this musical form led it to widely influence European classical compositions. After diffusing to the U.S. the Fandango was introduced to the nation's burgeoning popular music industry in 1860 after Liverpool-born musician Henry Worrall filed copyrights for two instrumental guitar songs that directly incorporated its sound and form; "Worrall's Original Spanish Fandango" and "Sebastopol" (Obrecht 2017) Both songs transformed the popular musical form to the guitar by requiring the strings to be tuned to open chords, specifically the Open G and D, while playing simple arpeggios. In time these popular songs became staples among formal middle class parlor music, a trend that accelerated after mass-produced guitars became widely available via mail order (Obrecht 2015, 2016, 2017; Wald 2016). The combination of their widespread appeal, and the fact that they were relatively simple to perform, led them to be regularly included in tutoring books packaged with newly purchased instruments. Accordingly, the use of open-tunings became the starting point for numerous rural guitarists at the turn of the 19th century. A large number of seminal blues artists in the Delta widely utilized this technique in a variety of ways, including Muddy Waters, who had purchased his first guitar via mail-order from Sears and Roebuck. For instance, in a 1941 interview with musicologist Alan Lomax, immediately after recording his first songs for the Library of Congress, the future Father of Electric Blues was recorded vividly describing the effectiveness of what he and his contemporaries in the Delta simply referred to as "Spanish tuning" (Gordon 2002).

Diffusion Stream 3b: Hawaii Influence via the Slide Guitar

The widespread adaption of open-tuning within the Delta partially stems from the fact that their use significantly enhanced the sound generated by another guitar technique popular within the region – the use of the slide guitar. Guitarists incorporating this latter technique, rather than altering the pitch of the strings in the conventional manner, place an object, such as a knife, metal bar or a bottleneck upon the strings to vary their vibrating length, thereby altering the pitch. "Sliding," or moving, the object along the neck of the guitar, enables a musician to generate smoother transitions in pitch. When combined with open-tuning, this technique facilitated the creation of especially expressive accents, harmonics and vibratos (van der Merwe 1989; Payne 2014).

The mainstream academic and popular music communities have generally maintained that the slide guitar technique is an element of blues whose cultural lineage traces back to Africa. For example, most literature on the subject links the use of slide guitars to the variously identified single-stringed instruments commonly found across the rural Delta, such as "diddley bows" and/or "jitterbugs." These instruments, assumed to be archetypal elements of African-American folk culture, are in turn thought to have been inspired by the monochord zithers found throughout West and Central Africa (Evans 1970, 1978; Ferris 1978; Lomax 1993). Troutman, after thoroughly inspecting the historical record, has recently presented compelling evidence suggesting that its far more likely that the slide guitar tradition actually originated in Hawaii (Troutman 2013, 2016). According to his theory, the slide guitar entered the Delta blues milieu only after it was brought to the mainland via traveling Hawaiian musicians during the early years of the twentieth century.

The influence that the Hawaiian Islands had on the blues guitar, and on popular music in general, stems primarily from the role the islands served as one of the world's most significant crossroads during the 19th century. Hawaii has historically functioned as the *most* significant cultural crossroads in the Pacific realm, a site-and-situation attribute that led it be the birthplace of a variety of syncretic cultural forms, including diverse musical forms (Carr 2014). The islands location along Pacific trading routes brought sailors, merchants, laborers, entrepreneurs and missionaries from a wide variety of source regions, including the mainland U.S., Japan, Portugal, Spain, and Mexico, all of which significantly influenced Hawaiian musical traditions. Spanish guitars first arrived to Hawaii from Mexico in the early 1800s, and by 1890 a local guitarist by the name of Joseph Kekuku'upenakana'iaupuniokeamehameha Apuakehau (or simply Joseph Kekuku) had perfected a new style of playing that Troutman (2013, 2016) argues precluded the slide technique later utilized so commonly within the blues tradition. Kekuku would essentially lay the guitar on his lap and slid a piece a metal along the strings to produce multiple chords. This new technique was quickly incorporated across a variety of musical genres on the island, and within a few decades Hawaiian guitarists became extremely popular across the mainland U.S., especially in the South where they appeared in vaudeville, Lyceum and minstrel shows. Kekuku himself toured North America and Europe for thirty years between 1904 and 1934, and by 1916 Hawaiian guitar music outsold every other genre of music in the United States (Troutman 2013).

The staggering popularity of Hawaiian guitar music on the U.S. continent during the exact time period when Delta blues was maturing into a distinct sub-genre lend credible support for Troutman's arguments. Beyond

such historical probabilities, Troutman also offers a comprehensive list of similarities between blues slide guitarists and Native Hawaiian musicians, including parallels based on actual technique, terminology, repertoires, song titles, and inferences in interviews (Troutman 2013). The most compelling evidence supporting a link between Hawaii and the Delta blues is that African-American Delta musicians themselves understood and acknowledged their musical styles as that of playing "Hawaiian guitar." For instance, W.C. Handy, acknowledged for providing distinctive form to American blues, and therefore known as the "Father of the Blues," upon hearing blues slide guitar for the first time in the Delta near the turn of the 19th century described it as ".....in the manner popularized by Hawaiian guitarists who used steel bars....." (Handy 1969). Eddie "Son" House, commonly described as the single most important blues figure linking pre-war Delta musical traditions to more contemporary mainstream popular music (Palmer 1981; Davis 2003; Gioia 2008), and therefore critical to the diffusionary network identified on Figure 2, also emphatically acknowledged an Hawaiian influence. ⁵

Conclusion and final remarks

The intent of this paper was threefold. First, we offer a conceptual framework emphasizing geographical movement, in the forms of migration and diffusion, as a key mechanism responsible for the evolution of Delta blues music. Second, by conceptualizing the variety of influences responsible for the music's creation as geographically linked components operating within a unified network of cultural exchange, we demonstrate the true global nature of this musical form. Third, we build upon and contribute to a growing literature that uproots and challenges some long-maintained myths concerning the geographical, cultural, and historical origins of blues music.

In this paper we outline an approach that investigates the geographical roots of blues, yet acknowledge that many of the ideas presented in this paper warrant further investigation. For instance, the diffusionary pathways highlighted on Figure 2 represent a mere subset of the complete set of influences that impacted Delta blues. Further, even the limited collection of influences we discuss here merged over time and space in exceptionally complex ways. For example, the Spanish influence on blues, manifested via the Spanish Fandango, came from a musician born in Liverpool, England (birthplace of the Beatles), yet only manifested after he relocated to North America and contributed to the popular music industry. The nature of the Hawaiian influences on blues via the slide guitar, while vividly and sonically palpable on the surface, are equally complex. The precise temporal progressions of the two respective influences remain particularly vague. Henry Worrall published his version of the Spanish Fandango in 1860, at least thirty years prior to the known arrival of Hawaiian music on the U.S. mainland

(Troutman 2015). Yet it is conceivable that the practice of utilizing open-chords may not have become commonplace within the Delta until after Hawaiian slide-guitar techniques diffused to the region. It is also possible that the two guitar techniques, used in combination with one another, diffused to the Delta together at the same time. The precise nature of these influences are muddled even further when we one considers that Hawaiian slide-techniques were implemented via an instrument that originated in Spain to begin with (Summerfield 2003). In short, the musical influences evident within "Delta blues culture" converged and manifested in different ways, in different places, at different times.

The exact timing and precise musical connections remain vague, yet what is vividly clear is that the convergence of Hawaiian and Spanish diffusionary influences, in combination with the expressive vocal traditions rooted in African practices of melisma, contributed to a syncretic musical culture in the Delta whose sonic impacts were profoundly and globally significant. The tendency for blues musicians from the Delta – Charley Patton, Son House, Robert Johnson, Muddy Waters, and Elmore James, to name just a few – to so effectively, and so powerfully, combine the Hawaiian slide-guitar and Spanish open-tunings as means to replicate and respond to the human voice undoubtedly partially explains why they became so popular to later generations of blues-influenced rockers world-wide (Oliver 1984; Dicaire 1999; Gioia 2008). Thus, our conclusions provide further support for notions refuting previously oversimplified depictions of the Delta, and by extension Delta blues, as somehow being detached from the progression of history and the world (Cobb 1992; Strait 2012). Cobb's characterizations of the Delta as a region exhibiting "close and consistent interaction" with a host of prevailing national and global forces have a geographical parallel; the uniqueness and significance of the Delta, and the musical culture to which it gave birth, stems from the region's multiple connections with a wide variety of other places. Moreover, the dynamic vitality of Delta Blues can be largely explained by the region's musical connections to a particular combination of other places – namely Hawaii, Spain and West Africa – that functioned as unique cultural crossroads in their own right. Acknowledging these connections does not diminish the extensive African-American cultural influence that lies at the core of blues culture and music. Likewise, the results presented here certainly do not indicate that Delta blues musicians were less creative or less talented than previously thought. They do, however, suggest that the magnitude of multiple diasporic collisions evident within the Delta were responsible for a musical culture that was and is far less isolated and segregated, and far more fluid and ethnically diverse, than has been traditionally imagined (Troutman 2013).

Using the lens of musical culture, it is undeniable that Spain, Hawaii and the Mississippi Delta are indeed linked to one another within a extensive and complex network of cultural exchange, one that has been responsible for the distinctive evolution of a musical form whose impacts have been felt globally. For this reason we believe the time is past due for scholars to more significantly incorporate the geographical dimensions of music within endeavors that utilize the production and reproduction of transnational social and cultural phenomena as a means to study globalization, transculturation, or diasporas (Appadurai 1991; Glick Schiller et al. 1996; Hannerz 1996). Musical forms obviously can and have spread freely and are capable of easily crossing borders in ways that many other commodities and cultural phenomena cannot. In doing so, music originating from geographically wide-spread source regions can still influence one another, and converge with one another, in complex ways.

The terms "global music" and/or "world music" are indeed present within both public and academic discourse, but ironically are most frequently used as marketing categories to refer to musical expressions that have supposedly been isolated from non-Western musical traditions. We maintain that blues music, particularly Delta blues, irrespective of previous attempts to inculcate its mythical folk roots, is in fact truly a transcultural or global phenomena. Geographers investigating the spatial aspects of particular musical forms often relate them to specific cultural landscapes or regions, typically by referencing actual lyrics and or themes inspired by these areas (White and Day 1997; Hancock- Barnett 2012). The few scholars who have approached the geographical study of music from a more global perspective have tended to focus on the ways that particular genres, or sub-genres, have diffused over space (Connell and Gibson 2003; Dalbom 2010; Strait 2012). We feel that a thorough understanding of the geographical aspects of any musical culture requires a deeper level of analysis. If the geographical study of Delta blues teaches us anything, its that an exceptionally complex and multi-layered circuitry of spatial connections was directly responsible for both its very creation and its relevance to the wider world. Accordingly, we maintain that thoroughly understanding the role that diffusion has on the globalization of music requires more than a mere consideration of its movement from point A to point B, or to point C. One key to unlocking the mysteries of music posed by Rolling Stones guitarist Keith Richards is to acknowledge the dynamic impact that the very process of geographical movement can itself have on musical evolution.

Notes

1 – The Mississippi Delta is a distinctive northwest section of the state of Mississippi that lies between the Mississippi and Yazoo rivers. This region is most commonly referred to by locals simply as the the "Delta." Irrespective

of its name, the region is not part of the actual delta of the Mississippi River, which is generally referred to as the Mississippi River Delta. By comparison, the Delta is actually a alluvial plain, created overtime by regular flooding of the Mississippi and the Yazoo rivers over thousands of years. Accordingly, this region is exceptionally flat and contains some of the most fertile soil in the world. Due to its well-entrenched history of planation agriculture, and the unique racial, cultural and economic systems historically associated with this form of agriculture, the Delta has been refereed to as "The Most Southern Place on Earth" (Cobb 1992).

2 – An earlier version of this map reflecting Marcus's original ideas has been utilized within previously published work (Strait 2012). That original map has been modified somewhat to accommodate newly developed ideas.

3 – Muddy Waters precise birthplace and date have been debated, but his birth name was McKinely Morganfield and he was most likely born in Jugs Corner, in Issaquena County, Mississippi in 1913. Morganfield grew up on Stovall Plantation near Clarksdale, Mississippi, which is where he was recorded by musicologist Alan Lomax for the Library of Congress in 1941. In 1943 he migrated to Chicago, Illinois. His use of electrical amplification led him to be considered the father of electric blues (or Chicago Blues) and is why he is often cited as the critical link between Delta Blues and Rock 'N' Roll.

4 – The Rolling Stones recorded at Chess Records, then located at 2120 South Michigan Avenue, during the group's first U.S. tour in 1964. Chess Records was in operation at this location from 1956 to 1965, the time period when Muddy Waters released most of his classic blues hits. The company eventually relocated to much a larger building in the late-1960s, 320 East 21st Street, the label's final Chicago home. The original location on 2120 South Michigan Avenue is now home to *Willie Dixon's Blues Heritage Foundation*.

5 – The historical significance of Son House (born Eddie James House, Jr.) to blues evolution is generally based on four factors. First, he was a contemporary of and played with Charley Patton, who is considered the Father of the Delta Blues due to the fact that was the first Delta blues musician to record and became known outside the region. Second, like Muddy Waters, House was recorded by Alan Lomax for the Library of Congress in 1941 and 1942. Third, House had formative influences on a number of other Delta musicians, including both Waters and Robert Johnson. Finally, House was one of the more important Delta musicians that was "rediscovered" during the blues revival of the 1960s, whereupon his career was re-established as an entertainer when he began performing widely for young, mostly white audiences in coffeeshouses, at folk festivals and on concert tours during the rise of the American folk music revolution.

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Exploring the Food Expenditure Patterns of College Students

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Abstract

This study explored the food expenditure patterns of college students. Information on monthly food expenditures and income from a sample of students was used to estimate the proportion of income that the average student spends on food and analyze the Engel relation between food expenditures and income. The average college student was found to spend about 30 percent of income on food. The estimated marginal share is 0.076. These findings indicate that food and related establishments that sell mostly to college students will receive very little of any potential increases in student income. However, increases in student income may be a boon for businesses that sell non-food items.

Keywords: Expenditure, marginal share, Engel, elasticity

Introduction

The average American spends about 10 percent of income on food. The percent of income spent on food varies by groups based on income and other characteristics. A group of interest consists of millennials and college students whose spending is an important component of local economic activity and act as catalysts for total economic development (Onear, 2007). Students in the United States spent a total of \$30 billion in 1995 (Ring, 1997). About 77 percent (\$23 billion) of the expenditures were on essential items such as food, rent, gas, car insurance, tuition, and books. Only 23 percent of income was spent on non-essential items. The limited nature of student incomes suggest that some essential expenditures may be based on borrowed money especially as the average student was found to have a credit card balance of \$2,700 in 2006 (Barrett, 2003). As with others, food is one of the most essential needs of students. However, expenditures on food by students are expected to be constrained, and vary, by income. Such expenditures support

many local businesses especially food-at-home and food-away-from-home establishments. Such establishments may do a better job of marketing their products and services to students if, in addition to others, they have better information on the relation between student food expenditures and income. This study explores the relation between food expenditures and the incomes of college students.

Theoretical Model

The model for the study is based on consumer demand theory. The rational consumer seeks to maximize utility with a combination of food and non-food goods and services. Utility is maximized subject to the constraint that the sum of expenditures (E) on food and non-food goods and services should not exceed the consumer's income (I). Maximization of the constrained utility function with respect to expenditures results in a set of three first order equations whose simultaneous solution results in a system of two expenditure equations – one for food and one for non-food – which are functions of prices and income. For constant prices, the expenditure equations could be expressed as functions of income.

Data and Methods

Data used for this study was obtained from a convenience sample of undergraduate students and were collected between January and April 2015. Each of 54 students in the sample provided information on monthly food expenditures and income. In addition, each student provided information on his/her gender, ethnic affiliation, classification and frequency of eating out.

The mean monthly food expenditure and income for the sample was calculated. The proportion of income that each respondent spent on food was calculated as a ratio of the monthly food expenditure to income. A scatter plot of the relation between monthly food expenditures and incomes was used to assess the nature of the Engel curve for the sample. A second scatterplot was used to assess the relation between the proportion of income spent on food and income.

Based on the relation suggested by the scatterplots, a simple linear regression was used to estimate the relation between monthly food expenditures and incomes. In addition, four different regression equations were estimated for the relation between income and the proportion of income spent on food. The functional forms for the four equations are linear, linear-log, log-log and inverse.

Results

The average monthly food expenditure for the respondents is about \$160 (Table 1). The reported food expenditure ranged from a low \$30 to a

high of \$540 and has a standard deviation of \$114. The mean monthly income reported by respondents ranged from a low of \$100 to a high of \$4,000. The reported monthly income has a mean of \$868 and standard deviation of \$968. The average student spent about 30 percent of income on food. This implies that, compared to the average American, the average student spends a higher proportion of his or her income on food and has only 70 percent of income to spend on non-food goods and services. The lowest proportion of income spent on food is 2 percent while the highest proportion is 57 percent.

Table 1: Summary Statistics on Student Monthly Food Expenditure and Income.

Variable	Mean	Std. dev.	Low	High
Food Expenditure (\$/mo.)	160	114	30	540
Income (\$/mo.)	868	968	100	4,000
Proportion of income spent on food (%)	30.4	17.5	2	57

Some of the estimated Engel equations are presented in Table 2. Equation 1 in the table is the estimated equation for monthly food expenditures (E_f) as a function of monthly income (I). The estimated intercept for the equation is 93.9 and could imply that students with little or no income spend an average of about \$94 per month on food (autonomous food expenditure). The estimated coefficient for income is 0.076 and is statistically significant at the 5 percent level. This estimate is the marginal share and implies that students will spend about \$7.60 on food for each \$100 of additional income. As expected, the estimate indicates that food is a necessity. Based on statistical properties, equation 5 is better than equations 2 and 3. The estimated coefficient for equation 5 is -0.51 which indicates that a percent increase in income will decrease the proportion of income spent on food by 0.51 percent. This finding is consistent with Engel's law which states that the proportion of income spent on food decreases as income increases. Equation 4 was used to test the applicability of the Workings (1943) model (marginal share = $w_f + b_i$). The 0.175 (0.304 -0.128) estimate of the marginal share given by the Workings model is consistent within the margin of error.

Table 2: Estimated Regression Coefficients for Engel Equations.

Equation #	Dependent Variable	Intercept	Income (I)	Ln(I)	I^{-1}	R ²	Std. Error
1	E_f	93.90 (5.85)	0.076*** (6.09)			41	87.53
2	w_f	0.40 (5.81)	-0.0001*** (-5.82)			38	0.13
3		0.182 (7.67)			37.20*** (7.27)	49	0.12
4		1.10 (12.17)		- 0.128*** (-8.94)		60	0.11
5	$\ln w_f$	1.81 (4.84)		-0.51*** (-8.68)		58	0.46

E_f = proportion of income spent on food, I = monthly income, w_f = proportion of income spent on food. Numbers in parenthesis are t-values, $n = 54$, *** = statistically significant at the 5 percent level.

Conclusion

The high proportion of income that college students spend on food is mostly likely due to their limited income. Given that food is a necessity, only a small proportion, about 8 percent, of additional income received by students will be spent on food. Budget allocations to food decrease by about one half percent for each percent increase in student income. During periods of rising incomes, businesses that sell food to college students could get more of the student dollar if they find ways to diversify into selling non-food items.

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Microfinance Model- A Dynamic Drive Towards the Women Empowerment

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Abstract

This study is based on the microfinance model which works for poverty reduction and financial inclusion mechanism for development of social systems and livelihood development in developing countries. Women are a powerful force that can be empowered to the benefit of their families, society and nation to which they belong. But in the rural and tribal area of Indian patriotic society, women face discrimination in their family with social, economic and political life. This study has examined the impact of microfinance on women empowerment in the context of various model and initiatives taken by programmes and schemes of government and non-government organisations. The methodology of the present study relies on case study method of women Self-Help Group (SHG). Secondary data has been collected from the annual and other reports of different departments and ministries, journals, books, research papers. This study suggest that microfinance played a very important to created financial resources for poor women but it requires investment in capacity building over a period of time, it will help to build the social capital and helps to bring economic prosperity.

Keywords: Empowerment, Microfinance, Self Help Group, Gujarat

Introduction

Mohammad Yunus, a Bangladeshi banker and economist who was awarded Nobel Peace Prize for founding Grameen Bank¹ and pioneering the concept of microfinance. Microfinance is one of the most important economic tools to make a remarkable change in the social and economic life of the poor people especially in the developing countries. It was designed to engage people in economic activities that could help them to meet their basic needs. NABARD (2000) defines microfinance as “the provision of thrift, credit and other financial services and products of very small amounts to the poor in

rural, semi-urban or urban areas enabling them to raise their income levels and improve living standards”.

The successful model of Grameen Bank from Bangladesh draws the attention of people from all over the world. These approaches have emerged in India in the 1980s through the Self Help Groups (SHGs) model. The Self Help Groups (SHGs) emerged as an integral part of the Indian financial system after 1996. They are small, informal and homogenous groups of not more than 20 members. Each SHG is an association of people from same socio-economic class who come together for a large benefit. The people in SHGs come together for solving their common problems through mutual help. Villages face problems of poverty, illiteracy, and lack of awareness about health issues. These problems are mainly due to lack of resources. It is very difficult to deal with them individually, and hence group efforts are necessary to solve them. In the last couple of years, Governments and NGOs (Non-Government Organisations) have made a tremendous effort through microfinance to encourage women entrepreneurship. Self Help Groups make the way for microfinance by providing credit to the poorest sections of the society. NABARD and RBI (Reserve Bank of India) have been the backbone in promoting and linking SHGs to different national banks.

Women all over the world are discriminated even though their contribution is no less than men are. Amartya Kumar Sen in 1990 has coined the term 'missing women' and said that there were 100 million missing women. UNFTA in 2012 has made a survey and found that number of missing women was even higher at 117 million. Sen argued that the basic reason for the missing women is the discriminatory treatment rooted in the cultural preference for boys. In fact, both males and females should be equipped with equal opportunities to enhance their capabilities so that they get the freedom to choose their means of development and improve their lives. It has been noticed that in almost all societies, women not only have less power than men do, but they also get lesser wages and have less control over the resources. The contribution of women in the economy is equally valuable but their work is invisible. The reason for low 'visibility' of women is the effect of difference in the working pattern of both men and women where women have less access to resources and thus lower payments. For example when young girls and boys reach their juvenile age, girls are expected to spend more time doing household chores and learning kitchen work while boys spend more time in farming or doing odd jobs to earn wages. When they reach their adulthood, girls are more over pressured than boys because they take care of household activities and they go to work to help their mothers. In reality, they spend more hours in work but get lesser outcome in financial terms.

Women also suffer from different types of deprivation in social and economic spheres of life, including poor education and income, less control

over their own income, less participation in decision-making, less access to production resources and reduced employment opportunities than men. According to the Gender Statistics Database (World Bank) 2016, gender inequality is a core development objective, a smart development policy and sound business practice. Gender equality can boost productivity, enhance prospects for next generation, build resilience and make institutions more representative and effective. It is true that women have less access to financial services and they remain in more disadvantaged position than men. We aim for inclusive economic growth, poverty eradication and sustainable development but to achieve all these, gender equality is must.

Women Empowerment

Empowering women in the process of development has been one of the main concerns of almost all development strategies and programs. Development agencies are now more concerned to raise the women's empowerment level, which will make them capable to challenge their dependency in the family and society (Selvaraj and Kannusamy 2007). Pandit Jawaharlal Nehru has rightly said, "*When a woman moves forward the family moves and the nation moves*". Mohammed Yunus has rightly said, "*When men get a chance, they start dreaming about themselves; when a woman gets a chance, they dream about home and their children and they also dream about what they can contribute to the community*". Even though lesser in numbers the contribution of women for economic growth, cannot be ignored.

Third World Feminists and Women's organizations presented the idea of 'Empowerment' for the first time in 1970s. The focus of this concept was to give an outline and provide support to the struggle for social justice and equality for women through transformation of social and political structures, and economic arrangements at national as well as international levels. This definition of empowerment strengthens the *transformative approach*. The concept of empowerment has received a great deal of attention during the past 20 years, due to its strong influence on organizational effectiveness and innovation (Spreitzer, 1995). Both government organizations and NGOs have been trying to adapt this management concept to achieve their goals and improve their operation in today's volatile environment. Empowerment is a concept shared by many disciplines and areas: Economics and Studies of Social movements, Community development, Psychology and Educational Organisations. The definition of empowerment relates more directly to power, as "A multidimensional and interlinked process of change in power relations".

- Power over, i.e. one person has power over other, which suggests an unequal relationship
- Power to, i.e. the ability to make decisions and find solutions

- Power with, i.e. social or political power, exercised by people on a common ground
- Power within, i.e. self-awareness and esteem which enables people to influence their own lives

These power relations operate in different spheres of life (e.g. economic, social, and political) and at different levels (e.g. individual, household, community, market, institutional (Mayoux, 2000)). The World Bank made an in-depth study on empowerment (Alsop, Bertelsen and Holland, 2006). Two main components; agency and opportunity structure were highlighted. Agency is the ability of individuals to make deliberate choices for themselves, whereas opportunity structure determines the degree to which participants can transform their agency choices into action. Within this framework, economic, social, political, and psychological resources are indicators of agency. The set of institutional policies, which govern choices available to people, and how individuals make choices is called opportunity structure. Opportunity structure influences the amount of power an individual has got over the agency. According to this framework, both agency and opportunity structures determine an individual's degree of empowerment. In addition to this, the analytic framework consists of three domains (the state, the market, and the society) and three levels (macro, intermediate, and local) that represent various geographical, economic, and socio-political contexts.

Women: Better Clients of Microfinance

In India, poverty and women are two sides of same coin. There is no doubt that women are poorest amongst the poor and they are bound to be vulnerable. Now the only way out is to make a strong platform for the growth of women, which empowers them to make their own choices and thereby contribute for the economic growth as well as development. It is true that many microfinance institutions prefer women members, as they believe that they are trustworthy, better at work and more reliable borrowers, which helps in contributing to their own financial condition (Swain & Wallentin, 2007).

- **Women and Poverty**

Women are among the world's poorest people. The Human Development Report, 1995, reported that 70 percent of the 1.3 billion people, living on less than \$1 per day are women. Women have a higher unemployment rate and lesser access to financial services than men do in almost every country of the world. Microfinance institutions can significantly reduce women's vulnerability by providing access to finances for income-generating activities.

- **Women and Inequality**

UNDP, UNIFEM, and the World Bank, all indicate that gender inequalities in developing societies inhibit economic growth and development. Gender equality implies a society in which women and men enjoy the same opportunities, outcomes, rights and obligations in all spheres of life. Equality between men and women exists when both are able to share equally in the distribution of power and influence; have equal opportunities for financial independence through work or through setting up businesses; enjoy equal access to education and the opportunity to develop personal ambitions. (Cheston & Kuhn, 2002).

- **Women and Household**

When women are empowered, the whole family gets the benefits. These benefits often have ripple effects on future generations. Women are also more likely to invest additional earnings in the health and nutritional status of the household and in children's schooling. This means that the giving benefit to women have a greater positive impact on child and household poverty reduction, measured in terms of nutrition, consumption and well-being. Assisting women therefore generates a multiplier effect that enlarges the impact of the institutions' activities.

- **Women and Work**

Women work plays an important role in development goals such as poverty reduction, human development and economic growth. It also transforms the lives of women by addressing gender inequalities at various levels. Women Participation in formal economic activities or work reflects the productive capacity of women, control over their own incomes and improves decision-making power. The ability to work outside and to engage in activities other than household can lead to significant strength, status and transformation of gender relations and challenge the traditional approach of social and economic relation.

Studies on Micro Finance and Women Empowerment

Hossain (1988) has examined Grameen bank participant members and non-participants also. He discovered that average household income was 43 percent higher than target non-participants in villages. Other than this the Grameen members were also found to be of younger age and better educated than non-participants. Grameen members spent 8 per cent more per capita on food and Grameen loans generated self-employment activities.

According to the Hashemi (1996) women's access to credit has an impact on their lives. Their results imply that women's access to credit contributes significantly to the magnitude of the economic contributions

reported by women, to the likelihood of an increase in asset holding of their own, an increase in their exercise of purchasing power, and in their political and legal awareness and also uses composite empowerment index. He found that access to credit was also associated with higher levels of mobility, political participation and involvement in 'major decision-making' for particular credit organization

Mayoux (1997) states that a small increase in income of the women also leads to a decrease in male's contribution in income to certain types of household expenditure whereas, others believe that investing in women's capabilities empowers them to make choices which is not only a valuable goal in itself but it also contributes to greater economic growth and development.

Tracey *et al.* (2006) has studied the economic empowerment of women from rural areas in India self-help through participation. These women were given training in stitching, embroidery, patch work, through Seva Mandir NGO in Udaipur. Women had to devote more time to the center as a result they had less time for household duties. Stress and pressure of work were the challenges they had to face. Positive result is that there was increase in their economic strength. This gave them great psychological relief.

Ashraf *et al.* (2008) has remarked that committed producer creates positive impact on decision making power and savings habit. She can take decision about withdrawing money or to roll-over balances. Commitment funds are to be used for certain purposes. Savings makes a woman powerful. Self-control on account has positive effect on female decision making power. Marketing also plays important and vital role. Bank staff members can encourage one to set saving goal and can persuade them for saving.

Microfinance programs have an important role to play to reduce poverty and empower poor women. It has been found that micro-finance services have positive impact on reducing poverty, improving standard of living and empowering poor women at international (Hashemi *et al.* 1996; Yunus & Jolis, 1998; Banu *et al.*, 2001; Hoque, 2008; Swain & Wallentin, 2011) and national level (Singh, 2001; Todd, 2001; Borbora and Mahanta, 2008; Noreen, 2011; Sarumathil and Mohan 2012). On the other side, some research studies have shown negative impacts. Loans from the microfinance programs are mainly used for non-income generating activities such as consumption and other emergency needs. Some studies have also found that there is no significant impact of the program on generating income, reducing poverty and women empowerment. (Amin 1993; White, 1995; Coleman, 1999; Narayanan, 2003; Sarangi, 2007; Aslanbeigui *et al.* 2010). Analyzing these types of microfinancial services issue is significant for researchers and academicians. So this Paper main objective is to will examine impact of Microfinance on women empowerment.

Methodology

Research method is a logical and systematic plan prepared for directing a research study. The method used in this study is the evaluation and the descriptive survey method. The study is based on primary data as well as secondary data and information. The descriptive method is suitable because the research work involved data collection from rural community members of microfinance institutions (MFIs) with a view to determine whether or not microfinance contribute to poverty reduction by increasing their income and welfare. The qualitative and quantitative information on SHG members and their households was obtained only through interviews. Multistage random sampling has been used for the data collection. For this study, from the Gujarat State Dahod District SHG has been selected because according to census 2011 in Gujarat state Dahod has second highest population of Scheduled tribes. The selection of SHG based on one criteria they should have taken a loan at least once from financial institutions. From each SHG 3 respondents were selected randomly. In total, 180 members of SHGs were selected for the study. For the data analysis Average and percentage analysis was carried out to draw meaningful interpretation of the results. One simple case study also shows the impact of this programme.

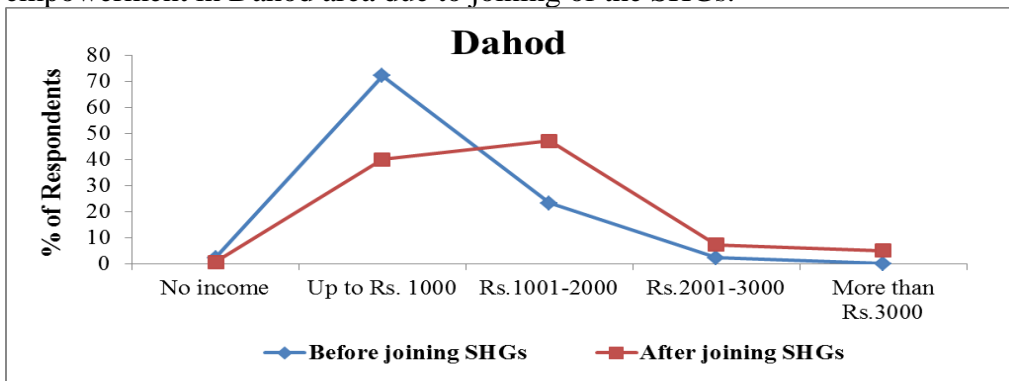
Socio Economic Profile of SHG Members

Majority of the women respondents in SHG belong to the middle age group. In the study area of Dahod (tribal district). Women between the ages of 26-35 years are actively participating in SHG. Out of total 51.1 percent women belong to this age group. 31.1 percent of women belongs to 36-45 age. In younger age group means less than or equal to 25 women participation are only 6.7 percent. The more than 46 age women are also members of SHG, and constitute only 11.1 percent in Dahod. According to the field survey 35 percent respondent are illiterate and 20 percent of the women can sign in Dahod district. Out of the total literate women 16.1 percent women have received primary education, 21.1 percent women have received secondary education and 6.1 percent have received higher secondary education. Only 0.6 percent women are graduate. Not a single woman is a post graduate. Any other course include diploma, ITI and others has only 1.1 percent. In Dahod major two type sub caste in tribes. The Patelia is known to be a much higher Tribe/Sub-caste than compared to Bhil. And hence there is huge discrimination and difference between both the Tribes/Sub-castes. They don't even allow cross marriages to take place within one another. Table clearly shows that 77.8 percent of respondents belongs to schedule tribes in Dahod district where as 17.2 percent respondents belongs to the other back ward caste. Only 5 percent respondents belongs to schedule caste. No single respondent from the general caste. All women are from Hindu religion. Out of total 92.2 percent of beneficiaries are

married, unmarried women constitute 3.9, and 2.8 percent widow respondents in the SHG. 99 (70.9%) respondents were from nuclear families and 81 respondents (29.1%) had live in joint families. Dahod is tribal area so 78.3 percent of the respondent have land, only 18.9 percent respondent live in pakka house (concrete house). 68.9 percent of the respondents got loan up to Rs.10000 and 31.1 percent of respondents got Rs. 10001- 20000.

**Impact of Microfinance on women Empowerment
Changes in Monthly Income of SHGs Women**

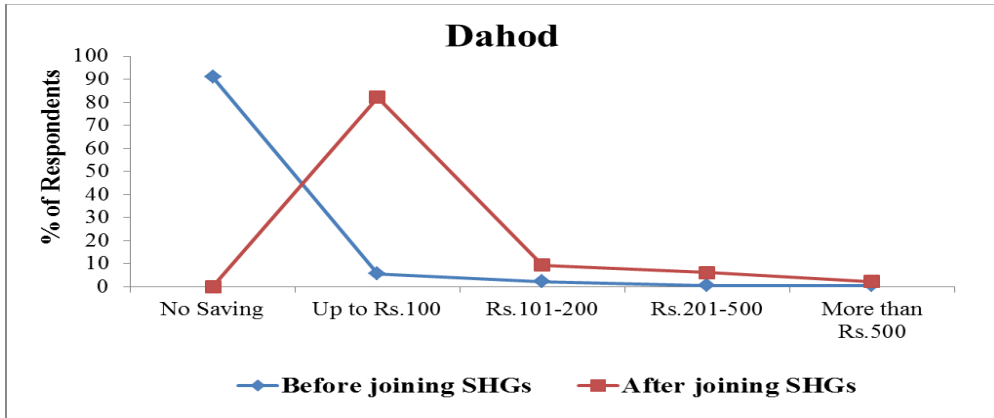
The shows the monthly income of SHG’s women who are 180 in number. Before joining the SHG 2.2 percent women were unemployed whereas after joining the SHG their number has gone down to 0.6 percent. The variation in unemployment rate is 1.6 percent. Those who are doing handicraft, agriculture and allied activity and casual labor some of them earned up to Rs.1000 only but after joining it there has been significant change in the employment level. After joining the SHGs their percentage has gone down from 72.2 percent to 40 percent. Which is praise worthy because after joining the SHG there has been a sharp rise in the level of income? That means a variation of 32.2 percent. In contrast the income group of Rs. 1001-2000 where earlier there were 23.3 percent respondents, now there are 47.2 percent. We can see income group of Rs. 2001-3000 total number of women increase from 2.2 percent to 7.2 percent. Before joining SHG no single women was earn more than Rs. 3000 but after joining SHG 9 women earn more than Rs. 3000. After getting a loan 70 percent members use it for productive activities such as purchase of stitching machines, raw material for the handicraft, buying a seeds and equipment for increased the agricultural production and cattle. Thus, we can conclude that there has been progressive economic empowerment in Dahod area due to joining of the SHGs.



Saving

Savings gives confidence in life, which increases the efficiency towards work. The amount of personal saving helps them to recycle the

amount and offer it as security to avail loan from the banks to which they are linked. Women always think about the future of the family and their children. The changes in the saving pattern are noticed due to change in the income of women. Income is divided into two parts; expenditure and savings. Income affects in both the parts and it is interrelated. Savings and micro-credit are the two important pillars. They cannot opt for one without the other. The basic aim of SHG is to develop thrift among the marginalized sections of the society. Saving, particularly among rural women, reduces dependency on non-institutional sources and helps develop self-reliance. Contribution of a fixed sum on monthly basis as saving assumes greater importance as it directly influences the growth of common fund of the group. The accumulated savings which is the prime source of SHG fund is lent to the group. The greater the amount of savings the greater will be the ability of the group to meet the requirements of its members, as well as, higher will be its ability to demand additional funds from the formal financial institution.



It shows the monthly individual savings of members of SHG. This table shows a drastic change in the saving pattern after joining the SHG. Women always think about the future of the family and their children. The data from the table clearly shows that 91.1 percent respondents did not have any savings before joining the SHG. It means all women in the SHG started saving after joining the SHG. Before joining SHG 5.6 percent respondents used to save money up to Rs. 100 in the bank or post office or Mandali, but now 82.2 percent respondents are saving because of SHGs. A drastic variation (76.6) in saving is noticed after joining SHGs. The women who save Rs.101-200 and Rs. 201-500 have increased from 2.2 percent to 9.4 percent and 0.6 percent to 6.1 percent respectively. Only single woman saved more than Rs. 500 per month before joining the SHG. But after joining the SHG, four women have saved. This data itself shows that the after joining SHG economic empowerment of women has increased. The first aim of SHG to motivate the saving of women. It is fulfill at grass root level also.

Changes in Participation of SHGs Women in Financial Decisions in Dahod

Participation in Financial Decisions	Dahod			
	Before joining SHGs		After joining SHGs	
	No. of Respondents	%	No. of Respondents	%
Nil	37	20.6	21	11.7
Partial participation	112	62.2	89	49.4
Full Participation	31	17.2	70	38.9
Total	180	100	180	100

Source: Primary Survey 2014.

Table no. 6.15 shows the women participation in the household financial decision before and after joining SHGs in Dahod district. Positive changes of Women involved in the household financial decision-making are definitely considered as more empowered. They are able to participate in financial decision making like, expenditure, budget allocation, savings, buying and selling of household durables etc. Before joining SHGs 20.6 percent of women have not participated in financial decision but after joining SHGs 11.7 Percent have not participated in Dahod district. In the tribal area there is male domination in all aspect. It has been noticed that 62.2 percent of the women have partially participated in financial decision before joining SHGs. 49.4 percent of respondents partially participation of the financial decision. Only 17.2 percent of the women have fully participated before joining SHGs, but after joining SHGs 38.9 percent women respondents are fully participate in financial decision making. The level of financial participation has positive change before and after joining SHGs.

The microfinance program helps the economic status of women and they feel more empowered within their family. The more income a woman is able to generate the more she can lend a helping hand in the family which improves her respect and the family members treat her with dignity. The income earned by a women also enables her to take part in the financial decision making process of the family. When the woman has her own money in her hand then she has full right over it which also increases her financial literacy to use it in a productive manner. This also gives a good opportunity to come out of the age old male domination over monetary matters in our country.

Case study of Mangalam Amul Parlour for Livelihood Promotion

India contributes to 15% of the global milk production and stands as the largest producer of milk in the world with a production of 122 MMT in 2011. The size of Indian Dairy Industry is estimated at around USD 60 billion (INR 2,662 billion) with a good annual growth rate in terms of volume. The

production & demand for milk is expected to continue and rise due to various factors including population growth, rise in income & changing life style.

Gujarat is one of the largest milk producing states in India with the contribution of 7.75% share in the total milk production of India. The state having 17 Cooperative dairy milk unions & 25 private dairy plants has a milk collection of 3.45 billion litres with over 30 lakhs milk producers, affiliated to more than 15,000 Primary Milk Cooperative Societies. Milk contributes to 22 percent to the Agricultural GDP of Gujarat and is one of the biggest sectors for supporting livelihood in the state. As per state census data, out of about 102 lakhs total household of Gujarat, 42.6 lakhs households are engaged in Dairy and Animal Husbandry sectors as a primary or secondary source of their income. Though the dairy sector is active in most of the districts, some of the districts still need to be brought in the active dairy network. GLPC ("Mission Mangalam" Government Programme for SHG entrepreneurship development) is involved in promoting livelihood in the dairy sector by facilitating technical and financial assistance to the beneficiaries through various Central and State sponsored schemes.

Kiran ben is forty-one year old, working as a secretary of 'Yashoda Mata Mandal (Name of the SHG)'. She is very enthusiastic and a hard working woman. Before joining SHG she worked in the agriculture sector. She states that *"Times were such that I was going through financial constraints as the income was uncertain in the agriculture sector and because of which it was not possible for me to take care of the upbringing of my children optimally"*. Coordinator of Mission Mangalam suggested and motivated women like her to create and join the SHG group. The cluster coordinator educated them that they will have to accumulate their savings till six months and after six months they will get the loan. She further adds that *"Initially I joined for the purpose of saving which might have been useful for my children in future"*. In search of income and most significantly livelihood, under Mission Mangalam, an innovative initiative of the Government of Gujarat has been taken to empower rural women. Some women came together to form Sakhi Mandal (Self-help Group) and initiated the thought of savings. She says that *"Facilitated by Mission Mangalam, I decided to start the Amul Mangalam Parlour with the intervention of Gujarat Milk Co-operative Federation (GMCF)"*.

She quotes that *"When I started, I had doubts on our own capabilities whether I would be really able to manage an income generating activity for my own self. My mind was filled with fear and uncertainty. I was totally confused. The coordinator of Mission Mangalam, helped me to imbibe self-belief."* She adds *"We had no knowledge about the actual expenses of setting up and managing the Amul parlor. But that was the whole point, to come out of ignorance and grab this opportunity with both the hands"*. Showing the accounts register, Kiran said *"I keep the accounts of the parlour on a daily*

basis in which I keep track of the stock that comes in and understand how much it is worth. Not a day has passed where I have not maintained systematic accounts of the things sold on a particular day. Now I have started keeping my household expenditure account. I have also started keeping my household expenses record which I was not keeping," she added. Asked about how you balance both household work and the job on other hand, she said she spends morning time for household work and in the afternoon she handles the parlor. The parlor was inaugurated in 2013 but with regular publicity in and around the village and amongst the school children, the sales has picked up by all means. Initially she was not able to earn that much of profit but now she earns good amount around Rs.8,000 to 10,000 per month. But during summer time she also earns more than Rs.10,000 per month. She also paid her loan amount which she had taken from bank. Because of the rise in her income now she can save more for her children's future and take care of them in much better manner and confidently participate in the financial decision making at her home. She feels that her self-confidence has increased more than what she had few years back. *"Through whatever learn, I wish to educate our children and see them successful in life. I have not got that opportunity but I will not deprive my children of that opportunity for sure"*. Kiran smiles happily as she is feeding better food to her children and manages her family quite well. Mission Mangalam has given her a sustainable source of livelihood which has changed her life.

- **Problems of Non-cooperation among Members**

The GLPC works as a catalyst between banks and women entrepreneurs by giving financial assistance to start entrepreneurial activities under the Mission Mangalam Yojana. The Amul Mangalam Parlor concept is to generate income through group participation. But in the above case, Kiranben complains that although, the Mangalam parlor being a group activity earning project, she doesn't get any support from the other members in the group and the group has not initiated any joint management work till date. When other members were asked about this, they turned the tables by telling that Kiran ben is not ready to share the profits so she doesn't allow anyone to share work in the parlor. Thus such disputes are part of such big concepts like the Mission Mangalam Yojana, but with proper planning and leadership such good concepts can be profitable to many people at a time.

Conclusion

It has been found from the observation that microfinance has been successful in developing sustainable household livelihoods, and decreasing household vulnerability and community development up to a great extent. The microfinance has enabled women to make a greater contribution to household

income through their own economic activities. This contribution is recognized and valued by other household members and lead not only to increase household well-being , but women’s increased role in decision making and improved well-being for women themselves. This increased status in the household in itself in turn gives women the support they need to enable them together with the men to bring about wider changes in gender inequality in the community. The group activity has given them a chance to come out to the mainstream, to realize the potentialities within themselves. This has led to a chance in their outlook towards society. The status of being a woman is no more considered as curse. All these, in fact are looked upon as boon to bring them closer, to bind them closer and as a mean to lay the foundation of a new gender equality society.

The transformation of any society has to begin from women because women are the center of a family- the foundation stone on which the family is built. When a woman is changed, the family is changed, and change in the family brings change in society. The SHG approach is playing tremendous role as it is process oriented approach. Members of the group automatically become assertive after joining SHG. In the process, awareness is created on their rights and many other welfare aspects in the group.

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