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MESSAGE FROM THE EDITORIAL BOARD

USC Upstate is proud to announce the publication of the third volume of the USC Upstate Undergraduate Research Journal. This Journal provides a glimpse into a few of the many high quality research activities conducted by the talented faculty at USC Upstate. The Journal is a compilation of outstanding papers from numerous disciplines submitted by undergraduate students who have been involved in faculty-mentored research, scholarly, or creative activities. Undergraduate students involved in faculty-mentored extra-curricular projects enter the work-force with an enhanced skill set, including better problem solving, critical thinking, and team-working skills. Since many students who are educated at USC Upstate become employed in the region, support of academic research has a direct and positive impact on the Upstate of South Carolina.

We would like to express our sincere thanks to STÄUBLI for their generous funding of this Journal. We would like to especially thank DAVID ARCENEAUX, JOE GEMMA, CHAD HENRY, and JIM COOK for their continued support. Many thanks also to SUSAN HODGE for her support in securing this funding. Such support from prominent regional businesses and organizations is greatly appreciated and essential for the advancement of academic research in the Upstate. Stäubli is a mechatronics solution provider with three dedicated divisions: textile machinery, connectors, and robotics. With a workforce of over 3000, the company generates a yearly turnover surpassing 1 billion Swiss francs. Originally founded 1892 as a small workshop in Horgen / Zurich, Stäubli today is an international group with its head office in Pfäffikon, Switzerland. To learn more, please visit http://www.staubli.com.

We would like to thank all the contributing authors for providing such a rich variety of outstanding articles on a broad range of exciting topics. A special thanks to VERONICA QUICK, Graphic Design Artist in the USC Upstate University Communications Office, for designing the outstanding cover of this volume of the Journal. Thanks also to LES DUGGINS for taking many of the pictures of the contributing authors. Many thanks to ELAINE MARSHALL, Director of Sponsored Awards, for making the grant writing process at USC Upstate a smooth and often fruitful process. Finally, we would like to take this opportunity to thank DR. MARSHA DOWELL, Senior Vice Chancellor of Academic Affairs at USC Upstate, who is dedicated to enhancing faculty and student research efforts at USC Upstate.

If you have any questions or comments about the Journal, or would like to receive a printed copy of the most recent volume of the Journal, please contact Dr. Sebastian van Delden, (864) 503-5292, svandelden@uscupstate.edu. The Journal is also available online, please visit the following website: http://www.uscupstate.edu/ResearchJournal.

Enjoy!
The Editorial Board
THE EDITORIAL BOARD

DR. SEBASTIAN VAN DELDEN
Editor-in-Chief

Dr. van Delden is an Associate Professor of Computer Science and Director of Research. His research interests include Natural Language Processing, Computer Vision, and Robotics. He has published works in the Language and Computers book series; The Journal of Data and Knowledge Engineering; The International Journal of Artificial Intelligence Tools; Lecture Notes in Artificial Intelligence book series; and several others.

DR. JUNE CARTER
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Dr. Carter is a Professor of Spanish in the Department of Language, Literature, and Composition. Her research interests include Latin American narrative and film, Afro-Hispanic literature, Latin American female writers, and US Latino/a literature. She has published works in Anuario de Letras; Latin American Literary Review; Caribbean Quarterly; The Rocky Mountain Review; Primal Cabral; Studies in Afro Hispanic Literature; and several others.

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Dr. Lancaster is a Professor of Business Management. Her research interests include Operations Management and Statistics. She has published works in Interfaces; the European Journal of Operational Research; the Production and Inventory Management Journal; the Socio-Economic Planning Sciences Journal; and several others.

DR. GAMAL ELNAGAR
Associate Editor

Dr. Elnagar is a Professor of Mathematics. His research interests include Optimal Control Theory in Climate Modeling and Economic Applications, and Numerical Solutions of Nonlinear Conservation Laws. He has published works in the following International Journals: Computer Mathematics; Numerical Functional Analysis & Optimization; Computational & Applied Mathematics; Differential Equations & Applications; and several others.
**A Remarkable Alumnus and Scholar**

**Kevin Krause** transferred to USC Upstate in the summer of 2004. After being paralyzed from the chest down in a diving accident in 2000, Kevin was unsure about his future, but he was also determined to finish the college degree he had started before the spinal cord injury had sidetracked his plans. It was not long before he realized that USC Upstate had been the perfect choice for resuming his education. Originally an English major, Kevin was so impressed by the passionate teaching method of Dr. Rob McCormick that he eagerly changed his focus to History. He graduated in May 2006 with a B.A. in History, also winning the department’s award for the Most Outstanding History Student.

The following fall Kevin began studying in the Graduate History Department at Clemson University, where his thesis examined the political career of South Carolina Governor Ben Tillman and the “farmers’ revolt” of the 1890s. Kevin proffered the theory that Tillman’s appeal to the white populace, despite his uncouth character, was rooted in tangible reform and not simply racist demagoguery. Kevin earned his Masters degree in History from Clemson in 2008, collecting the department’s top graduate student prize, the Ernest M. Lander Jr. Award for Excellence in Graduate Studies.

After receiving his M.A. Kevin returned to USC Upstate in 2008 and taught World History for one year as an adjunct instructor. This provided him invaluable teaching experience before entering the Ph.D. program at the University of Georgia in 2009. At UGA he is continuing his study of South Carolina during the Populist/Progressive era. As a first year student Kevin earned the William Jennings Bryan Award for the best paper by a graduate student. The essay, which highlighted Ben Tillman’s battle against monopolistic businesses, is one part of Kevin’s overall dissertation project that explores the commonly overlooked Progressive aspects of post-Reconstruction South Carolina. In researching and writing this project Kevin is working with notable scholars of Southern History, such as Dr. James C. Cobb, Dr. John Inscoe, and Dr. Stephen Berry. Kevin plans to graduate from UGA by 2012.

“My experience at USC Upstate definitely set a course for my future career and life. Before I decided to return to school, I was obviously concerned and even apprehensive about how I would function in an academic setting with my new disability. Fortunately, the great people in the Disability Services office, and the faculty as a whole, created an environment whereby my physical condition became essentially a non-issue. I was able to concentrate on my studies like any other able-bodied student, and that completely transformed my outlook on the future. Wonderful and personable professors like Dr. Rob McCormick and Dr. John Edmunds taught me that History was more than a random succession of events with dates to memorize. The rigorous study of the past opens the eyes to new ways of viewing the world and human society. The professors at USC Upstate instilled in me a desire to study the intricate structures of human civilization, and to reach for a better grasp on how human society functions.”
JENNA TORBERT is currently a senior at USC Upstate. Her major is Biology specifically Pre-Physician-Assisting with a minor in Psychology. While at USC Upstate, Jenna has been dedicated to the softball team for four years. She has been a member of the Health Professionals club and a member of the Big Green club for athletics. Jenna has volunteered for USC Upstate Disability services, the Upstate science fair, the Athletic Auction, and for various athletic camps around the Upstate area for underprivileged children. At home in Denver, NC, Jenna volunteers in the Lincoln County Emergency department, The Charlotte Humane Society, the Charlotte Metro Zoo, and East Lincoln Christian Ministries. She plans on continuing her education by attending the Medical University of South Carolina in Charleston, SC for Physician Assisting school.

“The Honors Program at USC Upstate has been more beneficial to me than I could have ever imagined. I have been able to take my desired courses while enriching my education and challenging myself not only as a student, but as a person. I have experienced many new things and had the opportunities to attend various seminars thanks to the Honors Program. In some of my major requirement courses such as Biology and Genetics I had the privilege to receive honors credit for those courses, which will hopefully place me ahead of others who are competing to get accepted to PA school. Most of all I am thankful for the Honors Program for giving me the opportunity to study abroad in May 2010. With a small group of other USC Upstate students I traveled to the countries of Turkey and Greece. This was an eye-opening and breath-taking experience that not many people are fortunate enough to encounter in their lifetimes. It was one of the best times of my life and I will never forget my cherished memories of that trip and I am so thankful to have gone.”

The Honors Program at USC Upstate provides an enriching educational opportunity for motivated students committed to academic excellence by offering a challenging curriculum of honors courses, exciting seminars, student-faculty conversations, extracurricular activities and other honors opportunities. For more information please contact DR. THOMAS MCCONNELL. (864) 503-5681, tmconnell@uscupstate.edu, http://www.uscupstate.edu/academics/honors/Default.aspx?id=2397.

GRANT WRITING: RECENT BIG WINNERS!

Universities benefit tremendously when their faculty members are awarded external grant monies for research or service projects. Applying for grant opportunities is a very time consuming and tedious process and often times goes unrewarded since most opportunities are highly competitive with only a small percentage being funded. Grant monies are often used to support student research assistants and thus can have a very positive impact on a student’s academic experience. We would like to congratulate all USC Upstate faculty members who have recently been funded, and
take this opportunity to spotlight Dr. Deryle Hope, Associate Director of International Studies and Coordinator of Strategic Academic Initiatives.

**DR. DERYLE HOPE**'s grant entitled, *Spartanburg Scholars Academy*, was funded by the U.S. Department of Education for a 5-year time horizon starting in the fall of 2007. The total amount funded will be $2,675,230, the largest grant award ever received by USC Upstate. The grant proceeds will be used to carry out the mission of the Academy, which is to attract and graduate students with a life-long passion for learning and compassion for others, and enable them to translate academic study and personal concern into effective leadership and action in their communities. The activities envisioned under the grant program include the following:

- Provide an accelerated academic program for Spartanburg county high school students on the USC Upstate campus in which students can successfully earn 45-60 college credits by the time of their high school graduation.
- Recruit and hire qualified teachers to provide honors and advanced placement coursework for students.
- Provide student access to university academic standards and rigor through college coursework while equipping students with the training/mentoring needed to be successful.
- Arrange participation in youth leadership programs and activities.
- Serve as a model for educational change by providing a template for college work and higher learner expectations during high school years.
- Enhance dialog between Spartanburg school districts and USC Upstate through collaboration and cooperation on curriculum issues.

<table>
<thead>
<tr>
<th>All Grant Winners (2009-2010)</th>
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<tbody>
<tr>
<td>Rosario, Astrid</td>
<td>Polymeric Membranes for Energy and the Environment $69,980</td>
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<td>Hope, Deryle</td>
<td>Spartanburg Scholars Academy $756,389</td>
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<td>Herzberg, Tina</td>
<td>Preparing Highly Qualified Personnel to Serve Children with Visual Impairment (Combined Personnel Preparation 84.25K) $373,478</td>
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<td>Pae, Holly</td>
<td>Special Education Preservice Improvement 84.325T $99,756</td>
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<td>Merriweather, Helen</td>
<td>ACHIEVE Program 2009-10 $317,411</td>
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<td>Pae, Holly</td>
<td>Project Create 08-09 South Carolina $47,266</td>
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<td>Herzberg, Tina</td>
<td>The Possibilities are Endless: Promoting Braille throughout SC $98,671</td>
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<td>Merriweather, Helen</td>
<td>ACHIEVE Program 2010-11 $40,000</td>
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<td>Thomas, Tasha</td>
<td>National Writing Project $46,000</td>
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<td>Minsky, Ina</td>
<td>SSS: Opportunity Network - Grant-in-Aid $55,647</td>
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<tr>
<td>Minsky, Ina</td>
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<td>Ward, Gloria</td>
<td>Upward Bound $210,501</td>
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<td>From, Heidi</td>
<td>Child Care Access Means Parents in Schools (CCAMPIS) 2009 $52,173</td>
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<td>Marlow, David</td>
<td>Talkin’ ’bout South Carolina: Encouraging Language Diversity, Tolerance, and Inclusivity $8,000</td>
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<td>From, Heidi</td>
<td>Family Daycare Homes 2009-10 $16,800</td>
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<td>Orr, Walter</td>
<td>USC Upstate HVAC Energy Savings $210,794</td>
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<td>Whittingham, Debra</td>
<td>Teacher Cadet Grant</td>
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<td>Ellis, Tim</td>
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<td>Fulbright, Ron</td>
<td>Immersive Innovation: Exploring the Use of 3-Dimensional Problem Formulator Diagrams for Innovative Problem Solving</td>
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<td>Beck, Judy</td>
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<td>Hightower, Mary Lou</td>
<td>Advanced Placement Summer Teacher Institute - Studio Art (2010)</td>
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<td>Hodine, Jane</td>
<td>USC Upstate: The Warhol Project</td>
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<td>Stockwell, John</td>
<td>SC Quality Forum</td>
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<td>Gibb, Katharine</td>
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<td>Gibson, Lynette</td>
<td>MGS: Breast Cancer Beliefs and Mammography Screening Intention In African American Women.</td>
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<td>Tzacheva, Angelina</td>
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<td>Dowell, Marsha</td>
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<td>Gibson, Lynette</td>
<td>SC Cancer Alliance - Women of Worth Upstate Conference</td>
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<tr>
<td>Turner, Jack</td>
<td>Microbial Study</td>
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<td>Stevens, Rebecca</td>
<td>OEO: Contract Courses, Memorandum #09227,09302,09403,09404,09405</td>
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Total: $2,823,424

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**CLUBS AND ORGANIZATIONS: SCHOLARLY TRAVEL**

The Office of Student Life provides programs and resources to the student body and the wider University community with the belief that learning takes place in all experiences, not just in the classroom. We are dedicated to creating meaningful, co-curricular campus activities for students at USC Upstate, with over 80 student organizations that strive to instill a sense of community, develop leadership skills, increase appreciation of diversity, and develop character. Experiences and connections with these organizations benefit students far beyond campus into their personal and professional lives. Need more information? Please contact **DR. KRYSYAL SMITH**, Director of Student Life, (864) 503-5125, ksmith@uscupstate.edu.

Many USC Upstate clubs and organizations travel to scholarly events during the academic year. Some of the recent 2009-2010 trips and events are outlined below.

**THE CAMPUS ACTIVITIES BOARD** travelled to the National Association of Campus Activities South Regional Conference, October 1-3, 2009 in Winston-Salem, NC, and again January 13-17, 2010 in Boston, MA. Student President: LaDarius Thompson, Advisor: Dr. Krystal Smith. This conference is a must for students planning a career as Student Affairs Professionals and great for Volunteer Planning and Professional Development.

**ALPHA MU GAMMA** travelled to the Alpha Mu Gamma Conference in Fairfield, CT, October 15-18, 2009. Student President: Maria Ruvalcaba, Advisor: Dr. June Carter. This was the first time an honor
society has traveled and presented at a conference. The presentation described new technology that will impact our learning of a foreign language. The trip also gave our USC Upstate student representatives experience as presenters at a national convention and an opportunity to work with members of AMG from across the nation.

**The Art & Design Club** travelled to tour Art Galleries & Art Museums, October 7-11, 2009 in New York City and again March 9-14, 2010 in Washington, D.C. Student President: Ryan Crawford, Advisors: Dr. Rachel Snow, Dr. Judith Battaglia, and Dr. Henry Fagen. This was an opportunity to view art in person rather than in textbooks, visit world-class museums and galleries to study art that improves one’s historical knowledge and artistic skills.

**The Carolinian** newspaper travelled to the Associated Collegiate Press/College Media Advisors Convention, Austin, TX, October 29 – November 1, 2009. Student President: Richard Mahler, Faculty Advisor: Dr. Chioma Ugochukwu. ACP is the nation’s largest and oldest national membership for college student media. CMA represents the people who advise college newspapers, etc.

**The American Humanics Club** travelled to the American Humanics Management and Leadership Institute in Phoenix, AZ, January 1-6, 2010. Student President: LaDarius Thompson, Advisor: Dr. John Long. This is an excellent training workshop for non-profit majors. Each student signs up for classes that are as individualized as their goals. The days are long and classes arduous. This is not a “fun” conference, but very worthwhile!

**The Mathematics Club** travelled to the Mathematics Association of America Southeastern Regional Conference in Burlington, NC, March 25-27, 2010. Student President: Nicole Tobias, Advisor: Dr. Kelly Waters. The entire group got to see math topics ranging from undergraduate topics that they understood very well to graduate level topics that blew their minds in what they could actually do with their knowledge of math.

**The Student Nursing Association - Greenville** travelled to Orlando, FL, April 6-10, 2010. Advisor: Dr. William Koehler.

**WritersInc** travelled to Anderson, SC to the 21st Annual Writers Workshop, March 26-27, 2010. Editor: Emily Kudeviz, Advisor: Dr. Marilyn Knight. Sessions on the future of publishing, the impact of the internet on the written word, and creating engaging fictional characters were attended. The most exciting aspect of the conference was that Emily was able to meet Keith Morris who teaches creative writing at Clemson. This meeting helped Emily to decide that she would accept Clemson’s offer of a graduate assistantship, and she began work on her MA in English in the fall of 2010.
DIALECT AWARENESS EDUCATION: THE IMPORTANCE OF WATCHING OUR WORDS

KEYWORDS: Education, Dialect Awareness, Terminology, Linguistic Discrimination

JENA ROWLAND. My interest in dialect education began with the concurrence of Dr. Marlow’s linguistics class and my clinical practicum experience. I am majoring in Secondary Education with a concentration in English. As part of my clinical requirement, I observed a high school English class for a few hours each week and was surprised that in a class of twenty-two English-speaking students, two students also spoke Russian, three spoke Spanish, some spoke in a heavy Southern dialect, and some spoke in an African-American dialect. This led me to question how I could successfully teach Standard English to such a linguistically diverse class. It was through Dr. Marlow’s teaching that I began to view language differences not in terms of right or wrong, but just in terms of difference. And it is from this perspective that I knew I wanted to teach Standard English. I was able to do a lot of research on dialect education for my final linguistic paper, and the more I researched, the more fascinating the issue of dialect education became. I wanted to understand all aspects of dialect and English education, but I began to realize that research can continue endlessly. I have to thank Dr. Marlow for helping me narrow down all of my research while at the same time suggesting other opportunities for me to expand what I had learned. I also want to thank Dr. van Delden for all of his work in providing so many great opportunities for undergraduate student research. I feel certain that I will be a much more effective and better prepared English teacher because of all I have learned through the culmination of my English and Education classes and having had the opportunity to link the two through research.

DR. DAVID MARLOW is an Assistant Professor of Linguistics and English as a Second Language and has been at USC Upstate since 2004. Dave has published numerous works in such journals as American Speech, Journal of Southern Linguistics, and Currents in Teaching and Learning and is currently President of the Carolina Teachers of English to Speakers of Other Languages. His primary research interests focus on affective variables influencing students’ involvement in class content – including technological enhancements, learning strategies, and encouraging diversity and tolerance both inside and outside the classroom. In pursuit of this last goal, Dave founded the South Carolina Language and Life Project with the mission of enhancing understanding of dialect diversity and promoting linguistic tolerance in South Carolina through education, community outreach, and academic research. Dave has received nearly $20,000 in funding from USC Upstate’s Office of Sponsored Awards and Research Support, USC Columbia’s Magellan Scholarship, and The Humanities Council of South Carolina in support of this project and has been delighted to find many smart and dedicated students, like Ms. Jena Rowland, are interested in this project and willing to focus some of their research efforts on surrounding issues.

ABSTRACT
This paper works to understand how dialect awareness programs can effectively change the negative attitudes toward English dialect variation in education while continuing to teach the Standard form of American English (SAE). Dialect awareness programs are designed to bring awareness to the fact that all dialects are equal through the understanding of the various ways that non-standard dialects are structured and just as organized as SAE. The goal is that as teachers and students realize that all dialects are rule-governed and logical, their attitude toward minority dialects will become more positive. But in order for linguistic awareness programs to accomplish this goal, the terminology that is used to describe the ways in which dialects vary from one another must be more neutral in nature.
1. Introduction

Linguists have been arguing for years that all languages and dialects are equal. Hamilton (2005) summarizes the views of several linguists working to end language discrimination in the U.S. as arguing that language discrimination is the result of Americans' negative attitudes toward non-standard dialects of English. Further, these linguists explain that the attitudes are based on the public’s basic misperceptions of how language actually works. Wolfram explains in Hamilton's article that the “most elementary principle [in linguistics] is that all language is patterned and rule governed, and you can apply that principle to African-American English, to Appalachian English, to every other dialect we look at” (35). For linguists, the goal is to end language discrimination by changing the public’s negative attitudes toward English dialects. This is accomplished through educational programs designed to bring awareness to the organization and logic in other dialects, and dialect awareness programs have already shown some effectiveness in their ability to increase one's knowledge of differences in English dialects. Siegel (2006) cites several dialect awareness programs (also referred to as contrastive approach or awareness approach) implemented in a few U.S. schools and colleges which have had success in both raising test scores and improving the feelings of minority dialect speaking students (165). But the goal of Dialect Awareness Programs is to change the negative attitudes toward non-standard English dialects, and it is here that their effectiveness is questioned. In this paper we first look at the attitudes in U.S. schools and how those attitudes can impact the effectiveness of a teacher teaching to non-standard dialect speaking students. Then we look at the dialect awareness programs and examine how their structure can effect attitude change. Finally, we look at the suggestions that researchers have given to increase the likelihood that dialect awareness programs will work toward accomplishing their goal of creating a positive attitude toward all varieties of the English language, thus promoting language equality in the U.S.

2. Understanding Attitudes toward Dialect Variation

Lippi-Green argues that language discrimination is “so commonly accepted, so widely perceived as appropriate, that it must be seen as the last back door to discrimination” (quoted in Wolfram, 2000, 278). We must work backward from discrimination to discover the underlying causes, beginning with a basic understanding of attitudes toward English in the United States. Eagly and Chaiken (1993) define attitude as one's tendency to see something as either positive or negative. (quoted in Fabrigar, MacDonald, and Wegener, 2005, 79). Fabrigar, MacDonald, and Wegener (2005) expand the definition to include the fact that “beliefs, affect (emotion/feeling), and overt behaviors” are reflected in and a reflection of one's attitudes (79). Using these definitions, we can then see that the negative attitude toward dialect variation in the U.S. involves an underlying belief—the belief that there is one correct version of English—Standard American English (SAE). It is this belief that fosters negative attitudes toward minority dialects and leads to dialect discrimination. And perhaps nowhere is this negative attitude toward non-standard dialects more obvious than in the public schools where SAE is taught every day.

Most teachers believe students need to learn SAE so that they will have the communication skills which will enable them more opportunities in the future, and there are numerous studies that support this position (e.g. Carlson and McHenry (2006) who found that speakers with a heavy, non-standard English were less likely to be hired (80)). It is from this belief that many teachers have developed a negative attitude toward minority dialects as forms of incorrect English. According to Wheeler and Swords, “[i]t is clearly the case that when an urban teacher tells minority-language students that their language is wrong and error-filled, she creates a seriously deleterious effect in the classroom” (quoted in Shelton, 2007, 67). And sociolinguist Walt Wolfram explains (2005) that when a teacher uses corrective measures to teach SAE, there is an automatic implication of wrongness in the student's own dialect which “set[s] those children up to feel inferior and create[s] a dynamic of resistance to the school experience” (36). While teachers’ intentions in teaching SAE are often imbedded in their belief that SAE will improve their students’ opportunity for future success, it is possible that their “corrective” attitude toward non-standard variations has actually been impeding their chances for academic progress.

The reason that this corrective approach has not had greater success lies in the very nature of language itself. Language not only communicates what we are thinking, language also communicates who we are. As Taylor (2005) states, “[l]anguage is a reflection of a people” (quoted in Hamilton, 35). Wheeler and Swords
explain the implications for teaching in that “[a]s the teacher seeks to eradicate vernacular language and culture, not only does she remove a link that could bring relevance to the classroom lives of the children, but she assails the child’s family and home community, thus contributing to a barrier between the values of home and school” (quoted in Shelton, 2007, 67). Basically, the importance that the attitudes teachers have toward English dialects in the classroom cannot be understated. When teachers ‘correct’ a child’s English, they must be aware that the correction goes deeper than just the child’s speech. For the teacher, this realization then creates a paradox. Evidence on one hand suggests that students who master SAE will have a better future, yet there is also strong evidence that shows correcting a child’s dialect as if it were a mistake will make the child less receptive to learning the socially accepted standard. While this seems to create an impossible choice for the teacher, this need not be an ‘either/or’ option, but rather a need for a new way of looking at language and how different dialects are able to function within the same language. According to Taylor (2005), “[t]hat’s the challenge for our schools and educational institutions—to teach kids to speak the language of education without denigrating the speaker” (quoted in Hamilton, 36). The real problem lies in the fact that we are not changing what we teach or even so much the ways in which we teach it; what we must change is how we think about it.

3. DIALECT AWARENESS PROGRAMS AND ATTITUDE CHANGE

Dialect education programs bring awareness to the fact that all dialects in any language are systematic and governed by a set of specific rules. At the heart of these programs lies the goal of changing “Standard American English is the correct English” ideology from the bottom-up. Most dialect awareness programs have been designed by linguists who see the key to attitude change lies in addressing the underlying misunderstanding of how language varies. Thus, for linguists, the message is simple: inform and educate the public and then the attitudes toward minority dialects will begin to change. Most programs focus on series of grammar exercises that will reveal certain patterns in a particular dialect’s phonology, morphology, syntax, and vocabulary. Once a pattern is identified, the participants compare it to SAE. As teachers and students complete the exercises and gain more knowledge in the history and development of the particular dialects, they will then begin to discover for themselves that other English dialects are also ‘systematic’ and ‘rule-governed.’ Linguists hope that through changing people’s attitudes, dialect awareness programs will overcome bias, stereotypes, and language discrimination.

Wyer and Albarrachin (2005) work to explain the connection between an individual’s belief, knowledge, and attitude. According to Wyer and Albarrachin, a person’s belief is just their subjective measure of how accurate or possible certain knowledge is (273-274). A few of the other elements that Wyer and Albarrachin address in regards to one’s belief of new knowledge involve prior knowledge (281), how new knowledge fits with social reality (299), how knowledge is comprehended (293-294), and the frequency and recall of the new knowledge (281-282). Using Wyer and Albarrachin’s work to better understand the relationships between knowledge, belief, and attitude, potential problems arise in dialect awareness programs that could prevent the attitude changes toward English from being realized. In particular, there are two primary concerns in the awareness programs—the terminology that is used to describe the differences between dialects and the oversimplified descriptions in the dialects’ structure. The terminology many dialect awareness programs use to describe how dialects of English differ is traditional linguistic terminology. This creates a problem in the fact that the terms have meaning and use outside of linguists. When dialect awareness programs use linguistic terms for educational purposes, the terminology is much more likely to carry with it connotations from everyday use. Wyer and Albarrachin (2005) note that “once a preexisting representation is activated and used to comprehend new information, instantiations of unmentioned features that are required in order to comprehend the information may be added spontaneously to the representation that is formed of the information” (290). Basically, the use of terminology that has a negative connotation in everyday use to introduce new dialect knowledge to a person is likely to “comprehend” the meaning of the term in a way that “spontaneously” incorporates the negative connotation in with the new knowledge. This can best be seen in one of the distinguishing features in African American English dialect (AAE)—what is linguistically referred to as the habitual be.
The table above compares two different sets of examples used to explain how the habitual be feature in AAE differs from SAE. In the first set, Finegan uses sentences to demonstrate in AAE habitual refers to “continuous, repeated, or habitual action” and as such is not the same as the SAE verb is (368). The second sentence set is from the Voices of North Carolina dialect awareness program, and this example explains the distinction a little more thoroughly as “what linguists refer to as ‘habitual be’: using the unconjugated form of the verb to be to signal a habitual or regularly occurring action” and also points out that “Standard English does not have a special form of the be verb to indicate habituality. It uses an adverb or adverbial phrase with the verb to indicate this meaning” (34.2). Both examples still keep their explanations and examples short and to the point, leaving students to assimilate the new information in whatever way they find useful.

How might a student assimilate the habitual be dialect difference into their schemata? Here it is necessary to look at the term habitual to understand its use in everyday speech for it is a term that most everyone is familiar with in some sense. The Oxford Dictionary (1998) defines habitual as an adjective with numerous meanings: “inherent or latent in the mental constitution [w]ith various shades of meaning . . . 2. Of the nature of a habit; fixed by habit; existing as a settled practice or condition; constantly repeated or continued; customary; b. transf. Of an agent: That habitually does or is what is denoted by the noun; constantly or customarily occupied in a practice. 3. Commonly or constantly used; usual, accustomed; a habitual criminal, drunkard, etc. colloq.”

Another way to gain a perspective of how the term is used in normal speech is to refer to a corpus. The table below lists the first ten returns from the Corpus of Contemporary American English online. Here we see a predominantly negative use of the word as it is often paired with reoccurring habits that are socially unacceptable and often illegal—’habitual steroid users,’ ’habitual behavior problems,’ ’habitual criminal,’ ’extreme violence and habitual, severely antisocial conduct,’ and ’habitual criminal.’ Less negative, but still not positive, are the uses like ’habitual heartache,’ ’habitual routes,’ ’habitual nature of his responses,’ ’habitual restriction,’ and ’habitual writer.’ This demonstrates that when a student is presented with the term habitual there is going to be a natural tendency to carry a negative association to whatever follows—in this case the habitual be. Then, looking at the example sentences from the table above, it becomes easier to see where the repetition of the word be could be comprehended as an overuse of be in AAE. It seems that the linguists’ sense of the term habitual is entirely neutral, referring only to a “regularly occurring action.” However, when students and teachers encounter the word, their sense could very well be entirely different as they relate it to their preexisting knowledge of habitual as the persistence of a very bad habit. The danger in using this term in dialect awareness programs is that it is too easy for the word habitual to be comprehended by a non-linguist as a negative feature in AAE dialect and thus support the idea of SAE as the correct English in that it uses be in the non-habitual form.

It is possible that the negative connotation in the terminology could be replaced in the explanation of dialect difference, but in order to use habitual be as a term to describe differences between AAE dialect and SAE dialect, the explanation of the difference must work to address this. Yet, as we see in Finegan’s and Reaser and Wolfram’s explanations for habitual be, they are very minimal in discussing the dialect differences. Such simplified descriptions would be less likely to overcome any negative connotation in terminology. Further, the oversimplified explanations could actually work against the goal of attitude change all together.
Table 2. From the online Corpus of Contemporary American English (Davies, 2008)

<table>
<thead>
<tr>
<th>No.</th>
<th>Year</th>
<th>Source</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2010</td>
<td>SPOK</td>
<td>PBS_NewsHour</td>
</tr>
<tr>
<td>2</td>
<td>2010</td>
<td>FIC</td>
<td>The Antioch Review</td>
</tr>
<tr>
<td>3</td>
<td>2010</td>
<td>MAG</td>
<td>Backpacker</td>
</tr>
<tr>
<td>4</td>
<td>2010</td>
<td>NEWS</td>
<td>AJC</td>
</tr>
<tr>
<td>5</td>
<td>2010</td>
<td>NEWS</td>
<td>Denver</td>
</tr>
<tr>
<td>6</td>
<td>2010</td>
<td>NEWS</td>
<td>Houston</td>
</tr>
<tr>
<td>7</td>
<td>2010</td>
<td>ACAD</td>
<td>Commentary</td>
</tr>
<tr>
<td>8</td>
<td>2010</td>
<td>ACAD</td>
<td>InstrPsych</td>
</tr>
<tr>
<td>9</td>
<td>2010</td>
<td>ACA</td>
<td>LawPublicPol</td>
</tr>
<tr>
<td>10</td>
<td>2009</td>
<td>SPOK</td>
<td>NPR_TalkNation</td>
</tr>
</tbody>
</table>

Wyer and Albarracin (2005) refer to the theory of “effects of novelty” to explain how “novel or unexpected events are likely to be thought about more extensively than common ones” and “become more accessible in memory and, as a result, should be more likely to influence judgments” (300). This means that the more “thinking” a person does when first presented a new idea, the greater the likelihood that the new idea will lead to new beliefs. Obviously, there are limits on this theory and its demonstration has primarily been shown.
in information represented in media, but it is useful in that it adds further considerations to the argument against overly simplified descriptions of dialect difference. These same problems with terminology and oversimplification can be seen in Fogel and Ehri’s (2006) study that examines the effects of dialect awareness on a teacher’s attitude. In this study, 73 teachers’ knowledge and attitudes of AAE were pre-tested, then divided into groups and taught seven features of AAE using three methods that varied in their explicit instruction and opportunity for practice. Fogel and Ehri found that teachers in all three groups made significant gains in their understanding of AAE, yet teachers’ attitudes toward AAE only went from slightly negative to neutral (474). Further, the teachers who had the greatest increase in dialect awareness did not show any greater gains in attitude. Fogel and Ehri concluded from this data that because “...no relationship was observed between how much teachers learned about AAE syntax and their attitudes toward its use [this] shows that attitude shifts require more than simple knowledge acquisition” (475).

While Fogel and Ehri did not choose to address the habitual be feature in AAE in their study, the terms that were used to describe the features in their study still carry a negative connotation when considered in everyday use as shown in the table below:

**Table 3.** Fogel & Ehri’s Syntactic Features of SAE and AAE

<table>
<thead>
<tr>
<th>SAE</th>
<th>AAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Omission of the possessive s marker</td>
<td>Bob_ friend</td>
</tr>
<tr>
<td>Bob’s friend</td>
<td></td>
</tr>
<tr>
<td>2. Omission of the past tense ed marker</td>
<td>Yesterday she play_</td>
</tr>
<tr>
<td>Yesterday she played</td>
<td></td>
</tr>
<tr>
<td>3. Omission of third-person singular s present tense marker</td>
<td>Jessica live_</td>
</tr>
<tr>
<td>Jessica lives</td>
<td></td>
</tr>
<tr>
<td>4. Omission of plural s marker</td>
<td>Three book_</td>
</tr>
<tr>
<td>Three books</td>
<td></td>
</tr>
<tr>
<td>5. Omission of linking verb copula</td>
<td>He tired.</td>
</tr>
<tr>
<td>He is tired.</td>
<td></td>
</tr>
<tr>
<td>6. Subject expression</td>
<td>David he go to school</td>
</tr>
<tr>
<td>David goes to school</td>
<td></td>
</tr>
<tr>
<td>7. Indefinite article</td>
<td>a orange</td>
</tr>
<tr>
<td>an orange</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** SAE = Standard American English; AAE = African American English.

Fogel and Ehri explain that “the features selected were those commonly cited by linguistic researchers as characterizing AAE syntax” (2006, 168). Consider the word omission and what it connotes when used to explain features of AAE speech. The Oxford Dictionary online (2008) defines omission as “The non-performance or neglect of an action which one has a moral duty or legal obligation to perform; an instance of this; the action of omitting, leaving out, or not including a person or thing.” Inherent in the distinction of AAE dialect is the implication of wrongness in that the AAE speakers fail to include the plural s marker in their syntax. The contrastive analysis that Fogel and Ehri use in their study seems to actually work against the goals of dialect awareness because the terminology connotes a sense of wrongness in the AAE dialect, and also uses SAE as the measure to which all other English varieties are compared, thus subtly reinforcing Standard English as the “prestige” variety.

### 4. Changes from Educators and Linguists

Overall, dialect awareness programs have seen the most success in terms of effectively increasing one’s understanding and knowledge of the variations in the English language. Several arguments have been made by those in the fields of education and linguistics to further the goals of the programs, ensuring that attitude change will occur. Green (1994) works to argue against dialect oversimplification, which she believes will
create misconceptions regarding the simplicity in AAE dialect. Green offers her own description of the *habitual be* as an example of just how complex this feature is. The complexity in Green's description is best seen when comparing it to Finegan and Reaser & Wolfram's explanations from Tables 1-A and 1-B above. Green's explanation of the *habitual be* in the table and quote below:

**Table 4. Green’s Grammatical Feature of AAE: Habitual be**

| 9a. Dee be waiting for the bus. | 12. Dee done left for school. |
| Dee is usually waiting for the bus. | a. Dee has already left for school. |
| b. Dee been’t waiting for the bus. | b. Dee done’t left for school. |
| c. Be Dee waiting for the bus? | c. Done Dee left for school? |
| 10a. Dee BIN waiting for the bus. | 13a. Dee be done left for school when I get there. |
| Dee has been waiting for the bus for a long time. | Dee has usually already left for school by the time I get there. |
| b. Dee BIN’t waiting for the bus. | b. Dee ben’t done left for school when I get there. |
| c. BIN Dee waiting for the bus? | b’. Dee be done’t left for school when I get there. |
| 11a. Dee BIN left. | c. Be done Dee left for school when I get there? |
| Dee left a long time ago. | c’. Be Dee done left for school when I get there? |
| b. Dee BIN’t left. | |
| BIN’t Dee left? | |

*The first point to make is that these markers contribute aspectual meaning and cannot be freely omitted from the sentences. Aspectual be is associated with habitual aspect; therefore, the ‘waiting’ in Example 9a occurs on particular occasions. BIN is associated with the remote past, and, as such, the ‘waiting’ in Example 10a started at some point in the remote past and continues to the present. Here the remote past is relative, so the ‘waiting’ could have been in progress for 15 minutes or 15 years. In Example 11a the ‘waiting’ started in the remote past, but it also ends at some point in the remote past. The marker done is associated with completive aspect, as it refers to an event, such as ‘having left’ (Example 12a), which has already occurred. The final marker be done is associated with both habitual and completive aspect. This means that Example 13a has both habitual (assigned by be) and completive (assigned by done) meaning. The completed event, “Dee’s having left by some specified time,” occurs on particular occasions. (Green, 1994, 75-76)*

Green's description differs from Finegan's and Reaser and Wolfram's in length, number of examples, and complexity. Also, Green never pairs habitual with the word be, instead using the term habitual aspect in her explanation, which gives the term less familiarity to its everyday use. Adding a level of complexity and explanation similar to Green's in dialect education programs could increase the probability that students will have more opportunity to develop a belief that AAE is, in fact, more equal to SAE in its organization. Palacas (2001) also argues that much of the problem in teaching SAE is due to the fact that “linguists have apparently been overemphasizing correlations and similarities between Ebonics and Standard English and not highlighting the root differences” (332). As Palacas points out, many dialect education programs only focus on difference at the level of syntax and neglect to address the reasons in those differences or how those differences affect semantics. Palacas further warns that this oversimplification could lead some teachers to conclude that switching between the AAE dialect and the SAE dialect is easier to do than it is in reality as it “devalues the differences and sends a message that eases the burden of teacher training when the actual need is for teachers to be trained much more in grammatical applications...” (332). While there is much to be gained at times from simple explanations, when it comes to understanding dialect difference for the purpose of attitude change, oversimplification of difference has the possibility of undermining the very goals that the programs are aimed to achieve.

Palacas works to address the problems in terminology by arguing for the use of a more neutral terminology created via a grammatical typology comparing AAE to SE. Languages are distinguished through typology, and the differences between various languages are described using universal terminology. Finegan (2008) explains that universals in language “determine what is possible and what is impossible in language structure” (215), and typology is how to compare the universals (236). Further, Finegan explains of typology
that “typological categories have no necessary correspondence with groups of languages that have descended from the same parent language; in fact, typological categories cut across language families” (217). Thus, by describing AAE as a language rather than a dialect, the terminology changes to reflect the choices that AAE makes rather than its differences compared to SE. Palacas stresses in his argument that his purpose for “driving Ebonics and English apart means seeing Ebonics and English not simply as an amalgam of rule choices within the same system but as separate systems, so that Ebonics and, particularly, standard English are, at the level of grammatical typology, different language types – leading to the marvelous paradox that English and Ebonics are, in respects, two highly disparate languages, both of which are English” (Palacas, 333-334).

5. CONCLUSIONS

Dialect awareness programs offer the greatest possibility for changing the negative attitudes that many Americans have toward dialect variation. These programs have already shown promise in their ability to help non-standard speaking students improve test scores and feel better about their own dialect, and teachers have also demonstrated that in participating in these programs, their knowledge of dialect difference can increase dramatically. But, the ultimate goal for dialect awareness programs is to change the negative attitudes toward dialect varieties. For this goal to be achieved, more studies need to be done to ensure that the terminology used to describe dialect differences promotes a positive view of minority dialects. Further, more research needs to be conducted to understand the most efficient way to introduce and explain dialect knowledge to students so that it will lead to attitude changes. While we still have a long way to go in terms of language equality in the U.S., it seems that with a little adjusting, dialect awareness programs are putting us on the right path.

REFERENCES

**LASERS, ROBOTS, AND COMPUTER VISION: A STUDENT-LED PROJECT THAT RECOVERS A 3D MODEL OF UNKNOWN SURFACES**

**ABSTRACT**

This paper describes a novel approach to 3D contour recovery using structured light in which a single camera and simple laser dot projector are mounted to the end of a robotic manipulator. Distance from the robotic end-effector and a surface can be calculated from the triangular geometry created by the camera, the laser, and the projected laser dot. The transformation relating an initial projection of the laser dot in the robot coordinate system must be calibrated. However, the primary contribution of this work is that a mm/pixel ratio does not need to be calibrated. Furthermore, camera/robot and camera/laser transformations do not need to be calibrated. The approach has been implemented along with a typical mm/pixel calibrated method. These approaches also use different data point collection techniques – a synchronous versus an asynchronous approach. This work has been implemented and tested on a Stäubli RX60 robotic manipulator with CS7B controller onto which an inexpensive off-the-shelf USB camera and laser-dot pointer were mounted with a bracket. Experimental test results are reported.

**KEYWORDS:** Industrial Robotics, Structured Light, Contour Recovery, Computer Vision

**Nicole Tobias.** As a mathematics major at USC Upstate, I enrolled in an Intro to Robotics course taught by Dr. van Delden. I found the course extremely interesting and when Dr. van Delden approached me about getting involved in some undergraduate research I jumped on the opportunity. The experience not only taught me many different things about the process of research, but it also inspired me to get a degree in computer science. I soon decided that I wanted to continue my education past my Bachelor's degrees. As a result, I am now currently working towards a Ph.D. in Computer Science at Clemson University. When I am not too busy with work, I enjoy spending time with family and friends, watching movies, sewing, camping, and doing the occasional karaoke night. Having had the chance to work with Dr. van Delden has made a great influence on the decisions that have brought me to where I am today. The experiences gained through working with him on this project and learning from him in a classroom will follow me throughout my graduate journey and beyond. I am grateful for having had the chance to work with Dr. van Delden.

**Dr. Sebastian van Delden** is an Associate Professor of Computer Science and Director of Research. He has been at USC Upstate since Spring 2004. His research areas include applications of Natural Language Processing and Computer Vision to Industrial Robotics, and he is in charge of the USC Upstate Robotics lab which features several top-of-the-line robotic arms and provides an outstanding teaching and research environment. Dr. van Delden earned a Ph.D. from the University of Central Florida and has published articles in several Journals, including: Language and Computers; Data and Knowledge Engineering; Artificial Intelligence Tools; Lecture Notes in Artificial Intelligence; and Computing Sciences in Colleges. Dr. van Delden grew up on Saba, a small Dutch island in the Caribbean, and he recently became a U.S. Citizen. When he is not spending time with his wife, Elizabeth, and daughters, Ava and Isabella, Dr. van Delden enjoys playing golf.

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1. INTRODUCTION

Recovering the distance or depth of an object with respect to oneself typically requires the integration of data gathered from at least two input sources that are observing the object. Humans can recover depth information because we are equipped with two eyes that are mounted in fixed positions in our eye sockets. The way this stereo input data is processed in the brain is not yet fully understood. Computer vision systems can also be built to recover depth and typically also use two cameras mounted at a known offset and angle with respect to each other—a stereo vision system (Shapiro and Stockman, 2001). Two input ‘sensors’ are not necessarily required, simply two different ‘sources’ of input data. For example, a single camera can be mounted to the end of a robot (a monocular vision system (Sayd et al., 2006)) and then translated a known distance. An image is taken at the initial position and then again at the final position. These two images are used to recover depth. In both of these cases, the most difficult issue is the correspondence problem—the ability to determine the corresponding locations of the real world points in both of the images. There have been several approaches developed for tackling the correspondence problem (Schmid et al., 2000). These approaches typically try to match high-interest points (small areas of high image contrast) in the both images.

Approaches with two cameras degenerate quickly when the input images do not contain high-interest points. In such cases, different types of input sensors can be used to recover depth (Jarvis, 1983). For example, an ultrasonic sensor can be used which measures timed pulses to recover depth.

In our work, “structured light” is used to recover depth: light is projected in a known pattern on the surface and a camera is then used to observe how the light pattern has been projected on the surface. Using structured light is a well-known area of research (Pribanić et al., 2010; Gu et al., 2008; Salvi et al., 2004; Li and Chen, 2003; Scharstein and Szeliski, 2003; Depiero and Trivedi, 1996) and several different types of light have been used—straight lines, multi-colored straight lines, single laser dots, checkerboard patterns, etc. Structured light is often used on smooth surfaces lacking high interest points.

This paper describes a novel approach to recovering a 3D contour using structured light where an inexpensive camera and simple laser dot pointer are mounted to the end of a robotic manipulator. The approach has been implemented and is shown in Figure 1.

An uncalibrated algorithm that uses synchronous communication between the image acquisition and the robot movement has been implemented. The robotic arm is able to translate the camera/laser end-effector along the surface to be measured as well as towards and away from the surface. The algorithm is very precise, but does suffer from time inefficiency because of the synchronization between image acquisition and incremental robot movement.

We have also implemented a second algorithm which is very similar to the first, but requires a mm/pixel ratio to be calibrated ahead of time—like most approaches to depth recovery using structured light. Furthermore, the arm does not translate its end-effector to/from the surface to be measured, but simply passes it along the surface. Distance in pixel movement of the laser dot centroid is simply multiplied by the ratio to obtain the mm change in depth. To speed up the algorithm, the image acquisition and the robot movements are asynchronous, which causes a lag between the actual depth and the recovered depth during an image acquisition. The results of this (calibrated, asynchronous) algorithm are used as a baseline comparison against the results of the first algorithm.

The following section describes the main contribution of the paper: the uncalibrated, synchronized algorithm that recovers the 3D model of an unknown surface. Section 3 briefly outlines the calibrated, asynchronous algorithm and section 4 presents experimental results that compare the performance of the two approaches. Finally, section 5 concludes the paper and outlines the current efforts on extending and improving this work.

Figure 1. Image of the contour recovery system. As the robot passes the camera/laser end-effector along the contour, a 3D model of it is recovered on the computer monitor in the background.
2. The Uncalibrated, Synchronized Algorithm

The basic hardware setup and movements are illustrated in Figure 2. The mount angle between the camera and the laser is not important; however, it must be fixed as the algorithm executes. This camera/laser end-effector is rigidly attached to the end of a robotic arm which has at least two degrees of freedom so that it is capable of translating along the surface as well as to and from it. \( \mathbf{rT} \) is the transformation that relates the initial laser dot projection to the robot coordinate system:

\[
\mathbf{rT} = \begin{bmatrix}
\mathbf{R} & \mathbf{D} \\
0 & 1
\end{bmatrix}
\]

where \( \mathbf{R} \) is the 3x3 rotation matrix and \( \mathbf{D} \) the translation values. The initial projection of the laser dot must be on a known location in the robot world coordinate system. All depth quantities that will be recovered are with respect to this initial location. This projected laser dot must also appear somewhere in the input image, but does not have to be calibrated in the image. The robotic arm then proceeds to translate the camera/laser end-effector along the surface that is to be measured. As the depth changes, so will the location of the projected laser dot in the image. Immediately, as the laser dot’s location in the input images moves, the robotic arm translates the camera/laser end-effector away or towards the surface until the laser dot is back in its original centroid position in the input image. Once it has returned to its original position in the image, the distance that the robotic arm has translated is recorded as the new depth to the surface.

The translation towards or away from the surface until the laser dot centroid in the image returns to its original location is the most important aspect of this approach because it avoids the usual mm/pixel requirement or other calibration transformations. In a closed-loop fashion (known as “visual servoing” (Hutchinson et al., 1996)), the robot incrementally translates away from or towards the surface by some small (user-defined) distance \( Z_{\text{offset}} \) until the distance between the new laser dot centroid is minimized with respect to the original location.

The camera/laser end-effector is moved by the robot by known user-defined mm increments (\( X_{\text{offset}} \) and \( Y_{\text{offset}} \)) along the robot’s X and Y coordinate system vectors. The number of increments (\( N \) and \( M \)) in each direction will determine the size of the physical surface area to be scanned: \( N \times X_{\text{offset}} \times M \times Y_{\text{offset}} \). The recovered depth at each of these locations in the area can be stored in a two dimensional array, \( D \). To calculate the robot transformation to each recovered depth point \( D_{ij} \) on the surface area, the X and Y distances at \( ij \) and the depth value are simply added to \( \mathbf{rT} \):

\[
\mathbf{D}_{ij} \mathbf{rT} = \begin{bmatrix}
\mathbf{R} & \mathbf{D} \\
0 & 1
\end{bmatrix}
\]

where \( D_{ij} \mathbf{rT} \) is the transformation that relates each point on the scanned surface area to the robot’s coordinate system so that the robot can now visit each location on this previously unknown surface. There is no change to the rotation matrix because the robot is translating linearly along the vectors that comprise the robot’s world coordinate system. The granularity of the system can be modified by adjusting up or down the \( X_{\text{offset}}, Y_{\text{offset}}, \) and \( Z_{\text{offset}} \) values.
Once the 2D array of depths has been recovered, it can be converted to 3D vertices so that the data can be displayed graphically for user inspection. Figure 3 shows an example input and output to this conversion process. The vertices are computed as follows:

\[ V_{ij} = [i \cdot X_{\text{offset}}, j \cdot Y_{\text{offset}}, D_{ij}] \] (3)

where \( X_{\text{offset}} \) and \( Y_{\text{offset}} \) are the same user-defined incremental movement distances used in (2) and the algorithm.

Since the \( X_{\text{offset}} \) and \( Y_{\text{offset}} \) values are in mm, the first two dimensions will be scaled properly with respect to the third dimension. This is an important step, because otherwise the data could appear severely distorted since the X and Y coordinates would be in pixels and the Z value would be in mm.

These vertices can be grouped into 3-tuples, each representing a triangle that is to be rendered by whatever 3D graphics engine is being used:

\[
\begin{align*}
V_{00} &= [0 \cdot X_{\text{offset}}, 0 \cdot Y_{\text{offset}}, D_{00}] \\
V_{10} &= [1 \cdot X_{\text{offset}}, 0 \cdot Y_{\text{offset}}, D_{10}] \\
V_{01} &= [0 \cdot X_{\text{offset}}, 1 \cdot Y_{\text{offset}}, D_{01}] \\
V_{11} &= [1 \cdot X_{\text{offset}}, 1 \cdot Y_{\text{offset}}, D_{11}] \\
V_{10} &= [1 \cdot X_{\text{offset}}, 0 \cdot Y_{\text{offset}}, D_{10}]
\end{align*}
\]

Triangle 1

\[
\begin{align*}
V_{01} &= [0 \cdot X_{\text{offset}}, 1 \cdot Y_{\text{offset}}, D_{01}] \\
V_{11} &= [1 \cdot X_{\text{offset}}, 1 \cdot Y_{\text{offset}}, D_{11}]
\end{align*}
\]

Triangle 2

For an \( n \) by \( n \) array of vertices, this approach will generate \( (n-1)(2n-2) = 2n^2 - 4n + 2 \) triangles.

In order for the lighting to be properly rendered, a vector that is normal to each triangle must usually also be provided to the 3D graphics engine. This can be found simply by subtracting two of the vertices from the third vertex and then computing the cross product of the resulting two vectors. Figure 4 illustrates how a vector normal to the plane created by triangle 1 could be computed. This process would be repeated for all triangles.

3. **The Calibrated, Asynchronous Algorithm**

Our second implementation of the algorithm is very similar to the first, but requires a mm/pixel ratio to be calibrated ahead of time – like most approaches to depth recovery using structured light. We implemented this algorithm to use as a base-line comparison. Unlike the first approach, the arm does not translate its end-effector to/from the surface to be measured, but simply passes it along the surface. Distance in pixel movement of the laser dot centroid is simply multiplied by the ratio to obtain the mm change in depth. To speed up the algorithm, the image acquisition and the robot movements are asynchronous, which causes a lag between the actual depth and the recovered depth during an image acquisition.

The time efficiency of this version of the system is better than the original version; however, extra calibration is needed which can decrease the precision of the system: instead of a visual servoing loop...
precisely recovering the depth at a certain location, the pixel distance is simple multiplied by the pixel/mm ratio.

4. EXPERIMENTAL RESULTS

The algorithm has been implemented and tested on a Stäubli RX60 robotic manipulator with CS7B controller. An inexpensive, off-the-shelf USB camera and a laser-dot projector were mounted with a bracket to the end of the manipulator. The internal parameters of the camera and laser projector do not need to be known and are not important to this work. The synchronized, uncalibrated algorithm recovers the exact depth of the objects, and is only limited by the resolution of the camera and the granularity of the robot movements. This algorithm suffers from time inefficiency – an order of magnitude longer than the second algorithm. The results are compared against the baseline (calibrated, asynchronous) algorithm. On all of the below example tests, the algorithm measured the cross-section of the objects in 95 seconds, which for practical purposes is quite slow. However, this is primarily due to the specific hardware limitations of the CS7B controller. In all cases, the robot arm was running at 10% speed and recovered 150 depth measurements. Increasing the robot’s speed did not help in this case because Stäubli CS7B controllers can only forward process one move at a time. More modern machines like the Stäubli CS8 controller can forward process 10 moves which would increase time efficiency by an order of magnitude.

Figure 7 shows the system work area just before it recovered the cross section of a small wooden block (above) and a wooden block with a concave circular cut out (below). The synchronized, uncalibrated algorithm recovers a better representation of the block when compared to the baseline (calibrated, asynchronous) algorithm. The error in the baseline algorithm is especially apparent at the edges.

Several videos of the system have been recorded and are available to view on YouTube:

- The following video shows a demonstration of the system as it recovers a 3D digital model of an unknown part in the robot’s work area: http://www.youtube.com/watch?v=IhM_O4ibdqE
- In this next video, the system first recovers the 3D model of an unknown undulating surface and then uses a pointing tool to push an object gently up and over the surface: http://www.youtube.com/watch?v=5mInN8Rfz9o

5. CONCLUSIONS AND FUTURE WORK

This initial work shows that a simple camera/laser dot robotic end-effector can be used to recover a digital 3D model of an unknown contour. Furthermore, the approach requires only that the transformation representing the initial projection of the laser dot in the robot coordinate system be known. The camera/laser transformation does not need to be calibrated and furthermore a pixel/mm calibration step is not required.

Results on simple objects have been shown in Section 4 so that: the improvements over a calibrated, asynchronous approach can be clearly visualized (Figure 7). The system can be applied to
more complex 3D objects. The quality of the results are coupled with the movement offsets (X_offset, Y_offset, and Z_offset), which are user-defined in the algorithm and equations (2) and (3), since these, along with the resolution of the camera and size of the laser dot, control the granularity of the system and the size of the surface area to be scanned.

Currently the speed efficiency of the algorithm is being improved (along with porting the system to a CS8 controller) and the system is being extended so that the color of the surface is also recovered. We are also working to (partially) solve the occlusion problem by automatically rotating the end-effector around the projection of the laser dot when an occlusion is suspected. This will cause the laser dot to be projected on the surface from a different angle, revealing occluded areas of the contour.

ACKNOWLEDGEMENTS

We would like to sincerely thank Stäubli and SEW Eurodrive for supporting this work. This project has also been partially funded by the Magellan Scholars Program offered by USC Columbia.

REFERENCES

RACE TO THE FRONT: FRONTLOADING AND VOTER TURNOUT

**ABSTRACT**

The trend in recent presidential election cycles has been for states to hold their nominating contests earlier in the calendar year. Whereas Super Tuesday has traditionally been at the beginning of March, in 2008 it was on February 5th. This paper seeks to explore the phenomenon of frontloading by analyzing why more states are holding earlier contests, and what the impact is on political participation. Specifically, it seeks to answer the question: does holding a nominating contest earlier result in high voter turnout? Our thesis is that states hold earlier elections in an effort to exert more influence over nominations, and that this results in higher voter turnout. To conduct this analysis data was collected from each of the 50 states regarding its voter turnout in the 2000 and 2008 nominating contests. A statistical analysis was then conducted to show the value of states holding their nominating contests earlier in the election cycle. Ultimately, our research shows whether states gain additional influence over nominations and whether there is higher turnout when holding their elections earlier.

**KEYWORDS:** Presidential Nominations, Voter Turnout; Frontloading

**DONNA DELAINA RANDOLPH.** I graduated from USC Upstate in May with a Bachelor’s degree in Political Science. Working with Dr. Pingley in conducting quantitative political research has not only strengthened my ability to make deductions and generalizations, but it has also contributed to my appreciation for political science in general. Currently, I am a graduate student at Central Michigan University in pursuance of a Master’s in Political Science with a concentration in International Relations & Comparative Studies. Upon completion of my MA, I plan to attend law school in the fall for a J.D. in International/Human Rights law. My long term career goal is to work as a Foreign Service attorney for the United States Agency for International Development. I wish to study and help challenge the political, economic, and social disparities among nations. My interests include traveling, playing chess, reading, shopping, spending time with friends and family, and community service. I would like to thank Dr. Allison Clark Pingley for allowing me the opportunity to work alongside her in conducting this insightful and informative research project.

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1. **INTRODUCTION**

There were many unique aspects of the 2008 U.S. presidential election. One was the large number of states that decided to hold their presidential nominating contests early in the election season. While Super Tuesday is typically at the beginning of March, in 2008 “Super Duper Tuesday” was on February 5. More than half of states held their nominating contests by this date. Why did so many states frontload? What were they hoping to gain, and what impact did it have on the electoral system? This paper seeks to answer these questions by analyzing how the date of a nominating contest impacts voter turnout.
Our hypothesis is that states hold earlier contests in an attempt to exert more influence over nominations, which in turn causes voter turnout in those states to increase. To test this hypothesis voter turnout information from the 2000 and 2008 presidential nomination contests are analyzed. Data from the 2004 election is not included because many states chose not to hold Republican primaries that year since George W. Bush was seeking reelection. Therefore, much of the data from 2004 would not be comparable.

Before discussing the results of the analysis, the theoretical background of this study will be established. The next two sections of this paper explores the motivations states may have to frontload, as well as factors that contribute to voter turnout. Some of these variables will be discussed in more depth, for example, how the type of nominating contest (i.e. primary, convention, or caucus) may impact voter turnout. Section 4 will discuss the data and methods, and section 5 presents results and conclusions.

2. Why Frontload?

One of the first instances of frontloading was in 1988 when a majority of southern states moved their primaries to the second Tuesday of March and called it “Super Tuesday” (Gangale, 2008; Putnam, 2004). Even though not as much frontloading took place in 1992 (some southern states even moved their primary dates back), in 1996 California decided to move its primary from the first Tuesday in June to the second Tuesday in March. Since then, more and more states have moved the dates of their contests earlier, with the number of states holding their nominating contests by March 14 more than doubling since 1980 (Putnam, 2004).

The main motivations states have for frontloading are to gain influence in the system, draw increased media coverage, and attract additional campaign spending in the state (Adkins and Dowdle, 2001; Geer, 1989; Gurian and Haynes, 2003; Mayer and Busch, 2004; Putnam, 2004). Looking at the states holding the earliest contests shows the advantages other states may gain by frontloading. For example, numerous studies have been conducted to examine the impact of winning the earliest primary in New Hampshire. These studies indicate that by holding the first contest, New Hampshire has a lot of influence over presidential nominations even though it is one of the smallest states and its population is not necessarily representative of a majority of the national electorate.

Frontloading also decreases the amount of time it takes for one candidate to get the number of delegates necessary to win the nomination. For example, until 1976, New Hampshire held the first primary on the first Tuesday in March. However, in 2000, the first Tuesday in March marked the end of the campaign (Gangale, 2008). This shortened primary season means that candidates have to begin their fundraising and organization efforts much sooner (Haskell, 1996; Putnam, 2004).

Additionally, the media has a large impact on the speed of which a nominee is chosen in the frontloaded environment. The media tends to more closely follow primaries rather than caucuses, earlier events rather than later ones, and delegate-rich events over delegate-poor ones (Geer, 1989; Putnam, 2004). This means that states – particularly large states – have extra incentive to move their primaries forward.

3. How Does Frontloading Affect Voter Turnout?

If states are holding their nominating contests earlier to seek additional influence in the electoral system, then it would seem likely that voter turnout in these states would increase. This is because people are more apt to vote when they feel their vote will impact the outcome of an election (Blais and Young, 1999). However, there are many other factors aside from when a nominating contest is held that could affect voter turnout.

3.1 Voter Turnout in Primary Elections

First, voter turnout in general can be examined. Voter turnout in the United States tends to be lower than other industrialized democracies. This is especially true of voter turnout during presidential nominating contests, which has only gotten above 30 percent twice – 30.3 percent in 2008 and the all-time record of 30.9 percent in 1972.
There are three main factors that affect turnout in primary elections: the socioeconomic composition of the potential voter; legal restrictions on voting; and the political context of the election (Kenney and Rice, 1985). In looking at the socioeconomic composition of voters, studies have shown that the people most apt to vote in presidential nominating contests are older (Norrander, 1991; Rosenstone and Hansen, 1993) and of higher socioeconomic status (Abramowitz, McGlennon, and Rapaport, 1981; Marshall, 1978) than nonvoters. However, the most important socioeconomic factor in regards to voting appears to be education.

Many studies have shown that education has a large impact on voter turnout (Geer, 1989; Highton, 1997; Kenney 1986; Kenney and Rice 1985). This is because people who are better educated tend to be more attentive to politics, more knowledgeable about the process and candidates, and more informed about ways to participate (Rosenstone and Hansen, 1993). Therefore, states with higher aggregate levels of education are likely to experience higher turnout (Kenney, 1986).

3.2 Legal Restrictions on Voting

Aside from socioeconomic factors, studies have shown that the legal restrictions on voting in each state affect turnout (Abramowitz, McGlennon, and Rapaport, 1981; Kenney, 1986; Kenney and Rice, 1985; Norrander, 1991; Rothenberg and Brody, 1988). One factor concerns whether a state holds an open or closed primary. While scholars agree this is likely to impact voter turnout, there is not a clear consensus as to how. Since only registered party members are allowed to vote in closed primaries, it seems likely that voter turnout in open primary states would be higher. Some scholars have found this to be the case (Kenney and Rice, 1985), while others have found there to be higher turnout in closed primary states (Norrander, 1991).

A second factor concerns the voter registration requirements of each state. Scholars have found that those states with more lenient registration requirements, for example same-day registration, experience higher levels of turnout than states with more stringent requirements, such as residency requirements (Highton, 1997; Kenney and Rice, 1985; Knack and White, 2000). In 26 states voters must be registered at least 30 days before an election. Some scholars believe that lifting registration requirements would encourage likely voters - such as those with lower socioeconomic status and higher residential mobility – to vote (Highton, 1997; Knack and White, 2000). Therefore, states with less restrictive voting requirements are likely to have higher turnout.

3.3 Competition

The political context of each election will also have an impact on turnout. Two contextual factors to consider are interparty and intraparty competition. In looking at interparty competition, it has been found that two-party competitive states tend to experience higher rates of turnout than states dominated by one party (Kenney 1986). Also, states with a longer history of two-party competition (Kenney and Rice 1985), and states with a longer history of holding primaries (Norrander 1991; Rothenberg and Brody 1988) are likely to have higher turnout. In one study, it was found that for each additional primary election held in the past there is a .6 percent increase in turnout (Rothenberg and Brody 1988).

Intraparty competition also has an impact. Turnout is likely to increase along with the number of viable candidates competing for a party’s nomination (Geer 1989; Kenney 1986; Moran and Fenster 1982; Norrander 1991; Rothenberg and Brody 1988; Zeidenstein 1970). For example, the competitive race between Hillary Clinton and Barack Obama in 2008 likely caused increased turnout on the Democratic side. This can partially be explained by rational choice theory - the more people who compete, the more likely a voter will find a candidate close to his or her preference (Moran and Fenster 1982; Norrander 1991). Also the more competitive a race, the more money candidates are likely to spend, and the more media attention there is likely to be (Rothenberg and Brody 1988).

The competitiveness of a race is partially determined by whether or not an incumbent is seeking office, with incumbency tending to decrease turnout (Kenney 1986). If an incumbent president is running then he will either be unchallenged in the primary, or if his approval is weak he may be challenged by one other candidate. This helps explain why the 2004 election was excluded from this study. However, when an incumbent is not running then it is not uncommon for five to nine candidates to enter the race (Gurian and Haynes 2003). This was the case in 2008 when there were initially ten plus Democrats and Republicans running for the presidency, which would make an increase in turnout likely.
3.4 Type of Nominating Contest

A final factor likely to impact voter turnout concerns the type of nominating contest being held. While the majority of states hold primaries, some states hold caucuses or conventions instead. Voter turnout tends to be much higher in states holding primaries than in those holding caucuses or conventions (Marshall 1978; Trish 1999). The main reason turnout is lower is because the cost of participating in a caucus is much higher than participating in a primary. Caucuses are held at specific times, so there is not as much flexibility in terms of when you participate. Therefore, some people who wish to participate may be unable to. Also, because other party business is conducted during the caucus, it requires much more information to participate (Trish 1999). Ultimately this leads to caucuses and conventions being influenced more heavily by dedicated and atypical party activists (Marshall 1978).

3.5 Contexts of the 2000 and 2008 Elections

Aside from the various factors that affect voter turnout, specific circumstances surrounding the 2000 and 2008 elections should also be considered. In 2000, even though Bill Clinton was not seeking reelection, it was still not a pure open-seat election since Vice President Al Gore was seeking the Democratic nomination. Although Gore was challenged by Senator Bill Bradley of New Jersey, he was still able to win in every single state. The Republican nomination contest between Governor George W. Bush of Texas and Senator John McCain of Arizona was more competitive; however, McCain only carried seven states. Therefore, there was not a high level of interparty competition in either party during the 2000 nominating contests, which could potentially be a factor for lower turnout.

There was much higher interparty competition in 2008. This was largely due to the fact that there was a truly open seat, with neither the incumbent president nor vice president seeking election. This resulted in a large field of candidates seeking nomination both on the Democratic and Republican sides. The Democratic side was particularly competitive between Senator Barack Obama of Illinois and Senator Hillary Clinton of New York. Although many analysts projected knowing who the likely nominees would be by February 5, the Democratic race played out until June. Therefore, turnout is likely to be higher, particularly in the later 2008 contests.

4. DATA AND METHODS

To understand the impact of frontloading on voter turnout, data was collected from the 2000 and 2008 presidential nominating contests for each of the 50 states and Washington, D.C. Statistical analyses were then conducted to determine whether frontloading does in fact increase voter turnout. For this study, voter turnout is the dependent variable. Multiple independent variables were used to account for socioeconomic factors; legal restrictions on voting; interparty and intraparty competition; and the nominating contests themselves.

4.1 Dependent Variable

The dependent variable for this study is voter turnout. Although data was collected regarding turnout using both the voting age and voting eligible populations, ultimately the voting eligible population was used as the denominator in this analysis. Studies have shown that using the voting age population may result in turnout appearing lower than it really was (McDonald and Popkin, 2001); therefore using the voting eligible population is likely to provide a more accurate picture of voter turnout. For our hypothesis to be correct, states holding earlier nominating contests should have higher voter turnout than those holding later contests.

4.2 Independent Variables

Multiple independent variables are used in this study. In order to determine the correlation between when a nominating contest is held and voter turnout, other variables potentially affecting voter turnout have to be controlled and considered.
Socioeconomic Factors – Since education is such a strong indicator of whether or not a person will vote, a variable was included to account for differences in educational attainment among states. Therefore, the percentage of people 25 years old and older holding a Bachelor’s degree or higher was recorded for each state. This data was collected from the U.S. Census Bureau for both 2000 and 2008.

I would expect that states with higher levels of educational attainment to have higher voter turnout.

Legal Restrictions on Voting – To account for different legal restrictions on voting present in each state, data was collected regarding whether the primary being held was open or closed. Additionally, each state was coded a 0, 1, or 2 depending on the stringency of its registration requirements. States coded 0 had the most lenient requirements and allowed same-day voter registration. States coded 2 had the most stringent requirements and required voters to be registered at least 28 days before an election. States coded 1 fell somewhere in between the two.

Competition – Variables were included to account for interparty and intraparty competition. There are several measures widely used to account for interparty competition; however, we chose to use the measure developed by Robert Brown and John Bruce (2002). While other measures are based largely on competition in state legislatures, Brown and Bruce’s measure focuses on election performance at the national level – mainly the margin of victory by Democrats and Republicans in each state. Their measure ranges from 0 to -100, with 0 being perfect party competition and -100 being total dominance by one party. It is expected that the closer to 0 a state’s interparty competition score is, the higher its turnout is likely to be.

There are various ways intraparty competition can be measured. For this study, intraparty competition is recorded as the number of presidential candidates still running at the time each state’s primary is held. It is expected that turnout will be higher when more candidates are still in the race.

Nominating Contests – Three different variables will be included to account for when each contest is held and the type of nominating contest. When each nominating contest is held will be measured by the number of days since the first contest was held. For example, in 2008, Iowa was the first contest, holding its caucuses on January 3, so it will get a 0. The next state was New Hampshire, which held its primary on January 8, or five days later, so it will get a 5. It is expected that turnout will decrease as time goes on (or the more days that have passed since the first primary). The type of contest being held will also be coded. A dummy variable was included to account for whether the state held a primary or not. It is expected that states holding primaries will have higher turnout than those holding caucuses or conventions.

5. RESULTS

Figure 1 shows the relationship between voter turnout and when a contest was held in 2000. The spike shows that New Hampshire, which held its primary on February 1, had a little over 44 percent voter eligible turnout – the highest turnout of any state. The next spike in voter turnout was on Super Tuesday, which was March 7. At this point, Bradley still had the opportunity to win the nomination, suggesting that voters were motivated to participate because it was still possible for them to influence the outcome.

After Super Tuesday, turnout declined and tapered off, until the last spike shown on the graph, which was Oregon’s primary on May 16. While this may initially seem contrary to my hypothesis, there is another possible explanation. Elections in Oregon are conducted entirely by mail. Research has shown that this increases voter turnout because the cost of

![Figure 1. 2000 Voter Turnout by Date of Contest](image-url)
voting is not as high (Karp and Banducci, 2000; Southwell and Burchett, 2000).

Figure 2 shows the relationship between voter turnout and when a contest was held in 2008. As evident, participation was highest at the beginning of the primary season, with New Hampshire once again having the highest turnout of any state at 53.6 percent. The second spike in turnout again represents Super Tuesday, however, this time on February 5. The biggest difference in turnout between 2000 and 2008 though, is that instead of turnout tapering off after Super Tuesday, we see it briefly decline and then increase again all the way until the end.

While this could indicate my hypothesis is incorrect, more likely it is indicative of the competitive nature of the Democratic race. Obama did not get the necessary majority of delegates to win the nomination until after his wins in Montana and South Dakota on June 3, meaning that until those contests, Clinton still had a chance.

Table 1 compares voter turnout in 2000 and 2008 in those states that held their primaries later in the 2000 election season, but moved them forward to February 5 in 2008. Looking at the data, it appears that all the states had higher turnout in 2008 with the exception of California and New York.

<table>
<thead>
<tr>
<th>State</th>
<th>Voter Turnout 2008</th>
<th>Voter Turnout 2000 (Date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>32.2%</td>
<td>15.3% (June 6)</td>
</tr>
<tr>
<td>Arkansas</td>
<td>26.8%</td>
<td>15.4% (May 23)</td>
</tr>
<tr>
<td>California</td>
<td>40%</td>
<td>40.3% (March 7)</td>
</tr>
<tr>
<td>Connecticut</td>
<td>20.5%</td>
<td>15.6% (March 7)</td>
</tr>
<tr>
<td>Georgia</td>
<td>32%</td>
<td>17.7% (March 7)</td>
</tr>
<tr>
<td>Illinois</td>
<td>33.8%</td>
<td>18.6% (March 21)</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>38.2%</td>
<td>15.5% (March 7)</td>
</tr>
<tr>
<td>New Jersey</td>
<td>29.2%</td>
<td>4.4% (June 6)</td>
</tr>
<tr>
<td>New York</td>
<td>19.5%</td>
<td>25.4% (March 7)</td>
</tr>
<tr>
<td>Utah</td>
<td>24.7%</td>
<td>7.5% (March 10)</td>
</tr>
</tbody>
</table>

This suggests that most states moving their primaries forward in 2008 did have higher turnout. However, simply looking at the data does not show whether the higher turnout was due to holding an earlier primary, or to other factors. Therefore, a regression analysis was conducted to see whether a statistically significant relationship existed between voter turnout and when a primary was held. Table 2 shows the result of the regression analysis, using the model:

\[
\text{Voter Turnout} = \text{Primary Date} + \text{Educational Attainment} + \text{Registration Requirements} + \text{Open/Closed Primary} + \text{Competition} + \text{Contest Type}
\]
This model takes into account the relationship between voter turnout and when a primary was held, as well as other independent variables that may affect turnout.

**Table 2. Voter Turnout (Coefficient/Standard Error)**

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>2000 Turnout</th>
<th>2008 Turnout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Days</td>
<td>.030</td>
<td>.039</td>
</tr>
<tr>
<td></td>
<td>.049</td>
<td>.041</td>
</tr>
<tr>
<td>Educational Attainment</td>
<td>.353</td>
<td>.292</td>
</tr>
<tr>
<td></td>
<td>.405</td>
<td>.354</td>
</tr>
<tr>
<td>Registration Restrictions</td>
<td>-2.834</td>
<td>-.707</td>
</tr>
<tr>
<td></td>
<td>2.226</td>
<td>2.143</td>
</tr>
<tr>
<td>Open Primary</td>
<td>-.177</td>
<td>-2.549</td>
</tr>
<tr>
<td></td>
<td>3.755</td>
<td>3.405</td>
</tr>
<tr>
<td>Type of Contest</td>
<td>-7.730</td>
<td>-12.833**</td>
</tr>
<tr>
<td></td>
<td>7.561</td>
<td>3.839</td>
</tr>
<tr>
<td>Intraparty Competition</td>
<td>.027</td>
<td>.081</td>
</tr>
<tr>
<td></td>
<td>.192</td>
<td>.151</td>
</tr>
</tbody>
</table>

*α=.10   **α=.05   ***α=.01

As shown, none of the independent variables were significant using the 2000 turnout data. This suggests that none of the factors are any more or less likely to increase voter turnout, including when a nominating contest is held. Using the 2008 data, the only significant variable was whether or not the state held a primary. As shown, turnout in states holding primaries was much higher than in states holding caucuses or conventions. This is consistent with other research that indicates participation in caucuses and conventions is much lower than in primaries (Marshall, 1978; Trish, 1999). Once again though, the number of days since the first contest was held is not significant.

To see whether there was an interaction effect between the variables, regression was conducted using only the dependent variable, voter turnout, and when a contest was held. Table 3 shows the results of this analysis.

**Table 3. Voter Turnout Based on the Date of a Contest (Coefficient/Standard Error)**

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>2000 Turnout</th>
<th>2008 Turnout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Days</td>
<td>.017</td>
<td>.059</td>
</tr>
<tr>
<td></td>
<td>.041</td>
<td>.038</td>
</tr>
</tbody>
</table>

*α=.10   **α=.05   ***α=.01

As shown, the date a contest is held is not significant in either 2000 or 2008. Again this suggests that holding an earlier nominating contest does not increase voter turnout. Therefore, even though turnout was higher in most states in 2008 than in 2000, it is not necessarily because those states held earlier contests.
6. CONCLUSIONS

Based on the statistical analyses conducted, no significant relationship exists between voter turnout and when a nominating contest is held, which is contrary to our hypothesis. There are several possible explanations for the lack of relationship.

One possible explanation is that even though states may be trying to increase their influence over nominations, this does not mean that residents will be more compelled to vote. For one, residents would have to be aware that having an earlier primary may give them more influence over nominations, and research consistently shows that the electorate is largely uninformed (Bartels, 1996; Page and Shapiro, 1992). Secondly, when considering the costs and rewards associating with voting, having more influence may not be enough of a reward to offset the costs to some voters.

A second possible explanation is that holding an earlier contest may not motivate more people to vote, but instead, holding a later contest may deter people from voting. For example, in 2000, both Gore and Bush secured their party’s nominations on March 14. Therefore, people residing in states that held their contests after that date may not have been as motivated to vote since the nominations were already secured. However, in 2008, Obama did not secure the Democratic nomination until June 3, which could help explain why states holding later contests saw a surge in turnout.

Why then, was voter turnout higher in 2008? As suggested in the literature review, many factors may have led to increased turnout in 2008, especially increased competition. It was an open-seat election and there were multiple candidates running on both sides—both factors which are likely to increase turnout (Geer, 1989; Gurian and Haynes, 2003; Kenney, 1986; Moran and Fenster, 1982; Norrander, 1991; Rothenberg and Brody, 1988; Zeidenstein, 1970). Therefore, voter turnout was likely to be higher in 2008 regardless of when a state held its contest.

This illustrates another possible reason none of the variables in our model were significant, which is because all of the factors affecting voter turnout may not have been adequately included. For example, consider the variable used to measure intraparty competition. We chose to use the one by Brown and Bruce (2002), however, that does not mean it was necessarily the best fit for this model. Had we chosen to use Ranney’s index or another variable the results may have been different. Additionally, it would have been hard to include variables to account for the competition that took place between Hillary Clinton and Barack Obama. The high level of competition was evident because both continued to win contests and poll numbers remained close; however, how does one capture that in a scientific model? Therefore, it is possible that some of the independent variables used in this study may have a relationship to voter turnout, but were not significant because they were measured incorrectly.

Overall, even though turnout was higher in 2008, it was likely due to other factors and not when a nominating contest was held. This suggests that states should not be so anxious to frontload. As shown in 2008, the states holding their contests at the end of primary season had the greatest potential to influence nominations. Another important finding from this study is that states holding primaries have higher turnout than those holding caucuses or conventions. This suggests that if non-primary states want to increase their turnout, they should consider changing the type of nominating contest they use, instead of when they hold that contest.

REFERENCES


**ABSTRACT**

 Would it not be exciting to step into a three dimensional virtual reality and have Yoshiro Nakamatsu, the world record holder for number of patents, Nikola Tesla, the inventor of efficient power transmission, and Thomas Edison, provide their innovative insight on a problem we were trying to solve? We are a few years away, but the essence of those and thousands of other innovators has been captured in a knowledgebase and toolset known as I-TRIZ. I-TRIZ is the result of sixty-five years of development beginning in the Soviet Union just after World War II. The I-TRIZ methodology allows anyone to innovate on demand by employing this vast collection of knowledge to help stimulate new innovative ideas and nonlinear thinking. In this paper, we describe an exploratory project in which we experimented with the idea of performing an I-TRIZ analysis in a three dimensional virtual world called Teleplace. We sought to discover whether or not working in such an environment could make us better innovators. We also explored using the third dimension in the immersive environment to allow us to use I-TRIZ tools in new and different ways.

**KEYWORDS:** Innovative Problem Solving, Computer-Aided Innovation, Alternative Thinking, 3D Virtual Worlds

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**CHRISTOPHER ERNST.** I am pursuing the Bachelor’s degree in Information Management & Systems at the University of South Carolina Upstate with a minor in Business Administration. I gained almost a decade of experience in job titles such as Lead Operations and Programmer/Analyst during information technology’s rapid expansion in the 1990s gaining valuable experience in the IT departments of various companies including sales and marketing, nutrition and health products, and warehouse/factory automation. I was introduced to TRIZ and I-TRIZ during this summer project but at the time of this writing am enrolled in a course teaching the I-TRIZ methodology. One of my interests is synthesis and programming in three dimensional virtual worlds.

**DR. RON FULBRIGHT** is Associate Professor and Chair of the Department of Informatics at the University of South Carolina Upstate with over 28 years experience in software engineering, distributed artificial intelligence, autonomous robotics, information technology, information resource management, and informatics. Dr. Fulbright was first exposed to classical TRIZ in 1993 and learned I-TRIZ in 2003. Dr. Fulbright’s research interests are in computer-aided innovation and emergent systems with a current focus in innovation education pedagogy. Dr. Fulbright has recently created the first university-level course in I-TRIZ called “systematic innovation.”
1. INTRODUCTION


TRIZ is a broad title representing methodologies, tool sets, knowledge bases, and model-based technologies for generating innovative ideas and inventive solutions. The longtime goal has been the development of an algorithmic approach to invention and innovation. TRIZ is based on the study of the patterns of innovative thought and technological systems evolution. Indeed, the motivation behind all of TRIZ is the belief that universal methods can be developed based on observed patterns. As Zusman (1999a) states:

Altshuller set out to develop a method that would help technical individuals handle difficult technological problems. In fact, he accomplished much more than this, revealing the basic patterns and principles of evolution and creativity that are applicable to any field of human activity requiring creative solutions. He also succeeded in systematizing these patterns and principles, making them available at a much larger scale.

There have been three distinct phases in the 65-year history of TRIZ (Zusman, 1999a):

- **Classical TRIZ** – development led by Altshuller from the mid-1940s to the mid-1980s
- **Contemporary TRIZ Phase I** – development during perestroika in the former Soviet Union from the mid-1980s to the early 1990s
- **Contemporary TRIZ Phase II** – penetration into the Western world from the early 1990s to the present

TRIZ development took place for over forty years under government-imposed secrecy behind the Iron Curtain. Following the collapse of the Soviet Union, many TRIZ researchers, scholars, and practitioners moved to the West and since have established their own companies serving as consultants and trainers. Many have continued to develop and expand classical TRIZ resulting in several modern extensions. Today, the TRIZ community is a vibrant culture comprising large corporations, and individual practitioners alike around the world. A large selection of TRIZ-centric Web sites, workshops, books, tutorials, journals, and seminars are available.

2. CLASSICAL TRIZ

The classical TRIZ era began in 1946, launched by Altshuller's seminal research into what differentiates innovators from everyone else, and continued to the mid-1980s (Zusman, 1999a). Altshuller and his colleagues analyzed over forty-thousand patents looking for recurring patterns and documenting human innovation. Altshuller realized that technical systems are developed according to certain patterns, and that these “patterns of evolution” for different systems have much in common. The main accomplishments during the Classical TRIZ era were:

- The Principle of Ideality—that we desire to engineer systems to a perfect state of having only beneficial impact and no undesirable features—is the goal of any system's evolution
- The realization that resolving those conditions keeping systems from being ideal (called contradictions) is vital to the evolution of a system
- The development of a systematic approach (a methodological approach) to the problem-solving and inventive process
- Formal problem models and standard solutions
- An innovation knowledgebase featuring case studies illustrating the application of fundamental innovative concepts
- Methods for reducing psychological inertia
- 40 Innovation Principles and the Contradiction Table
- Separation Principles
- Patterns of Evolution
- Substance-Field Analysis
3. I-TRIZ

Ideation International formed in the early 1990s and is located in Southfield, Michigan, near Detroit. Composed of a number of the original Altshuller team members, Ideation has developed extensions to classical TRIZ and created entirely new TRIZ-based methods and tools collectively called I-TRIZ. I-TRIZ has been applied to a large number of application domains including, but not limited to: scientific work (Zainiev, 1999), quality management (Halliburton, 2005), and other non-technical areas (Halliburton, 2005; Zlotin et al., 2000; Zusman, 1999b; Clark, 1999; Zainiev, 1999).

I-TRIZ aims to facilitate innovative thinking. Often, I-TRIZ leads to solutions that would have never been conceived by conventional means. As such, I-TRIZ is a way to overcome psychological inertia—the kind of thinking that artificially constricts our creativity and prevents us from entertaining potential creative solutions. I-TRIZ consists of four modules (Kaplan et al., 1999; Mizrachi, 1999; Zusman, 1999a):

- IPS Inventive Problem Solving
- AFD Anticipatory Failure Determination
- DE Directed Evolution
- IP Control of Intellectual Property

Directed Evolution is used to identify future versions of a product, years in advance, while also helping manufacturers of the product select one of the future incarnations as the goal of production efforts. The IP module allows one to protect inventions from encroachment by competitors. AFD not only helps identify causes of problems, but also helps to predict critical failure points in a system (Kaplan, 1999). In this project, we used IPS which includes an extensive knowledgebase, and a set of tools, one of which is a graphical modeling tool called the Problem Formulator.

3.1 Operators

At the heart of I-TRIZ is a knowledgebase comprised of a collection of suggestions for incremental changes called operators. These operators were identified by studying over two million patents. Each operator encapsulates an innovative idea employed in previous inventions. There are currently over four-hundred operators defined. An operator is intended to:

- Help overcome psychological inertia
- View the problem in a different way
- Offer a solution containing an already solved problem
- Identify a resource needed to solve a problem
- Suggest an evolutionary step

We believe the set of I-TRIZ operators represents the most comprehensive distillation of innovative thought in human history.

3.2 The Problem Formulator™

One could generate ideas by simply browsing through the operators. However, the large number of operators and many inter-relationships are overwhelming. Practitioners need a way to find a trajectory through the operators identifying the subset of operators most likely to be beneficial to a problem. Ideation International sells a software tool called the Innovative WorkBench (IWB) that serves this purpose. One tool in the IWB is the Problem Formulator (PF). PF is a graphical modeling tool with a deceptively simple graphical vocabulary. I-TRIZ views systems as collections of harmful functions (undesirable features) and useful functions (desirable features). Useful and harmful functions are represented as nodes as shown in Figure 1.

A function either produces (causes) or counteracts (inhibits) another function. These relationships are represented as shown in Figure 2. Sometimes, a useful function causes another useful function which is a
desirable occurrence. However, sometimes a useful function has undesirable side effects and causes something harmful to happen as shown in Figure 3. A diagram in the Problem Formulator is essentially a collection of cause/effect relationships describing various situations. Contradictions are the undesirable situations and fall into three categories as shown in Figure 4.

A system without contradictions would be an ideal system, since no harmful effects would be present. In reality though, there is no such thing as a completely ideal system. Therefore, all systems have at least one contradiction. In fact, the reason for analyzing a system in I-TRIZ is to solve some problem with the system. In I-TRIZ, the essence of an innovative solution is to resolve as many contradictions as possible.

4. VIRTUAL WORLDS AND TELEPLACE

A virtual world is a computer-generated simulated environment allowing users to interact with objects and with each other, via digital representatives called avatars, in an immersive 3D space. Simulated reality video games like Halo and Call of Duty have used 3D virtual worlds for years, and many 3D virtual communities such as Second Life and World of Warcraft are available via the Internet. Indeed, today’s college students have grown up in these virtual worlds. These students are increasingly expecting their college education to be available in online formats and via distance education. Educators in higher education are just beginning to explore the possibilities of immersive 3D virtual education.

Teleplace, Inc. creates application collaboration solutions to help enterprises manage data-intensive operations across multiple locations. Teleplace provides application collaboration solutions to over one-hundred global five-hundred and mid-size customers, including leading firms in the semiconductor, financial, energy, consulting, IT, and manufacturing sectors.

Teleplace has made available a secure virtual workspace just for educational purposes combining voice, video and chat communications with multi-application and document sharing (Teleplace, 2010).

5. THE CAROLINA VIRTUAL WORLDS CONSORTIUM

The Carolina Virtual Worlds Consortium (CVWC) was established in 2007 to explore 3D virtual worlds and immersive technologies for education (Consortium, 2010). The CVWC has partnered with the University Center of Greenville (UCG), a consortium of higher education institutions bringing undergraduate and
Innovation with I-TRIZ in a 3D Virtual World

graduate education to Greenville County in the Upstate region of South Carolina (UCG, 2010). In September of 2010, UCG opened the SimHub Immersive Technology Center in collaboration with the CVWC for faculty to gain access to, and gain experience in, using 3D virtual worlds for educational purposes. During the months of June and July of 2010, UCG and CVWC sponsored several teams, including ours, to explore using 3D virtual worlds to support our respective programs.

6. I-TRIZ IN TELEPLACE

We were faced with the challenge to study how to use I-TRIZ in a 3D virtual space and especially to investigate the opportunities and advantages related to the third dimension. We chose Teleplace as the 3D environment, to take advantage of existing resources and local expertise. Our initial activities focused on developing Problem Formulator diagrams within the virtual environment. Traditional Problem Formulator diagrams are two dimensional existing either on a piece of paper or on a computer screen. Our goal was to explore the opportunities with the virtual world and the advantages of collaborating in a third dimension. We wanted to see if a 3D diagram facilitates analysis in new and interesting ways. We examined the concept of being “immersed in the diagram” then surveyed the benefits gained from the ability to walk through and around a Problem Formulator diagram in the virtual world. We also explored the collaborative possibilities of Teleplace. We analyzed the virtual space to determine if it is an appropriate meeting place for individuals located across the globe to come together and participate in a collaborative I-TRIZ analysis effort.

6.1 Collaborative I-TRIZ in 3D Virtual Worlds

The business environment is shifting towards a quicker, more efficient platform and businesses are demanding information, communication, and collaboration at much higher levels. Virtual I-TRIZ would offer businesses an opportunity to collaborate in real time interactive meetings and provide a stage for innovative development. The allure of virtual collaboration is based on the promise of:

- 24/7 access (Internet connectivity required)
- Removes time zone barriers
- Overcomes geographic boundaries
- Translation features to overcome language barriers
- Facilitates global ad-hoc meetings
- Increases information exchange both in quantity and quality in “face-to-face” meetings (even virtual)
- Document sharing with multiple viewers and editors
- Spatial advantages – representing information in a three dimensional space that looks like a real room

First, we observed that it will be critical to overcome the preconception that all 3D virtual worlds look and feel like a video game. Until people experience it themselves, they assume that anything in a virtual world is not a serious business utility.

Second, it will be necessary to convince people that 3D virtual world collaboration offers a higher value than traditional audio/video conferencing solutions.

Third, we observed that learning how to navigate, look around, speak, emote, and manipulate in-world objects requires a non-trivial learning curve. People with some experience in video games will have less trouble, but those who do not, will have to learn new skills. However, we observed that those in our group and other research groups had fun learning these skills. This enjoyable experience may mitigate the initial feeling of “being lost” or “paralyzed” because one does not know how to navigate through such an environment.

Fourth, we experienced some of the benefits of virtual collaboration ourselves. During the project, we met physically only two times. The schedules of the team members were vastly different, yet we managed to work effectively together using the 3D virtual world in Teleplace.
6.2 Synthesizing New Objects In-World

The version of Teleplace we used was limited in the number and kind of native in-world objects. To develop Problem Formulator diagrams, we needed the ability to create basic shapes, label these shapes with text, and assign the shapes with relational and functional attributes, developing relationships.

We quickly found that Teleplace did not have a mechanism for designing or modeling objects, like a rectangle, the basic component of the Problem Formulator. However, Teleplace does have a mechanism for adding objects. Any Teleplace user can choose from a wide variety of textures, colors, light reflectivity, and opacity using a rotary-bookshelf tool. The closest option to our rectangle was the cube. Examples of these are shown in Figure 5.

The second step in developing the Problem Formulator diagrams is adding text to the shapes. Teleplace offers various options related to the text, including post-it notes and bulletin boards. Originally, the bulletin boards, as shown in Figure 6, held our initial findings as we explored Teleplace and climbed the learning curve gaining experience in navigating through the world, manipulating objects, and sharing information.

Teleplace also offers document sharing. OpenOffice is built into the environment allowing us to upload, display, and share normal office documents. Documents can be linked into the virtual world to allow reference material such as information related to the operators and case studies. As a result, we were also able to post a 2D problem formulator diagram completed with traditional software.

Teleplace allows the import of objects in Google’s 3D warehouse. Again, we found that none of these objects were appropriate for building diagrams, although we could setup a virtual room complete with simulated furniture, display boards, and interactive note boards.

Google offers a free 3D modeling software package called Google SketchUp. Using SketchUp, we were able to create 3D objects inside the editor and easily import them into Teleplace. Therefore, the Google Sketchup tool was a logical workaround for Teleplace’s object creation deficiencies. As we learned to work within Sketchup, our diagrams began to take form.

6.3 Drawing 3D Problem Formulator Diagrams

We began by building sample formulator diagrams resembling Ideation’s Problem Formulator, but in 3D. The first diagrams we developed simply used 3D rectangular boxes instead of the traditional 2D rectangles. Thus, the diagram was still essentially a 2D diagram, just rendered in three dimensions as shown in Figure 7.

We decided it to be more efficient to model the diagrams using spheres. Spheres can be viewed and...
linked to from any angle in 3D. We knew from previous diagrams that the post-it style notes were insufficient, but Google Sketchup provided a solution. We were able to bind 3D text, superimposed on the spherical object primitive. Therefore, when we dropped the objects into Teleplace, it became one object with dimensional text faces as shown in Figure 8.

Drawing the diagrams in Teleplace requires building them cube by cube, note by note, and arrow by arrow, as well as positioning them very carefully within the environment. Teleplace does not currently have intelligence built into the system to programmatically formulate the diagrams. If we were to pursue this effort with Teleplace, automated object creation would be a requirement.

The 3D virtual world gives us the opportunity to walk around an object and see it from different angles. We wanted to know if we could take advantage of this characteristic to draw new kinds of problem formulator diagrams. We opted to build the diagram based on spheres atop a native object called the pedestal as seen in Figure 9. The pedestal gave us the ability to rotate the diagram in front of the avatar without having to walk around the diagram, which we found to be cumbersome and tedious. It became possible to view the diagram from one angle analyzing useful functions, and then rotate the diagram ninety degrees to view the harmful functions.

This discovery proved that the third dimension can provide a unique analytical benefit. It is possible to let each axis represent a different qualitative view of the system modeled in the diagram.

In Teleplace, there are no boundaries to the virtual space. This means there is no limit to the size of neither diagrams nor the number of diagrams. Diagrams could literally go on forever.

In order to create an environment for clients and customers to work, it is important that we build intelligent software to quickly formulate desired results for sharing. During this study, the research assistants manually built each model devoting a lot of time to each design. Within Teleplace, we believe we can implement in-world specialized tools, with platforms such as Python API, to quickly develop diagrams. Python is an extensive application programming interface (API), with many sample applications, support for both choreographing and scripting objects and events within Teleplace, and integration with outside systems (Guide, 2010).

For example, Python provides access to avatar movement and actions taken by avatars. It also enables programmatic import and instantiation of 3D models. Additionally, it provides thorough support for drawing custom 3D objects and responding to user actions, such as drag-and-drop. The native multiuser interactive whiteboard object included in Teleplace is written using the Python API.

Through the large body of existing Python libraries, integration with most types of databases, Web services, cloud computing, and legacy systems is possible; for example, for tying into Enterprise Application Integration (EAI) infrastructures. This supports applications such as virtual datacenter management and live data visualization applications. Very exciting are ideas such as linking Problem Formulator diagrams with live data.

7. The Path Forward

Before determining that Teleplace is the solution, we think it would be beneficial to spend some time researching other competing environments (i.e. Second Life). With this additional research, we will learn
more about the capability of 3D environments and weigh the advantages of Teleplace against other virtual worlds.

It is important that we maintain relationships between elements, case studies, and operators while working with the Problem Formulator diagrams. In a subsequent project, we need to develop standards that define these relationships and processes. In addition, we should consider developing a structure for the data (i.e. Information Objects, Information Packs, Information Network, Forums, Blog Spots, etc) to enhance collaboration and provide a platform for housing and exchanging information. An interesting idea is to link a 3D innovation workspace with an Internet-based social network built to support the I-TRIZ community. We envision being able to launch searches and queries into “community space” directly from within the 3D diagram while we are doing our innovative analysis. This could facilitate the dynamic import of information from anywhere on the Internet without having to leave the 3D virtual world.

We have learned a lot about the virtual world experience and capabilities within Teleplace. We would like to further explore the programming language and capabilities before determining our path forward using 2D versus 3D, but 3D looks like a promising future. One day soon, we will be able to not only collaborate with Thomas Edison, or rather Edison’s knowledge, but any of our collaborators from across the globe in a virtual 3D collaborative space full of innovation-supporting in-world tools.

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**ABSTRACT**

BrailleSC.org combines participant expertise from the disciplines of English, education, and computer science to create a fully accessible, online scholarly resource concerning braille and braille literacy in South Carolina. The website includes oral histories from individuals about their experiences with braille in everyday life; pedagogical materials to assist teachers in developing best practices for braille instruction; and resources for families, stressing the importance of braille literacy and the methods of braille instruction. Furthermore, the project is developing accessibility plug-ins for Omeka and WordPress—two widely-used content management systems—to overcome many of the web design problems that often frustrate visually impaired users. In partnership with the Center for Digital Humanities in Columbia, SC, and with guidance from the Center for History and New Media at George Mason University, we aim to model the ways in which scholarly digital resources can be designed and implemented with the needs of visually impaired users in mind.

**KEYWORDS:** Braille, Literacy, Accessibility, Web Design, Universal Design

**Cory Bohon.** I am an undergraduate Computer and Information Systems major at the University of South Carolina Upstate with an emphasis in application development and network security. I have worked with Dr. Williams and Dr. Herzberg since the beginning of the 2009-2010 academic year, developed the existing accessibility tools for Omeka, and begun to develop the same tools for WordPress. I maintain the project website, continue to develop accessibility solutions, and assist with documentation and interface testing.

**Dr. Tina Herzberg** is an Assistant Professor of Education and director of the Special Education/Visual Impairment Program at the University of South Carolina Upstate. Dr. Herzberg has a Bachelor’s degree in secondary education/math from Angelo State University, a Master’s degree in visual impairment from Texas Tech University, and a Ph.D. in special education and interagency collaboration from Texas A&M University. She is certified in literary Braille by the National Library of Congress. Dr. Herzberg helps to gather and develop the pedagogical materials on the site as well as the oral histories, and she acts as liaison to the state-wide community of individuals with visual impairments, helping to arrange interviews and usability testing.

**Dr. George H. Williams** is an Assistant Professor of English at the University of South Carolina Upstate. While finishing his Ph.D. at the University of Maryland, Dr. Williams worked for two years at the Maryland Institute for Technology in the Humanities, where he first began to experiment with accessible web design strategies while helping to develop the MITH-sponsored site DISC: A Disability Studies Academic Community. With a background in the study of orality and literacy in eighteenth-century Britain, and experience in helping to coordinate digital humanities projects, Dr. Williams serves as Project Director and manages the development of the content for the website as well as the accessibility tools for the user interface.
1. Introduction

The number of braille readers began to decrease in the 1960s (American Printing House for the Blind, 1991) and the decrease continued until the mid-1990s. In 1996, the American Foundation for the Blind estimated that less than 10 percent of citizens who were legally blind in the United States were braille readers. This trend continues for both adults and children. Today fewer than 10 percent of citizens who are legally blind in the United States are braille readers (National Federation for the Blind, 2009). Similarly, slightly less than 10 percent of children who are legally blind in American schools read braille (American Printing House for the Blind, 2006).

Throughout the last two decades, researchers have investigated several hypotheses for the decline in the use of braille, including negative teacher attitudes toward braille (Rex, 1989), the increase in individuals with visual impairments who have additional disabilities (Rex, 1989; Amato, 2002), a greater reliance on speech output and magnification technologies (Paul, 1993), the lack of high-quality braille textbooks (Amato, 2002), and teachers’ perceived lack of proficiency in braille (Wittenstein, 1994). Experts in the field were also concerned about current practices used to teach braille (Mangold, 1997; Ryles, 1996; Wittenstein, 1994).

The decrease in braille literacy is especially problematic as available research indicates that proficiency in braille contributes to an individual’s likelihood of successfully completing postsecondary education and obtaining employment. In a study of 74 individuals who were congenitally legally blind, Ryles (1996) discovered that the participants who read braille were more likely to have graduated from college and be employed. Moreover, a recent national survey of 500 respondents who are visually impaired found a positive correlation between the ability to read braille and a higher educational level as well as a higher likelihood of employment (National Federation of the Blind, 2009).

In order to address the critical need for braille literacy, BrailleSC.org was created with over $50,000 in funding from various grants. It is a fun, educational resource for individuals who are visually impaired as well as for their families, friends, and educators. It is a fully accessible web site emphasizing the importance of braille literacy and providing strategies for using braille in everyday life. This scholarly resource begins at the level of the personal, providing a venue for people of all ages to tell their own stories of braille and braille literacy. The site offers individuals an opportunity to see and hear contributors describe first-hand what braille means to them and how they use it in everyday life. In addition to the oral histories, BrailleSC includes pedagogical materials to assist teachers in developing best practices in braille instruction and resources for families, stressing the importance of braille literacy and the methods of encouraging braille literacy.

2. Methods

Often braille literacy is viewed in purely institutionally practical terms—how it will be used in school or at work—but it is even more important than this. Each and every day, sighted individuals rely upon printed visual materials for a variety of reasons, whether it is getting from place to place, consulting a recipe to make a cake, catching up on the news, organizing their CD collection, or reading their favorite books from the library. Braille literacy allows blind and visually impaired readers to experience all of these as well. The oral histories on BrailleSC.org reflect a wide range of personal experiences and demonstrate that braille is not just for employment or for education; it is for every aspect of life.

The content is obviously an important part of the project, but equally important is the task of making the content available in a format accessible to users who are visually impaired. To accomplish that task, project collaborators are developing accessibility tools—built right into the web site—to overcome many of the web design problems that often frustrate users who are visually impaired. In partnership with the Center for Digital Humanities in Columbia, South Carolina, and with guidance from George Mason University’s Center for History and New Media, the site models the ways in which digital humanities projects can be designed and implemented with the needs of visually impaired users in mind.

There are existing online resources with useful information about braille, and there are also existing online archives of oral histories and literacy narratives, but nothing like BrailleSC currently exists. In addition to beginning at the level of personal, this project has a central goal of designing an interface with the needs of users who are visually impaired at the center of decisions. In particular, plug-ins have been developed that work with the Omeka content management system developed by the Center for History and New Media at
George Mason University as well as with WordPress, the commonly-used blogging platform. Both Omeka and WordPress are free, open-source tools, and anything developed will be made available to others under the same license. Users with visual impairment often access digital information through a variety of alternatives, not primarily using traditional visual cues presented from the standard graphical user interface. For example, many such users navigate information by listening to a synthesized voice reading textual material aloud to them. The software that generates such a voice is known as a “screen reader.” To make navigation easier for these users, the “Access Keys” plug-in allows users to get from page to page and section to section by pressing an easy-to-remember combination of keys. Other users require text enlargement, and the “Text Zoom” plug-in changes the size of the text to suit their needs. Future work will refine these existing plug-ins and develop additional ones for users to customize such elements as color and contrast.

The content of the site is delivered through the Omeka content management system. Each oral history, for example, will be added to the Omeka database and will be delivered in the choice of medium that the user specifies: video (with or without captions, according to the user’s preference), audio only, or text only. And the site has been designed to be as accessible as possible for users who are visually impaired. For example, the team has developed ways of embedding video on a web page that do not involve the commonly-used animation browser plug-in Flash, since current screen reading software is incompatible with Flash.

3. RESULTS AND DISCUSSION

At the time of this writing, almost 500 individuals from 17 countries have visited the online resource. We are quite pleased with these numbers given that the site has only been online for two months and that it has not received significant publicity yet. International visitors have come from such countries as the United Kingdom, Canada, Australia, Germany, and France. In the United States, we have received hits from 29 states, including California, Florida, Washington D.C., Virginia, and New York. The site has received 322 visits from South Carolina; statewide locations with the most visits include Arcadia, Spartanburg, Columbia, Greenville, and Glendale. Average time on the site was almost eight minutes, and the most commonly viewed sections were the archive of oral histories, the resources page detailing various South Carolina resources for individuals with visual impairments, and the page of information concerning young children who are low vision or blind. Thus far, word-of-mouth has been the primary publicity tactic. A plan to publicize the resource has been developed and will be implemented within the next month.

As development of the site content and interface continues, the researchers will conduct various user-testing sessions involving a diverse group of end-users with varying degrees of visual ability or impairment. All interface tools developed for the BrailleSC project have been or will be released as open source code. All content—including oral histories and pedagogical materials—have been made available under a Creative Commons Attribution-Noncommercial-Share Alike license. Easy-to-follow instructions for how to implement the accessibility features are currently being created. The Center for Digital Humanities has agreed to provide long-term hosting for all tools and content developed. Finally, a white paper will be released at the project’s conclusion explaining what collaborators have learned about developing designing accessible digital humanities projects and making suggestions for “retrofitting” existing projects.

4. CONCLUSIONS

The collaborators hope to make a world of difference with BrailleSC.org by allowing individuals who are low vision or blind to find others who have faced the same challenges and learn about the ways those challenges were met. In South Carolina, many individuals with visual impairment live in rural areas and have limited opportunities to meet and talk with others who are visually impaired. This makes the need even greater for individuals to come together as an online community. Sharing the challenges they face can alleviate feelings of isolation. Additionally most sighted people are unaware of anything beyond the most basic details of braille, and this online project will allow these individuals to learn a great deal about its importance. And finally, students and scholars in the fields of history, education, and writing studies will find this website a rich collection of primary source material for research and teaching.
ACKNOWLEDGEMENTS

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ON THE COMPARISON OF TWO SURVIVAL FUNCTIONS

**ABSTRACT**

For survival data recorded for individuals, testing the null hypothesis that two samples are from populations that follow the same survival function can be done using Gehan’s generalized Wilcoxon test, the Cox-Mantel test, the Cox’s F test, the log-rank test, and Peto and Peto’s generalized Wilcoxon test among others. One also plots their Kaplan-Meier estimates, visually examines these curves, and subjectively summarizes how the difference varies over time. In many clinical studies, however, these two graphical and numerical analyses provide different results and care must be taken to compare survival functions.

**KEYWORDS:** Survival Function, Cumulative Hazard Function, Kaplan–Meier Estimator, Log-rank Test, Gehan-Wilcoxon Test

**BRENT MCCracken.** I worked with Dr. Hyun on a type of statistics known as survival analysis. We came to some interesting conclusions about data gained from clinical trials treating various diseases. Statistical analysis like we performed is very important to medical research and is necessary to advance our knowledge in many other fields as well. I personally learned a lot about statistics and their importance and hope to apply this in my career as well as future research opportunities. I am currently employed as a Programmer/System Analyst for CSC and I hope to pursue a graduate education in Computer Science in the future. I also enjoy spending time on the lake kneeboarding and water skiing, traveling, and learning foreign languages. I enjoyed working with Dr. Hyun and I am grateful to have had this research opportunity.

**DR. SEUNGGUEUN HYUN** is an Assistant Professor of Mathematics and has been at the University of South Carolina Upstate since 2007. His research interests are primarily in biostatistics, such as statistical analysis of failure time data, competing risks data, longitudinal data, and application of statistical models to real problems involving data from medicine, epidemiology, demography, and engineering. He has published research articles in several journals, including the Journal of Applied Statistics, Biometrics, and Statistics in Medicine. Before he joined USC Upstate, he had an opportunity to participate in a research program at the National Institute of Health (NIH). This experience provided him with comprehensive, practical research mentoring.

1. **INTRODUCTION**

Comparison of treatments is one of the primary objectives in most medical studies such as clinical trials. In principle, because survival times are not normally distributed, nonparametric or distribution free methods are usually preferred if there is not strong evidence to support a particular parametric model. For right-censored failure time data, most of the existing nonparametric methods can be classified into two types: weighted log-rank tests and weighted Kaplan-Meier. In particular, the log-rank test is perhaps the most commonly used nonparametric procedure in practice. Detailed discussions about these two types of statistics can be found in Fleming and Harrington (1991) and Kalbfleisch and Prentice (2002) among other books.

For survival data recorded for individuals, testing the null hypothesis that two samples are from populations that follow the same survival function can be done using Gehan’s generalized Wilcoxon test, the Cox-Mantel test, the Cox’s F test, the log-rank test, and Peto and Peto’s generalized Wilcoxon test among others. Most of these tests are accompanied by appropriate z-values (values of the standard normal
distribution) and these z-values can be used to test for the statistical significance of any differences between groups. However, most of these tests will only yield reliable results with fairly large samples sizes; the small sample behavior is less well understood.

In comparing two survival functions, one also plots their Kaplan-Meier estimates, visually examines these curves, and subjectively summarizes how the difference varies over time. However, these two numerical and graphical analyses provide different results in many clinical studies. In this research we find the difference of these two analyses.

2. COMPARISON

There are no widely accepted guidelines concerning which test to use in a particular situation. Cox’s F test tends to be more powerful than Gehan’s generalized Wilcoxon test when sample sizes are small (i.e., n per group less than 50); if samples are from an exponential or Weibull; or if there are no censored observations (Gehan & Thomas, 1969). Lee, Desu, and Gehan (1975) compared Gehan’s test to several alternatives and showed that the Cox-Mantel test and the log-rank test are more powerful (regardless of censoring) when the samples are drawn from a population that follows an exponential or Weibull distribution; under those conditions there is little difference between the Cox-Mantel test and the log-rank test. Fleming and Harrington (1981) also propose a very general class of test that includes, as special cases, the log-rank test and a version of the Mann-Whitney-Wilcoxon test, very close to that suggested by Peto and Peto (1972). Here, the survival function at the previous death time is used as a weight to ensure that these weights are known just prior to the time at which the comparison is to be made. The following studies are used to illustrate the difference among the tests and Kaplan-Meier estimates.

First, on a clinical trial of the effectiveness of two methods for placing catheters in kidney dialysis patients (Nahman et al., 1992), 43 patients utilized a surgically placed catheter and 76 patients utilized a percutaneous placement of their catheter. We are interested in testing if there is a difference in the time to exit-site infection between the groups. Figure 1 shows the survival probabilities for the two groups. We can see that the two survival curves diverge for larger values of time after 10 months. On the other hand, the log-rank test has a p-value of 0.112 and the Peto-Peto modification of the Gehan Wilcoxon test has a p-value of 0.239. These tests suggest no significant difference between the two procedures in the distribution of the time to exit-site infection. Figure 2 shows the cumulative hazard risks of the two methods. It indicates that the hazard ratio of the two is not constant over time.

Second, we analyze the results of a clinical trial of a drug 6-Mercapropurine versus a placebo in 23 children with acute leukemia. Patients were followed until their leukemia returned (relapse) or until the end of the study (in months) and the question at the time was whether the standard course of chemotherapy should be extended (maintenance) for additional cycles. Figure 3 shows the survival probabilities of the two groups. No difference between the survival probabilities is examined graphically. Figure 4 shows the cumulative hazard risks of the two methods. It indicates that the hazard ratio of the two seems constant over time.

Figure 1. Survival probabilities vs. months.
But the log-rank test has a p-value of 0.0653 and the Peto and Peto modification of the Gehan-Wilcoxon test has a p-value of 0.0955. These tests indicate a significant difference between the two procedures.

Finally, a sample of 101 patients with advanced acute myelogenous leukemia was used to compare the effectiveness of two methods of transplant, autologous bone marrow transplant and allogeneic bone marrow transplant. Here, the event of interest is death or relapse, whichever comes first. It is well known that patients given an allogeneic transplant tend to have more complications early in their recovery process. Thus, of primary interest to most investigators in this research area is comparing the treatment failure rate among long-term survivors, and Figure 5 shows that there is a difference in the treatment failure rates for the two types of transplants. Figure 6 shows their corresponding cumulative hazard risks.

The log-rank test, however, has a p-value of 0.537 and the Peto and Peto modification of the Gehan-Wilcoxon test has a p-value of 0.977. These tests have larger p-values because the hazard rates of the two types cross at about 12 months, so that the late advantage of allogeneic transplants is negated by the high, early mortality of this type of transplant.
3. CONCLUSIONS

When comparing two or more groups it is very important to examine the number of censored observations in each group. Particularly in medical research, censoring can be the result of the application of different treatments: for example, patients who get better faster or get worse as the result of a treatment may be more likely to drop out of the study, resulting in different numbers of censored observations in each group. Such systematic censoring may greatly bias the results of comparisons. Kaplan–Meier provides a graphical method for estimating the survival curve, and the log rank test provides a statistical comparison of two groups. The log-rank test is powerful when survival is exponential, but it is not so powerful when the hazards are not proportional. Because the log rank test assumes that the hazard ratio is constant over time, care must be taken to check this assumption.

Figure 6. Cumulative hazards vs. months.

ACKNOWLEDGEMENTS

This research was supported by the Student Research Assistant Program offered by the USC Upstate Office of Sponsored Awards and Research Support.

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**SCIENTIFIC ILLUSTRATION MEETS DEEP SEA OOZE**

**ABSTRACT**

Even in the digital age, scientific illustration continues to provide valuable information about organisms and their habitats. This process is a tool of science and an art form, combining the observation and understanding of the scientist with the artist's eye for detail, proportion and scale. The result can illuminate taxonomic characters and delight the viewer as can be seen with these life-size digital images and hand-drawn images of microscopic life forms from beneath the Atlantic Ocean.

**KEYWORDS:** Scientific Illustration, Deep Sea Specimens, Art, Biology.

**LEIDY ESPINAL.** I started working with Dr. Campbell and Mrs. Campbell after I showed Mrs. Campbell a drawing that I had done of two preserved hearts. Both Dr. Campbell and Mrs. Campbell were very interested in my artistic ability; at that point we discussed the possibility of me drawing microscopic fossils. This entailed viewing specimens less than 4mm through a microscope and sketching the sample on a 20 x 25 cm format. With help of Dr. and Mrs. Campbell some of the microscopic drawings were entered into the 6th Annual Research Symposium at Milliken. Aside from the drawings, I also took pictures of several specimens that were used in Eric Carl Alexander’s paper and Dr. and Mrs. Campbell's presentation. I continue to work with Dr. and Mrs. Campbell as I continue to further my studies in Biology.

**DR. LYLE CAMPBELL and MRS. SARAH CAMPBELL.** Dr. Campbell is an Emeritus Professor of Geology and Mrs. Campbell is an Instructor of Biology. Dr. and Mrs. Campbell combine biology and geology in Paleobiology, the study of past life, with research in recent marine faunas in order to reconstruct past environments. Their major focus has been molluscan biogeography in the western Atlantic during the Cenozoic although they also are involved in the natural history of the Carolinas. Dr. Campbell has a Ph.D. from USC and Mrs. Campbell has a M.S. from USC. They have published articles in several journals, including *The Nautilus*, and in Journals of the Virginia and South Carolina Geological Surveys, American Malacological Society, International Bivalve Congress, and Southeastern Geological Society of America. Dr. Campbell is originally from Shenandoah Valley, Virginia, and Mrs. Campbell is from Tidewater, Virginia. In their spare time, the Campbells enjoy natural history, bird watching, herpetology, beach combing, astronomy, oil painting, photography and music, and chasing down unusual plants or butterflies.

**1. INTRODUCTION**

Scientific illustration is, as the name implies, a combination of science and art. Like a sandwich, science discovers the object to be portrayed and the specific characteristics which typify or identify that organism, habitat, or structure. However this essence is seen, captured, surrounded and recorded by the human artist differently than by a mechanical camera.

Scientific illustration requires very accurate use of lines and shades to create realistic drawings of organisms, body parts, or specimens. This type of work at times requires careful lighting, the use of microscopes and/or other instruments that will facilitate the work or that are necessary to illustrate the organism. Due to the minute size of the organisms that we were working with, we were required to use all of these tools. These organisms were drawn with the use of a dissecting microscope and special lighting, due to
their small size. But even with the use of a dissecting microscope (at 10 to 40 times life size), it was a challenge to see all the detail of some of the organisms. While observing from one angle, the artist needs to keep the whole three dimensional shape in mind and convey that, rather than a two dimensional image, to the viewer. Due to this challenge some of drawings took several days and even up to two weeks to draw one organism. Accuracy, detail, and excellent drawing skills are the most important aspects of scientific illustration, as well as time and especially patience and attention to minute details. With scientific illustration we are capable of emphasizing certain areas more than others, especially when working with small organisms like these and depicting a diagnostic representation for taxonomic study.

For example the sediment covering the ocean basins, deep sea ooze, is a strange mixture of extant organisms, their remains, and inorganic substrate. The sub-macroscopic size range of most organisms requires microscopic observation and examination, thus complicating the challenge of capturing a likeness on paper. This project transformed foraminifera, brachiopods, otoliths, and gastropods into scientific illustrations. Foraminifera can be described as shelled amoeba, and they display a wide variety of forms to challenge the observer. Brachiopods are commonly called lamp shells and bear a superficial resemblance to clams. Otoliths are oddly shaped fish ear bones, and gastropods include spiraled snails.

Figures 1-5 provide examples of the scientific illustrations generated by this work.

**Figure 1.** This *Acteon* is a microscopic snail. It appears to be the juvenile form of a new species found at Eagle Point, SC from a fossil deposit dated at 3.6 mya.
Figure 2. This fish otolith, drawn with front and back views, came from a Lantern Fish (*Ceratoscopelus*), a denizen of deep oceans.
Figure 3. This microscopic brachiopod was dredged from 770 m depth on the Blake Plateau, southeast of Charleston, SC.
Figure 4. This *Carinorbis lyra* is a fossil species of snail distinguished by the more squarish outline and the cancellate, cross-hatched surface sculpture. This surface pattern is intermediate between the typical sculpture found in this species and the pattern seen in later species. Specimen from Eagle Point, SC fossil deposit dated at 3.6 mya.
Figure 5. This foraminifera is representative of many shelled-amoebas found in deep sea sediment. This microscopic specimen was dredged from 770m depth on the Blake Plateau, southeast of Charleston, SC.

2. CONCLUSIONS

Capturing the essence of microscopic specimens in pencil or pen and ink requires careful observation and artistic skill. However the results provide a valuable tool for recording, observing, comparing, and studying variation within the natural world.

ACKNOWLEDGEMENTS

This project was an adventure in a new direction, begun at the request of an art/biology major. The specimens were selected from geologic collections at the University of South Carolina Upstate. Some were sieved from sediments dredged during research cruises aboard The Lady Lisa in cooperation with the South Carolina Department of Natural Resources, who graciously invited the Campbells aboard as research scientists. Mary Lou Hightower of the Art Department at University of South Carolina Upstate was consulted during the formulation of this project.

REFERENCES

**ABSTRACT**

Obesity is a serious medical condition that affects children worldwide. In particular, 34% of elementary school children in Spartanburg County are currently either overweight or obese. Researchers implemented a program to instill intrinsic rewards for balanced lunch choices at a Spartanburg elementary school. The cost-free, non-intrusive and sustainable program increased healthy meal selections and decreased sugar-added, flavored milk consumption compared to baseline measurements, demonstrating that children will modify their eating habits when given proper education and praise for healthy eating decisions. One month later, follow-up data was gathered to survey the impact of the program with results indicating a sustained increase in the number of healthy meal selections and white milk consumption by students. Researchers observed enthusiasm and pride in children participating in the program, suggesting the possibility of heightened self-esteem acquired through healthy decision making and positive reinforcement.

**KEYWORDS:** Childhood Obesity, Elementary School Children, School Lunch, Positive Reinforcement, Self-esteem

**EMILY SHEEHAN.** When I was introduced to Dr. Parker, my hope was to find a project that would gently introduce me to the field of psychological experimentation. Instead, I found myself immersed in the subject. Before long, I was surrounded by the tasks of designing and implementing a complex cooperative project. I was not at all overwhelmed by the effort, but empowered by the knowledge that our work would be used to improve the health of our community, and to increase our knowledge of childhood eating behavior. Before long, I found myself seeking out more assignments from Dr. Parker. Aside from a brief stint dressed in an apple costume (the theatre was never my calling), I adored every moment of this project. Though I ended up with more than I originally bargained for, my experience working with Dr. Parker and the research team from Wofford has helped to inspire in me a serious, lasting passion for the field of research. I have combined this love of research with my interest in criminal justice, and am currently pursuing a Master’s degree in Forensic Psychology at Marymount University with the hope of establishing a career in the field of police research. I would like to thank Dr. Parker, Dr. Pittman and my other wonderful professors for all of their time, talent and effort.

**DR. JENNIFER PARKER** is the Associate Dean of the College of Arts and Sciences and an Associate Professor of Psychology at the University of South Carolina Upstate. She earned a B.A. and M.A. from Hollins University and a Ph.D. from Virginia Tech. Dr. Parker has presented and published findings from her research projects that contribute to the understanding of factors related to childhood obesity, juvenile delinquency, exposure to domestic violence, stalking behaviors, and youth leadership. Dr. Parker is committed to the undergraduate research experience and USC Upstate students have been involved and contributed significantly to many of these research projects.

**ADDITIONAL COAUTHORS:** Brittney Getz, Sara Riggs, Christina Jackson and Jonathan Shay at USC Upstate, and Dr. Dave Pittman at Wofford College.
1. INTRODUCTION

Obesity is a serious medical condition that affects children and adults worldwide. In the United States, childhood overweight and obesity rates have tripled since 1980, resulting in a prevalence of 17.1% and 16.5% respectively (Garasky et al., 2009). Currently, South Carolina is the 8th ranked obese state in the United States with a 29.1% childhood overweight or obesity prevalence. Spartanburg County has a rate higher than the state average with 34.4% of children residing in Spartanburg County are either overweight or obese.

Almost all elementary-aged children in the United States attend a public or private school, therefore the potential impact of a healthy school environment on childhood obesity rates is promising. By targeting elementary-aged children, programs designed to influence healthy eating behavior can be more effective through instilling healthy behaviors, which are more likely to be carried into adulthood (Sohota et al., 2001).

The current study aimed to increase the number of balanced lunches chosen by elementary school students at Jesse Boyd Elementary School in District 7 of Spartanburg County Schools. Researchers partnered with Chartwell's, the school’s catering service, to increase awareness of the balanced lunch option. A balanced lunch option was created for each day to include all basic food groups and meet nutritional standards set by Chartwells and the federal government (Calories <664 , Protein >10g, Calcium >286mg, Iron >3.5mg, Vitamin A >2.24mg, Vitamin C >15mg, Fat <30% , Fiber >6g, Cholesterol <100mg, Sodium <1.3 g).

Lunch selections, including entrée, sides, desserts and milk choice of white, chocolate, strawberry or vanilla were recorded during a 9-day baseline period. An education day followed the baseline period, in which students were presented with information about the incentive program and the benefits of choosing the balanced lunch option with white milk. During the subsequent incentive phase, data were collected in the same format as the baseline period while the researchers gave a sticker, verbal praise and allowed each student that chose the balanced lunch with white milk to ring the bell in the cafeteria in front of their peers.

It was hypothesized that balanced lunch selections and white milk selection would increase during the incentive phase. We also expected that the increase in healthier selections would be greater for younger grades, reflecting a greater influence of positive reinforcement on younger students.

2. METHOD

2.1 Participants

Students at Jesse Boyd Elementary School, grades kindergarten through sixth, who purchased a school lunch were the participants in this study. The school population consisted of 525 male and female students ranging from five to thirteen years in age. An average of 44.23 students per grade purchased lunch over the course of the study.

2.2 Data Collection

During baseline, incentive and follow-up phases, each student’s selection of entrée, side item, milk type, and balanced choice was recorded. The menu selections repeated so that lunch options were the same across all data collection phases. Each day, three entrée selections were provided by Chartwell’s, with one option designated as the balanced choice. Up to four side item selections were also provided daily. Four milk choices were available each day of the study; 1% white milk was always the healthy selection while chocolate, strawberry, and vanilla were other flavored milk options. A selection of the identified balanced entrée and all identified side items with 1% white milk qualified as the healthy eating decision for our study. Selection of an entrée other than the balanced option or insufficient selection of the side items was not reinforced or recorded as a balanced choice. Data were collected over a total period of 21 days, which consisted of 9 baseline collection days, 9 incentive collection days and 3 follow-up days.
2.3 Education Phase

Following the baseline phase and two days prior to the incentive phase, researchers conducted an education day in the cafeteria during each grade’s lunch period. On this day, researchers demonstrated the importance of choosing white milk over flavored milk and the incentives granted for choosing the balanced lunch option with white milk. Students were shown a video clip prior to and on the education day explaining the purpose of the baseline data collection and the upcoming incentive phase. The video clip also explained the importance of choosing a balanced lunch using the food pyramid as an example. On the education day, the research team showed the importance of choosing the white low-fat milk with a demonstration in the cafeteria that displayed the extra amount of sugar that would be consumed over 1 school year with the flavored milk choices. Students also received educational brochures to take home which included the address of a website further explaining the study.

2.4 Incentive Phase

During the incentive phase of the study (9 days), students viewed a short, 20-second video commercial announcing the balanced lunch option for the day. Researchers measured food item and milk selections and students who successfully chose the balanced lunch, including entrée, sides, and white milk, received immediate reinforcement in the form of public recognition. They were allowed to ring a bell in the cafeteria and given a sticker, along with verbal praise from an researcher. In addition, bar graphs comparing the percent balanced choice selections from the previous day for each grade were posted to promote competition between grades. Another graph compared baseline milk choice with incentive milk choice from the previous day across grades.

2.5 Follow-up Phase

Four weeks after the incentive phase ended, researchers returned to collect follow-up data for three days. During this phase, researchers measured food item and milk selection without providing reinforcement.

3. RESULTS AND CONCLUSIONS

Overall, there was a positive response to the implementation of the balanced lunch incentive program. During the baseline data phase, less than 1% of students chose balanced lunches, and chocolate was the most popular milk selection. After the education day, during the incentive phase, balanced lunch selection rose by 40% school-wide (Figure 1). An even more dramatic change occurred in milk selection, with a 49% increase in white milk selection over baseline (Figure 2). On the first day of the incentive phase, so many students in the 6th grade (68%) purchased white milk that the lunch providers actually ran out. Follow-up data indicated some expected regression towards baseline but still demonstrated sustained increases (10%) overall in balanced choices with the greatest impact in the lower grades (Figure 3). An even greater effect was again found in the milk selections, where a 31% increase over baseline was maintained (Figure 4).

These data supported the hypothesis that offering a cost-free and sustainable incentive to children would be sufficient to increase healthy eating decisions during school lunch service. The intrinsic reward resulting from praise and public recognition served as a positive reinforcement by providing an outward, social acknowledgement of a healthy choice. This effect was especially strong in lower grades, as younger children displayed more eagerness to please and became more involved with public recognition than their older peers by applauding when a student made a healthy choice and rang the bell. Although measures of self-esteem were not included in this study, researchers noted enthusiastic participation, pride, and other evidence of heightened self-esteem as a result of the making healthy choices program.

Based on the results of this pilot project we plan to expand the program by developing an educators’ toolkit containing videos, brochures and educational material. The toolkit will provide instructions for implementing the Healthy Eating Decisions program in any elementary school. This program is intended to be low-cost, non-intrusive and sustainable. Over the long term we hope this program will continue to encourage healthy eating decisions in order to curb and begin to reduce the high prevalence of childhood obesity in Spartanburg County.
ACKNOWLEDGEMENTS

We would like to thank Thien-An Le for assistance with data collection, the Spartanburg Childhood Obesity Taskforce, Jesse Boyd Elementary School, Spartanburg School District 7, and Chartwells for their support of this study.

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Figure 1. Changes in entrée choices per grade from baseline to incentive phase.

Figure 2. Changes in white milk selection per grade from baseline to incentive phase.
Figure 3. Entrée choices (including white milk) by grade through baseline, incentive and follow-up phases.

Figure 4. Milk selection by grade through baseline, incentive and follow-up phases.
**SPECIES RICHNESS OF FORAMINIFERA OFF THE COAST OF SOUTH CAROLINA**

**ABSTRACT**
Foraminifera have come under increased scrutiny over the last 50 years. From this work, much has been learned about temperature and salinity changes in the ocean, over the past 60 ka years. Sediment from a 418 fathom research station off Charleston, South Carolina was dredged, sieved, and sorted to determine the species diversity in the sediment. Species richness and a comparison of pelagic and benthic organisms were recorded.

**KEYWORDS:** Foraminifera, Species Richness, Atlantic Basin

**CARL ALEXANDER.** I took my life-long interest in the outdoors with me first to USC Union and then to USC Upstate. Mrs. Campbell's course on the ecology of the deep sea hydrothermal vents exposed me to a whole realm of planet earth that had been less explored than the lunar surface. Following a series of labs analyzing sediment dredged from the Blake Plateau on her research cruises, I expressed interest in a research project, and a cruise. Sediment analysis took me into the systematics of microfauna - from bones through shells to foraminifera and their protist kin. Identification led to population ecology and reconstruction of the abyssal community.

**DR. LYLE CAMPBELL and MRS. SARAH CAMPBELL.** Dr. Campbell is an Emeritus Professor of Geology and Mrs. Campbell is an Instructor of Biology. Dr. and Mrs. Campbell combine biology and geology in Paleobiology, the study of past life, with research in recent marine faunas in order to reconstruct past environments. Their major focus has been molluscan biogeography in the western Atlantic during the Cenozoic although they also are involved in the natural history of the Carolinas. Dr. Campbell has a Ph.D. from USC and Mrs. Campbell has a M.S. from USC. They have published articles in several journals, including The Nautilus, and in Journals of the Virginia and South Carolina Geological Surveys, American Malacological Society, International Bivalve Congress, and Southeastern Geological Society of America. Dr. Campbell is originally from Shenandoah Valley, Virginia, and Mrs. Campbell is from Tidewater, Virginia. In their spare time, the Campbells enjoy natural history, bird watching, herpetology, beach combing, astronomy, oil painting, photography and music, and chasing down unusual plants or butterflies.

**1. INTRODUCTION**
Foraminifera, also known as forams, are protozoans that have a great variety of test composition and morphology, and are mostly marine organisms with very few living in brackish or fresh water (Culver, 1992; Cushman, 1948). In the last 50 years, 951 different species of forams have been discovered in the Gulf of Mexico alone, including 919 benthic species and 32 planktonic species (Gupta et al., 2009). The majority of these organisms crawl, using pseudopodia, on the surface mud and ooze found on the ocean floor (Cushman, 1948). Also in the last half of the 20th century, these organisms have been found to be widespread throughout
the world's oceans (Gupta et al., 2009). Forams are very similar in abundance from Florida to the shelf of Maine (Schnitker, 1971).

In the ocean at a depth of ~20-30m, the first pelagic forams can be found, with a great increase in abundance, because of benthic forams, at ~70m (Schnitker, 1971). Generally, the highest abundances can be found from the continental shelf to ~2000m (Cushman, 1948). The distribution of these organisms can be influenced or limited by the temperature and/or the salinity of the water they inhabit, along with currents that flow along the bottom of the ocean (Snyder, 1978). In 1966 and 1968 Jones reported that these organisms could be used as excellent indicators of minor changes in the surrounding environment (Snyder, 1978). The shell of some of these organisms can show a genetic imprint of the individual that inhabited them and preserve some environmental indicators. The growth and shape of the test could reflect if there were overcrowding in the population, if the temperature and salinity were suitable or stressful for their survival, and if the abundance or scarcity of food had impacted the individual’s growth (Abbott, 1974).

According to Snyder, living specimens are now generally recognized as indicators that show variation in the ecological factors in their environment. By the differences in the latitudinal segregation of some of these species, differences in temperature can be determined. A “key” species can show the ecological differences over time in an area; in the Foraminifera, *Globigerinodes ruber* is often utilized. For one species to be the “key”, it must have a high resistance to dissolution, have a high abundance level, and also show sensitivity to the changing salinity levels and the temperature of its environment. The only problem with *Globigerinodes ruber* is that it does not fit all the criteria because it does not have a high resistance to dissolution (Snyder, 1978).

### 2. MATERIALS AND METHODS

In 1986, the SC Marine Resources *Lady Lisa* went on a survey cruise to study the distribution of *Geryon* crabs southeast of Charleston, South Carolina, on the Blake Plateau. While on the cruise, it was permitted for a 30 cm diameter pipe dredge to be attached to the ballast holding down the crab traps. A series of bulk samples were taken from different stations, including one at a depth of 418 fathoms (846m), for this study. This was possibly the first set of bathyal sediment obtained from South Carolina waters.

This sediment was washed and screened through seven sieves with the mesh ranging from 12.5 mm to 0.7 mm. Sediment was placed in containers according to sieve level, and studied through light microscopes. More than 160 species have been found, and are concurrently being classified.

### 3. RESULTS

After compiling the material, there were 166 species which represented 12 separate phyla. The most abundant class was Gastropoda with 68 species present. Through the four largest sieve sizes, the highest of all taxa diversity was located in the fourth sieve, with over 92 different species present. Abundance difference was recorded for the classes Bivalvia, Gastropoda and Foraminifera, but further research is still needed in the comparison of the most abundant species from each class.

Phylum Foraminifera also had a large difference in abundance level between the third and fourth sieve size. There were almost 3 times the number of species in sieve 4 than in sieve 3 (See Table 1). The table for Class Foraminifera contains five subgroups, used strictly for assortment, totaled together. These organisms were predominantly benthic, with three exceptions, *Orbulina universa*, *Globorotalia truncatulinoides*, and *Globigerina rubra*.

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Table 1. This similarity matrix shows the species diversity throughout the different sieve sizes in Class Foraminifera. This shows the relation in the number of species between each sieve size and the corresponding sieve sizes.
There was also a comparison completed between benthic organisms and pelagic organisms. After sorting of the sample was almost completed, each organism was assigned its taxonomical name according to literature collected over the duration of the study. During this process, it was determined whether the species was benthic, pelagic, or nektonic. In this study, Foraminifera and the classes of Gastropoda and Bivalvia, in the phylum Mollusca, were represented by 119 benthic species and only 28 pelagic species, a ratio of 4.25:1. However, pelagic Foraminifera and Gastropoda were the most abundant in these assemblages.

4. CONCLUSIONS

It has been shown in previous studies that the total number of species in an area, both pelagic and benthic, will increase in total number as the depth increases (Snyder, 1978). The high diversity shown in this study supports the possibility that there are many niches available in the sediment, but only a small understanding of the evolution and the ecology of foraminifera is actually known. More studies in these areas need to be done to truly understand the great diversity of niches these organisms fill (Akers and Dorman, 1964).

The availability of resources appears to be higher along the ocean floor than that first imagined. It was originally thought that the oceans were deserts, devoid of life. Since that time, many scientists have shown this to be false. With continuing research, it may be possible to learn more about climate change and salinity changes in the past, so we can more accurately understand the present and predict the future climate.

ACKNOWLEDGEMENTS

South Carolina Department of Natural Resources graciously invited the Campbells to participate in a series of research cruises from the Fort Johnson, South Carolina research station. Leidy Espinal provided digital images of critical species. University of South Carolina Upstate CURS granted equipment funding.

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Music Information Retrieval with Temporal Features and Timbre

Abstract
At a time when the quantity of music media surrounding us is rapidly increasing and the access to recordings as well as the amount of music files available on the Internet is constantly growing, the problem of building music recommendation systems is of great importance. In this work, we perform a study on automatic classification of musical instruments. We use monophonic sounds. The latter have successfully been classified in the past, with the main focus on pitch. We propose new temporal features and incorporate timbre descriptors. The advantages of this approach are: preservation of temporal information and high classification accuracy.

Keywords: Music Information Retrieval, Music Instrument Recognition, Audio Signal Processing

Keith J. Bell. When I first met Dr. Tzacheva, I found out she was involved with computers and music. I have a background in both computers and music and had wanted to combine the two disciplines. For a long time I had wanted to do a project on Music and Neural Networks, but had not been able to find a sponsor - so I jumped at the chance. The project we embarked on was an extension of musical information retrieval that uses temporal features and timbre by applying the automatic classification of musical features using data mining techniques (including applied Neural Networks.) The experience was both educational and rewarding. While the research we conducted is basic, I hope that eventually it will lead to innovative applications. I would like to thank Dr. Tzacheva for her guidance and direction on this project. I currently work in information systems as a vocation (mostly piecework.). I co-authored a paper with Dr. Tzacheva, which was published in the Proceedings of 6th International Conference on Active Media Technology (AMT 2010), LNCS, Toronto, Canada.

Dr. Angelina Tzacheva is an Assistant Professor of Informatics and has been at USC Upstate since 2005. Her research interests include data mining and knowledge discovery, distributed databases, multimedia databases, biomedical image processing, and human factors in computing. Her work is published in Fundamenta Informaticae Journal (European Association for Theoretical Computer Science), International Journal of Intelligent Systems (Wiley), Encyclopedia of Data Warehousing and Mining (Ed. J. Wang), and Advances in Soft Computing (Springer-Verlag). Dr. Tzacheva is on program committees of several international conferences, including: the International Symposium Advances in Artificial Intelligence and Applications (AAIA), Mragowo, Poland; the International Conference on Knowledge-Based and Intelligent Information & Engineering Systems (KES), Santiago, Chile; and the International Conference on Computers & Industrial Engineering (CIE), Troyes, France. She has received support from USC Upstate’s Office of Sponsored Awards and Research Support and USC Columbia’s Magellan Scholars program.

1. Introduction

Music has accompanied man for ages in various situations. Today, we hear music media in advertisements, in films, at parties, at the philharmonic, etc. One of the most important functions of music is its effect on humans. Certain pieces of music have a relaxing effect, while others stimulate us to act, and some cause a change in or emphasize our mood. Music is not only a great number of sounds arranged by a composer, it is also the emotion contained within these sounds (Grekow and Ras, 2009).
The steep rise in music downloading over CD sales has created a major shift in the music industry away from physical media formats and towards Web-based (online) products and services. Music is one of the most popular types of online information and there are now hundreds of music streaming and download services operating on the World-Wide Web. Some of the music collections available are approaching the scale of ten million tracks and this has posed a major challenge for searching, retrieving, and organizing music content. Research efforts in music information retrieval have involved experts from music perception, cognition, musicology, engineering, and computer science engaged in truly interdisciplinary activity that has resulted in many proposed algorithmic and methodological solutions to music search using content-based methods (Casey et al., 2008).

This work contributes to solving the important problem of building music recommendation systems. Automatic recognition or classification of music sounds helps user to find favorite music objects, or be recommended objects of his/her liking, within large online music repositories. We focus on musical instrument recognition, which is a challenging problem in the domain.

Melody matching based on pitch detection technology has drawn much attention and many music information retrieval systems have been developed to fulfill this task. Numerous approaches to acoustic feature extraction have already been proposed.

This has stimulated the research on instrument classification and new features development for content-based automatic music information retrieval. The original audio signals are a large volume of unstructured sequential values, which are not suitable for traditional data mining algorithms, while the higher level data representative of acoustical features are sometimes not sufficient for instrument recognition.

We propose new dynamic features, which preserve temporal information, for increased accuracy with classification.

The rest of the paper is organized as follows: section 2 reviews related work, section 3 discusses timbre, section 4 describes features, section 5 presents the proposed temporal features, section 6 shows the experiment results, and finally section 7 concludes.

2. RELATED WORK

Martin and Kim (1998) employed the K-NN (k-nearest neighbor) algorithm to a hierarchical classification system with 31 features extracted from cochleagrams. With a database of 1023 sounds they achieved 87% of successful classifications at the family level and 61% at the instrument level when no hierarchy was used. Using the hierarchical procedure increased the accuracy at the instrument level to 79% but it degraded the performance at the family level (79%). Without including the hierarchical procedure performance figures were lower than the ones they obtained with a Bayesian classifier. The fact that the best accuracy figures are around 80% and that Martin and Kim have settled into similar figures shows the limitations of the K-NN algorithm (provided that the feature selection has been optimized with genetic or other kind of techniques). Therefore, more powerful techniques should be explored.

Bayes Decision Rules and Naive Bayes classifiers are simple probabilistic classifiers, by which the probabilities for the classes and the conditional probabilities for a given feature and a given class are estimated based on their frequencies over the training data. They are based on probability models that incorporate strong independence assumptions, which may, or may not have a bearing in reality, hence are naive. The resultant rule is formed by counting the frequency of various data instances, and can be used then to classify each new instance. Brown (1999) applied this technique to 18 Mel-Cepstral coefficients by a K-means clustering algorithm and a set of Gaussian mixture models. Each model was used to estimate the probabilities that a coefficient belongs to a cluster. Then probabilities of all coefficients were multiplied together and were used to perform the likelihood ratio test. It then classified 27 short sounds of oboe and 31 short sounds of saxophone with an accuracy rate of 85% for oboe and 92% for saxophone.

Neural networks process information with a large number of highly interconnected processing neurons working in parallel to solve a specific problem. Neural networks learn by example. Cosi (1998) developed a timbre classification system based on auditory processing and Kohonen self-organizing neural networks. Data were preprocessed by peripheral transformations to extract perception features, then were fed to the network to build the map, and finally were compared in clusters with human subjects’ similarity judgments. In the system, nodes were used to represent clusters of the input spaces. The map was used to generalize
similarity criteria even to vectors not utilized during the training phase. All 12 instruments in the test could be quite well distinguished by the map.

Binary Tree is a data structure in which each node contains one parent and not more than 2 children. It has been pervasively used in classification and pattern recognition research. Binary Trees are constructed top-down with the most informative attributes as roots to minimize entropy. Jensen and Amspang (1999) proposed an adapted Binary Tree with real-valued attributes for instrument classification regardless of pitch of the instrument in the sample.

Typically a digital music recording, in form of a binary file, contains a header and a body. The header stores file information such as length, number of channels, sampling rate, etc. Unless it is manually labeled, a digital audio recording has no description of timbre or other perceptual properties. Also, it is a highly nontrivial task to label those perceptual properties for every piece of music based on its data content.

In the music information retrieval area, a lot of research has been conducted in melody matching based on pitch identification, which usually involves detecting the fundamental frequency. Most content-based Music Information Retrieval (MIR) systems query by whistling/humming systems for melody retrieval. So far, few systems exists for timbre information retrieval in the literature or market, which indicates it as a nontrivial and currently unsolved task (Jiang et al., 2009).

### 3. Timbre

The definition of timbre is: in acoustics and phonetics - the characteristic quality of a sound, independent of pitch and loudness, from which its source or manner of production can be inferred. Timbre depends on the relative strengths of its component frequencies; in music - the characteristic quality of sound produced by a particular instrument or voice; tone color. ANSI defines timbre as the attribute of auditory sensation, in terms of which a listener can judge that two sounds are different, though having the same loudness and pitch. It distinguishes different musical instruments playing the same note with the identical pitch and loudness. So it is the most important and relevant facet of music information. People discern timbre from speech and music in everyday life.

Musical instruments usually produce sound waves with frequencies, which are integer (a whole number) multiples of each other. These frequencies are called harmonics, or harmonic partials. The lowest frequency is the fundamental frequency \( f_0 \), which has close relation with pitch. The second and higher frequencies are called overtones. Along with fundamental frequency, these harmonic partials distinguish the timbre, which is also called tone color. The human aural distinction between musical instruments is based on the differences in timbre.

#### 3.1 Challenges in Timbre Estimation

The body of a digital audio recording contains an enormous amount of integers in a time-order sequence. For example, at a sampling rate 44,100Hz, a digital recording has 44,100 integers per second. This means, in a one-minute long digital recording, the total number of the integers in the time-order sequence will be 2,646,000, which makes it a very large data item. The size of the data, in addition to the fact that it is not in a well-structured form with semantic meaning, makes this type of data unsuitable for most traditional data mining algorithms.

Timbre is a rather subjective quality and not of much use for automatic sound classification. To compensate, musical sounds must be very carefully parameterized to allow automatic timbre recognition.

### 4. Feature Descriptions and Instruments

Based on the latest research in the area, MPEG published a standard group of features for digital audio content data. They are either in the frequency domain or in the time domain. For those features in the frequency domain, a STFT (Short Time Fourier Transform) with Hamming window has been applied to the sample data. From each frame a set of instantaneous values is generated. We use the following timbre-related features from MPEG-7:
Spectrum Centroid - describes the center-of-gravity of a log-frequency power spectrum. It economically indicates the pre-dominant frequency range. We use Log Power Spectrum Centroid, and Harmonic Spectrum Centroid.

Spectrum Spread - is the Root of Mean Square value of the deviation of the Log frequency power spectrum with respect to the gravity center in a frame. Like Spectrum Centroid, it is an economic way to describe the shape of the power spectrum. We use Log Power Spectrum Spread, and Harmonic Spectrum Spread.

Harmonic Peaks - is a sequence of local peaks of harmonics of each frame. We use the Top 5 harmonic peaks - Frequency, and Top 5 Harmonic Peaks - Amplitude.

In addition, we use the Fundamental Frequency as a feature in this study.

5. Design of New Temporal Features

Describing the whole sound produced by a given instrument by single value of a parameter which changes in time may be omitting a large amount of relevant information encoded within the sound. For example, calculating the average of the values taken in certain time points. For this reason, we design features, which characterize the changes of sound properties in time.

5.1 Frame Pre-processing

The instrument sound recordings are divided into frames. We pre-process the frames, in a way that each frame overlaps the previous frame by 2/3 as shown on Figure 1. In other words, if frame1 is abc, then frame2 is bcd, frame3 is cde, and so on. This preserves temporal information contained in the sequential frames.

![Figure 1. Overlapping frames](image)
5.2 New Temporal Features

After the frames have been pre-processed, we extract the timbre related features described in section 4 for each frame. We build a database from this information, shown in Table 1. \(x_1, x_2, x_3, ..., x_n\) are the tuples (or objects - the overlapping frames). Attribute \(a\) is the first feature extracted on them (log power spectrum centroid). We have a total of 7 attributes, two of which in a vector form.

Next, we calculate 6 new features based on the attribute \(a\) value for the first 3 frames \(t_1, t_2,\) and \(t_3\). The new features are defined as follows:

\[
\begin{align*}
    d_1 &= t_2 - t_1 \\
    d_2 &= t_3 - t_2 \\
    d_3 &= t_3 - t_1 \\
    tg(a) &= (t_2 - t_1) / 1 \\
    tg(\beta) &= (t_3 - t_2) / 1 \\
    tg(\gamma) &= (t_3 - t_1) / 2
\end{align*}
\]

This process is performed by our Temporal Cross Tabulator. \(y_1, y_2, y_3, ..., y_n\) are the new objects created by cross tabulation, which we store in a new database – Table 2. So, our first new object \(y_1\) in Table 2 is created from the first 3 objects \(x_1, x_2, x_3\), in Table 1. Our next new object \(y_2\) in Table 2 is created from \(x_2, x_3, x_4\), in Table 1. New object \(y_3\) in Table 2 is created from \(x_3, x_4, x_5\), in Table 1.

Since classifiers do not distinguish the order of the frames, they are not aware that frame \(t_1\) is closer to frame \(t_2\) than it is to frame \(t_3\). With the new features \(\alpha, \beta,\) and \(\gamma\), we allow for that distinction to be made. \(tg(\alpha) = (t_2 - t_1) / 1\) takes into consideration that the distance between \(t_2\) and \(t_1\) is 1 while \(tg(\gamma) = (t_3 - t_1) / 2\) because the distance between \(t_3\) and \(t_1\) is 2.

This temporal cross-tabulation yields current attributes * 6. In other words, for every attribute (or feature) from Table 1 we have \(d_1, d_2, d_3, \alpha, \beta,\) and \(\gamma\) in Table 2. Thus, 15 current attributes (or features: log power spectrum centroid, harmonic spectrum centroid, log power spectrum spread, harmonic spectrum spread, fundamental frequency, top 5 harmonic peaks amplitude – each peak as a separate attribute, and top 5 harmonic peaks frequency – each peak as a separate attribute) * 6 = 90. The complete Table 2 has 90 attributes, which comprises our new dataset.

![Figure 2. New Temporal Features](image-url)
6. EXPERIMENT

We chose 6 instruments: viola, cello, flute, english horn, piano, and clarinet for our experiments. All recordings originate from MUMS CD’s (Opolko and Wapnick, 1987), which are used worldwide in similar tasks. We split each recording into overlapping frames, and extract the new temporal features as described in the previous section. That produces a dataset with 1225 tuples and 90 attributes.

We import the dataset into WEKA (Hall et al., 2009) data mining software for classification. We trained two classifiers: Bayesian Neural Network and J45 Decision Tree. We test using bootstrap. The summary results of the classification are shown in Table 3 and the detailed results in Table 4.

Table 3. Results Summary

<table>
<thead>
<tr>
<th></th>
<th>Correctly Classified</th>
<th>Incorrectly Classified</th>
<th>Correct %</th>
<th>Incorrect %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bayesian Neur. Net.</td>
<td>994</td>
<td>231</td>
<td>81.1429 %</td>
<td>18.8571 %</td>
</tr>
<tr>
<td>J45</td>
<td>1185</td>
<td>40</td>
<td>96.7347 %</td>
<td>3.2653 %</td>
</tr>
</tbody>
</table>

Table 4. Results - Detailed Accuracy by Class.

<table>
<thead>
<tr>
<th></th>
<th>TP Rate</th>
<th>FP Rate</th>
<th>Precision</th>
<th>Recall</th>
<th>F-Measure</th>
<th>ROC</th>
<th>Class</th>
</tr>
</thead>
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<tr>
<td>BNNet</td>
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<td></td>
<td></td>
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<tr>
<td>0.957</td>
<td>0.141</td>
<td>0.548</td>
<td>0.957</td>
<td>0.697</td>
<td>0.98</td>
<td></td>
<td>2A#_piano</td>
</tr>
<tr>
<td>0.931</td>
<td>0.016</td>
<td>0.911</td>
<td>0.931</td>
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<td>0.994</td>
<td></td>
<td>2C_cello_bowed</td>
</tr>
<tr>
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<td>0.945</td>
<td>0.783</td>
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<td>0.988</td>
<td></td>
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<tr>
<td>0.712</td>
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<td></td>
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<tr>
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<td>0.792</td>
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<td>0.994</td>
<td></td>
<td>4A#_flute_vibrato</td>
</tr>
<tr>
<td>J45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.973</td>
<td>0.015</td>
<td>0.919</td>
<td>0.973</td>
<td>0.945</td>
<td>0.996</td>
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<td>0.935</td>
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<td>0.996</td>
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<td>0.999</td>
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<td>0.981</td>
<td>0.983</td>
<td>1</td>
<td></td>
<td>4A#_flute_vibrato</td>
</tr>
</tbody>
</table>

7. CONCLUSIONS AND DIRECTIONS FOR THE FUTURE

We produced a music information retrieval system, which automatically classifies musical instruments. We use timbre related features. We propose new temporal features. The advantages of this approach are preservation of temporal information and high classification accuracy. This work contributes to solving the important problem of building music recommendation systems. Automatic recognition or classification of music sounds helps users to find favorite music objects within large online music repositories. It can also be applied to recommend musical media objects of a user’s liking. Directions for the future include automatic detection of emotions contained in music files.
REFERENCES


Opolko, F., and J. Wapnick. 1987. MUMS-McGillUniversityMasterSamples.CD’s
COMMUNITY-BASED PARTICIPATORY RECRUITMENT METHODS FOR AFRICAN-AMERICAN WOMEN

ABSTRACT
Breast cancer is the most common cancer among African-American women. Of all other U.S. ethnic groups, the mortality rate is higher for African-American women; furthermore, African-American women are more likely to die from breast cancer at every age. Despite these facts, many African-American women do not participate in breast health forums or research studies. There are also few nursing research studies that report the recruitment of African-American women into breast health studies. This paper will describe the outcomes of various strategies used to recruit older African-American women into a research study that tested whether a culturally specific breast health forum would increase the women's intention to have mammography screening. Most of the women were recruited to the study by the health ministry, word of mouth, and religious leaders. Social networking, specifically word of mouth, provided the majority of participants. The implication for nursing practice is that the use of community-based participatory recruitment methods may be successful in increasing involvement by African-American women in breast health forums. Further investigation into ways to recruit older African-American women into breast health research studies is warranted.

KEYWORDS: Breast Cancer, African-Americans, Recruitment

HADASSA S. LEGRAND. As a nursing student at the Mary Black School of Nursing, I was approached with the opportunity to do research and broaden my knowledge on African-American women and breast cancer. I was particularly interested in this kind of research because it allowed me to investigate various ways that we, as nurses, can more effectively educate individuals within the African-American community. It was very exciting that we were able to establish a breast health forum alongside some community leaders that would bring awareness, education as well as emotional and social support within the African-American community. The findings of this study will be able to help other researchers as they embark on their research studies. I currently work as a Registered Nurse at St. Francis Hospital in the Intensive Care Unit. My future goal is to obtain a Master's in Nursing and hopefully continue to do research on breast cancer. My hobbies include playing the trumpet and reading. I would like to thank Dr. Gibson for allowing me to work with her on this research and being a great mentor.

DR. LYNETTE M. GIBSON, RN, is originally from Bermuda and is an Associate Professor at the Mary Black School of Nursing on the University Center of Greenville campus. She has earned a Ph.D. in Nursing Science from the University of South Carolina and has published articles in several journals, including: the Cancer Control Journal, Journal of the National Black Nurses Association, the ABNF Journal, and Applied Nursing Research. She has provided scholarly presentations regionally, nationally, and internationally and is often invited to speak on health issues in the community. Her primary research is in the area of health disparities, particularly related to research recruitment strategies, breast health beliefs, spirituality, and breast cancer survivorship. She has had her current research on breast health in African-American women funded through research assistantships and a mini-grant award from the Center for Undergraduate Research as well as the University of South Carolina Magellan Scholars Program. She and two of her research assistants have had been invited to present scholarly papers at regional and national conferences. “I love to participate with undergraduate students in conducting nursing research. I enjoy serving as a mentor and watching them develop academically and professionally. One of my mentors taught me to always reach back and inspire students to excel.”
1. **INTRODUCTION**

The African-American community is a vital community where much research is needed; however, this community is one of the more challenging to reach. Breast cancer research is one area where more studies are needed. Breast cancer is the most common cancer among African-American women (American Cancer Society [ACS], 2009). Of all U.S. ethnic groups, the breast cancer mortality rate is higher for African-American women and African-American women are more likely to die from breast cancer at every age (ACS, 2009). Despite these facts, many African-American women do not participate in breast health forums or research studies. Overcoming breast cancer health disparities is one of the best opportunities we have for eliminating the suffering and death due to breast cancer.

Barriers to recruiting African-American women into research studies exist. Examples include fear, distrust and lack of knowledge (Office of Research on Women's Health [ORWH], 2002). Other barriers include limited resources, financial concerns, low socioeconomic status, previous negative experiences with the healthcare system, and participants’ inability to read and understand informed consent (Knobf et al., 2007). Reactions to the 1932 U.S. Public Health Service Tuskegee study, in which black men were not offered efficacious treatments for syphilis (Adams, 2003; Allen, 1994; Jones, 1993; Seto, 2001) continue to have a profound negative impact on the African-American community (Bates & Harris, 2004; BeLue et al., 2006; Corbie-Smith, 1999; Fouad, et al., 2000; Gamble, 1993; McCallum et al., 2006), resulting in a lack of trust in biomedical research (Meinart, et al., 2003); this lack of trust led to a reduction in participation into research intervention studies. The primary barrier to African-American participation in clinical research is a lack of trust in the researcher (Calderon et al., 2006; Mainous et al., 2006; Mouton et al., 1997; Russell et al., 2008) and being misinformed (BeLue et al., 2006).

Because of the challenges faced in recruiting African-American women into breast health studies, there is a need to use culturally appropriate community based participatory recruitment strategies. In order for successful recruitment it is critical for researchers to understand the study population and be flexible and open to modifying or adding elements that deliberately consider the population (ORWH, 2002). Additionally, the involvement of African-American spiritual institutions is essential to successful recruitment efforts with African-American communities (Meinert et al., 2003). Several researchers emphasize the importance of incorporating religious groups as recruitment because of studies indicating that spiritual and religious beliefs are among the most important influences on decision making in African-Americans (Abrums, 2000; Phillips et al., 1999; Underwood & Powell, 2006).

There are few nursing research studies that report the recruitment of African-American women into breast health studies. This paper discusses the various strategies that were successful in recruiting African-American women for a breast cancer study that sought to measure the effect of using a culturally appropriate intervention called “Save Our Breasts” Breast Health Forum on African-American women’s breast cancer beliefs and intentions to engage in mammography screening.

According to Wilbur et al. (2006), other strategies for recruitment include handing out brochures, community presentations, social networking, and community health fairs. These researchers found that the most effective strategy was social networking or word of mouth. Word of mouth consisted of church and community leaders forming a relationship with a researcher which then built a foundation for a relationship between the researcher and the African-American community. This was essential because recruitment occurred when other individuals heard of the study from an individual they trusted or with whom they had a relationship. The researchers also went into their targeted communities and discussed the study with individuals. Their goal was to establish trusting relationships with the persons they wanted to recruit. In order for successful recruitment, it is critical for nurse researchers to understand the study population, and to be flexible and open to modifying or adding elements that deliberately consider that population (ORWH, 2002).

2. **METHODS**

The research assistant and research advisor met with key African-American women from local churches and community organizations who proposed ways to recruit older African-American women into a breast health study that sought to measure the effect of using a culturally appropriate intervention called “Save Our Breasts” Breast Health Forum on African-American women’s breast cancer beliefs and intentions to engage in mammography screening. The research assistant designed a questionnaire for the research packet that invited participants to place a check mark to identify the way(s) they were informed about the study. The
following items were included: health ministry (nurses and other health professionals that were church members), religious leader, health fair, word of mouth, and flyers. Community networking initiates community engagement, aids in understanding culture, and encourages a trusting relationship between researchers and the target population. Social networking consisted of church and community leaders having a relationship with researchers and in return established a foundation for a relationship between the researchers and the African-American community.

3. RESULTS

The African-American women leaders from the churches and community organizations gave feedback on the language used in the consent form and suggested that the flyers promise incentives. These women believed that more women would be receptive to participating in the breast health forum if they were promised some kind of incentive. The women also recommended using response forms, a letter of invitation and follow-up telephone calls. In addition, they agreed to personally help to recruit women into the study. Of 100 women that were initially approached, there were a total of 34 participants who ranged in ages from 34-78 with the average age being 50 years old. The majority of the women had incomes of $40,000 or more (n=26). The participants’ education level ranged from elementary (n=3) to having a bachelors degree (n=9). Of the 34 participants there were 2 women that were breast cancer survivors, one of 15 years and the other 2 years of survivorship. The majority of the participants (N=9) attained a Bachelor’s degree. Of the participants, the majority learned about the study through their health ministry (n=13). Others learned through word of mouth (n=6), flyers (3), health fair, religious leader/health fair, health ministry/flyer (n=1 each), other (3). Five women had no response. The results are summarized in Table 1.

Table 1 Demographics and recruitment of African-American women into breast health study

<table>
<thead>
<tr>
<th>Age</th>
<th>Education</th>
<th>Income</th>
<th>Survivorship</th>
<th>Recruitment Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>Bachelors</td>
<td>50,000+</td>
<td>15 years</td>
<td>Health ministry 13</td>
</tr>
<tr>
<td>34-78</td>
<td>High school</td>
<td>30,000-39,999</td>
<td>2 years</td>
<td>Word of Mouth 6</td>
</tr>
<tr>
<td></td>
<td>Some College</td>
<td>40,000-49,999</td>
<td></td>
<td>Flyers 3</td>
</tr>
<tr>
<td>Mean</td>
<td>Graduate School</td>
<td>9,999 or less</td>
<td></td>
<td>Combination* 1</td>
</tr>
<tr>
<td>50</td>
<td>Elementary</td>
<td>No response</td>
<td></td>
<td>Other 3</td>
</tr>
<tr>
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<td>No response</td>
<td>20,000-29,999</td>
<td></td>
<td>No response 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10,000-19,999</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Combination= Health fair, religious leader + health fair and/or health ministry + flyer

4. DISCUSSION

The findings of this study were that social networking provided the most participants. Social networking consisted of word of mouth from an individual or group from the African-American community to other community members. The health ministry (nurses and other health professionals who were church members), word of mouth (unspecified), and religious leaders constituted social networking in this study. Building a trusting relationship among community leaders facilitated the recruitment of African-American women into the study. The women were more willing to participate in the breast health forum after they were informed that community and church leaders supported the study. In essence, the research assistant and research advisor formed a relationship with community leaders. In turn, a relationship was formed between the researchers and the community.

A focus group study by Smith et al. (2007) revealed some of the perceptions that African-American women have about clinical research. Most of the women believed that research was biased and used to benefit the European-American community. Most African-American women are motivated to participate by the desire to be altruistic; many will become involved only in research that they perceive can help their community or other people of color or both (Killien et al., 2000). The findings of this study were supported by Smith et al. (2007), who reported that the research team’s involvement in their community encouraged participation from African-American women.
The current findings furthermore are supported by Wilbur et al. (2006) who reported that social networking was the most effective strategy for recruiting African-American women. Word of mouth was essential because the recruitment process occurred when other women heard of the study from a woman who they trusted or with whom they formed a relationship.

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THE INTELLECTUAL AND CULTURAL RISE OF AMERICAN IDEALS: LIFE IN 1930S AMERICA

ABSTRACT

Although two climactic conditions largely affected 1930s America—the Crash of the Stock Market and the Dust Bowl—the need to develop “a collective consciousness [that] serve[d] as our public vocabulary and cultural” identity (Hasian 9) largely impacted the dramatic regeneration of our nation during this turbulent time. A new era that relied heavily on a modernist perspective was born. The beliefs, opinions, and ideas that were promulgated in the 1930s were based on the modernist mentality of the age that was largely affected by technological and scientific advances. One could argue that it was 1930s modernism that influenced the contemporary society of today.

KEYWORDS: 1930s American Cultural Identity, Eugenics in American Thought

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While researching 1930s culture for my Senior Seminar paper, I stumbled across an article on eugenics and became fascinated because I had never heard of this dark area of intellectual thought that dominated America’s cultural perspective and would eventually affect the world at large. Once the paper was started I could not stop until it was thoroughly researched and perfected. I learned much more than what was written in the paper and am thankful for the experience and education achieved by researching this subject.

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1. National Crises and Increased Crime Change Society

The United States had just suffered one of the biggest financial crises of all time—the stock market crash of 1929. Also known as Black Tuesday, the stock-market crash largely affected the 1930s and very much of what happened during this decade was a development of this climactic event. People became homeless and destitute as jobs could not be found to provide for their basic needs.

Shortly afterward life was further impacted by a drought that affected the whole country. In early 1930, most farmers got a good amount of rain that resulted in healthy crops but by the end of that year the ground dried up and turned into dust creating what would be known as the Dust Bowl that lasted until 1936. Drought conditions affected crops and farmland throughout the United States and resulted in “topsoil being blown off barren fields and carried in storm clouds for hundreds of miles” (Ganzel, “The Dust Bowl”). The driest region became known as the Dust Bowl—“southeastern Colorado, southwest Kansas, and the panhandles of Oklahoma and Texas” (Ganzel, “The Dust Bowl”). By 1934, “millions of acres of farmland had lost all or most of the topsoil to the winds” (Ganzel, “The Dust Bowl”). In 1935, with winds being clocked at 60 mph, one of the worst dust storms of the decade blew over several states, leading one Associated Press reporter to comment the day after Black Sunday, “Three little words achingly familiar on the Western farmer’s tongue, rule life in the dust bowl of the continent – if it rains.” (Ganzel, “The Dust Bowl”).

Throughout the Plain States, dust was everywhere. Avis D. Carlson wrote that “People caught in their own yards grope for the doorstep. Cars come to a complete standstill, for no light in the world can penetrate that swirling murk . . . We live in dust, eat it, sleep with it, watch it strip us of our possessions and the hope of possessions. It has become real.” Some effects that farmers recall of these dust storms were seeds being blown out of the ground, it being impossible to “keep houses clean” (Ganzel, “The Dust Bowl”), schools were closed due to dust and children were sometimes kept overnight at the school for fear of them getting lost in the dust—visibility could get down to zero. There were even “cases of ‘dust pneumonia’ where dust clogged the lungs just like the disease” (Ganzel, “Calling off School”). The entire United States felt the impact of the dust storms. A story is told of Hugh Hammond Bennett, one of FDR’s advisor’s, who while on his way to appear before Congress about the need for soil conservation legislation was hit by a dust storm that caused a “dusty gloom to spread over the nation’s capital blotting out the sun” in Washington, D.C. Bennett explained, ‘This gentlemen, is what I have been talking about’. Congress passed the Soil Conservation Act that same year (Ganzel, “The Dust Bowl”).

As farmers lost the ability to support themselves when their crops failed they struck out in hopes of finding riches in California. Mass numbers moved from the plain states, especially from Oklahoma and were referred to as “Okies” by the popular press. They went in search of a better life and many responded to the need by California for migrant workers. However, California soon became overwhelmed by an excess of migrant workers and the situation became so bad that unemployed migrant workers were forced to live in squalor along the roadside in “ditch” communities. In “1936, the Los Angeles Police Department sent 136 deputies to state lines to turn back migrants who didn’t have any money.” Those citizens who were turned away from California were referred to as “Dump Hoboes” (Ganzel, “Okies”).

Hoboes abounded around the country as people moved from place to place looking for work or a new start at life, riding the rails and hitchhiking became popular modes of transportation. Although, “riding the rails was an established practice, it was [both] dangerous and illegal” (Ganzel, “Hitchhiking”). Often, it was the only way that hoboes could get around. “More than two million men and perhaps 8,000 women became hoboes” and “at least 6,500 hoboes were killed in one year either in accidents or by railroad ‘Bulls’, brutal guards hired by the railroads to make sure the trains carried only paying customers” (Ganzel, “Riding the Rails”).

During the depression era, the number of hitchhikers exploded and it was estimated that at least one man in 10 had hitchhiked once in his life. The New Deal saw the mass need for transportation around the country and set up “a Transient Bureau between 1933 and 1936 to run 300 centers around the country to help hitchhikers and hoboes” (Ganzel, “Hitchhiking”). Until this era in our nation’s history, motorists would pick up a hitchhiker out of an act of kindness. However, they were increasingly finding the act of kindness betrayed by the very people that they were helping. What followed was a number of laws to “protect motorists” from “losing money when hitchers got a free ride” (Ganzel, “Hitchhiking”).

As the hardships of this Great Depression were being felt throughout America, criminal activity increased. Gangsters and criminals were made famous as newspapers chronicled their latest illegal activities and
2. INNOVATION AND INVENTIONS HELP TO FORM A NEW CULTURAL IDENTITY

Life was changing as innovation and improvements were being made in all areas of the community. It was during the 1930s that electricity finally made its way to the rural communities. Before that time if you lived in rural America there were no electric lights, radios, air conditioners, electric irons, or washers, and dryers. Stan Jensen says that “in farmhouses and barns, light came from kerosene lamps that were so dim that ‘you almost had to use a flashlight to see if they were on” (Reinhardt and Ganzel, “Bringing Electricity”). Rural families relied on the battery powered radio to bring news and entertainment. And FDR used this to his advantage with “his fireside chats” being a huge influence on Americans. Also, in rural communities, indoor plumbing did not exist. Pumping water by hand and heating it on a wood-burning stove for baths and washing were common practice. Before running water, families used outhouses until the Rural Electrification Act REA groundwork towards an electrified America is made as more and more communities get electricity. And after electricity, came indoor plumbing. The use of electricity made “it possible to pump water into indoor water pipes” (Reinhardt and Ganzel, “Indoor Plumbing”). With the invention of running water and as outhouse pits were filled in, public health got better.

It is surprising that the Great Depression did not have a negative impact on scientific research. In fact, it was exactly the opposite as atomic physics, industrial and business changes and innovative inventions changed lives for Americans. Some of these inventions are radar for aircraft, the radio telescope, the electron microscope, the helicopter, the jet engine, magnetic recording, sticky tape, and synthetic rubber. In addition, the invention of a material called plastic promised to be the “miracle” of tomorrow as an agent of change. It was hailed as the “epitome of modern design” (American Decades: “The 1930s: Science and Technology Overview”). America entered “a new ‘plastic age’ in which everything, including homes, might be mass-produced at cheap prices” (American Decades: “The 1930s: Science and Technology Overview”).

At the California Institute of Technology and Columbia University the practice of atom smashing was leading to groundbreaking new achievements in physics. In 1933, Einstein emigrated to the U.S. and in 1939 he wrote a letter to Roosevelt recommending the development of the atom bomb.

Although the origins of television started in 1844 with the patent to a German inventor, Paul Nipkow for “an image-sensitive disk”, it was not until 1931, that it was “tried out in ‘public’ experiments”. Shortly afterward, “President Franklin D. Roosevelt became the first American Leader to appear on television as he opened the [New York World’s Fair] exhibit” in 1939 (Desyon, Television). This modernist mentality was echoed at the New York World’s Fair that advertised with the phrase “Building on the World of Tomorrow” and emphasized the “successes of scientific research” (Welcome to Tomorrow). Mankind was indeed scaling new heights with regards to inventions and innovations. The Empire State building was completed in 1931 and was the tallest building in the world at 1,250 feet tall.

An American Decades article entitled, “The 1930s: Science and Technology Overview”, states that it was during the 1930s that America first published accounts of how to achieve the perfect utopian society. Technology and science replaced religion and revolution in American thought as new inventions were viewed as a means to provide answers to life’s problems.
3. THE TRANSFORMATION OF AMERICA’S CULTURAL IDENTITY

A document that is still referred to today as the basis of progressive education is The Humanist Manifesto, written “in the May-June 1934 issue of the New Humanist” (Kurtz). It basically “sought to offer an alternative for people unwilling to rely on religion for an explanation of life and its meanings” (Kurtz) and called for a rejection of supernaturalism in exchange for a scientific viewpoint as to the origins of creation/man. It went on to say that “people should consider, the complete realization for human personality to be the end of man’s life and [seek] its development in the here and now (Kurtz).” It then went on to oppose capitalism. The Manifesto sparked a debate against what conservatives were calling liberalism. They linked the Manifesto to Dewey’s ideals for secularism in education reform and “progressive education” (Kurtz).

Education reform took root as new schools were built and the government paid teachers and taxes to keep them running. Prior to and during the early 1930s some schools were still using the one-room school house that had children from several grades in one classroom. They were often taught by a teacher not much older than them. In some rural communities, teenagers had to quit school to work the farm. In addition to this, The Works Progress Administration WPA helped school children by providing health services and school furniture, as well as a school-lunch program to feed needy children while in school. Education reform became a topic for political discussion in this era. Not only did education undergo radical changes but teaching children to read became a primary goal of educators. Dick and Jane books became popular learning implements for young readers. And in 1931, the first Dr. Seuss rhyming book was introduced. Young girls read Nancy Drew and children of all ages read about Superman in Action Comics. The adventures of Flash Gordon, Dick Tracy, and Terry and the Pirates were enjoyed in newspaper comic strips.

Along with education reform the nation underwent a dramatic transformation of cultural identity as “the model of culture as the best of man’s intellectual and artistic achievements lost its preeminence and became more accurately a description of ‘high culture’” (Gorman). In 1931 British anthropologist, Bronislaw Malinowski’s theory of functionalism as the basis of culture was widely accepted by intellectuals of this time (Edwards and Neutzling) and in 1931, his “radical definition of culture appeared in the Encyclopedia of Social Sciences” (Gorman). He suggested that there are four basic “instrumental needs” (economics, social control, education and political organization) that require institutional devices” (Edwards and Neutzling). Russell Nye describes functionalist mentality in, “The Thirties: The Framework of Belief,” and states that philosophers like Malinowski “ceased believing in a ‘single universal constant’ called ‘human nature’ and instead came to believe a more ‘systems-thinking model’” to culture to hold men together that relied on the “totality of institutions, adjustments, beliefs, and values” to create a single whole of cultural identity (1).

It was during the 1930s that government took on a larger role in America life. Our government grew larger in response to America’s need. It reformed itself by implementing new programs to provide for citizens’ needs while restructuring it to gain more control. American government would never be the same.

In an effort to recover from the hardships imposed by the stock market crash and the drought of the dust bowl, many new foundations were set up to help bring order and stability to a shaky economy and a broken America. In an effort to revitalize the country, President Roosevelt established several new branches of government. Some of those agencies were under the Umbrella of the New Deal programs. Among these were the Agricultural Adjustment Act (AAA) of 1933 that gave farmers payments in exchange for taking some of their land out of farming and not planting a crop; the Civilian Conservation Corps (CCC) of 1933 that employed individuals to build roads and parks, replant grazing land, renovate historic buildings and string telephone lines; the Farm Security Administration (FSA) of 1935 and 1937 that loaned money to farmers to purchase needed farm equipment; the Soil Conservation Service (SCS) of 1935 to prevent soil erosion; and the Rural Electrification Administration (REA) that made direct loans and guarantees to electric companies so they could service rural areas. In addition to these, the government set up The Social Security Act of 1935 to provide for the elderly and the Securities and Exchange Commission.

The philosopher, Adam Smith, wrote in The Wealth of Nations, a book that largely affected early twentieth century culture that:

“civilization deals with what Joseph Spengler has called the problem of order, requiring continuous readjustments between freedom (or autonomy) and control, continuity and change, and hierarchy and equality. Each such philosophy encompasses not only freedom or continuity, but also the systematic
However, not only did American politics change to handle the crisis in America, but society changed as we struggled to identify ourselves as a country. American Identity was thus being revealed as western culture latched onto modern philosophy and a new ideal was formed. Americans believed that they could reshape their identity into a civilization of intellectually superior people, although some sought to do so forcefully.

In an effort to understand what shaped the mentality of U.S. citizens in the 1930s, it is important to look back at the foundations of what led to the misperceptions of racism and social order. The changing viewpoint of America starts in the late 1800s with Gregor Mendel’s theory of heredity in which his study of pea pods led to a predication that they have “dominating” and “recessive” traits. In his experiments, whenever he crossed the smooth pod with a wrinkled pod, the “trait for the wrinkled skin dominated” (Black 26). This would later become a human simile advocated by the elite society against the weak or any individual that they considered unworthy of existence. Later cellular biologist, August Weismann used the term germ-plasm to describe his discovery under powerful microscopes of a cell nucleus that held all the physical and mental characteristics of heredity contained with it.

In 1883, Charles Darwin's cousin, Sir Francis Galton first coined the term Eugenics which literally means “well-born” (Black 16) and would write many books in which he claimed that “human mental abilities and personality traits, no less than the plant and animal traits described by Darwin are essentially inherited” (Kuhar). He “reasoned that talent and quality were more than an accident” and that “two-people of bad blood would only create progressively more defective offspring” (Black 15, 17). The term eugenics was ambiguous and provided an outlet for respectable Anglo Americans to invoke it openly regarding social issues that concerned them. It was spoken in any number of “reputable communities [by individuals who] heard speeches and read articles by presidents, public health officials, social scientists, literary critics and laypersons” (Hasian 14). The ‘Eugenic Creed’ was so deeply ingrained into early twentieth-century culture that it became a “form of discourse that influenced the way ordinary citizens gave meaning to their lives” (Hasian 14). However, Galton realized that his work was fallible and advocated caution and more study into his theory. Unfortunately, people who were looking for justification to rid the world of those they deemed inferior regarded the works of Mendel and Galton, among many others who would follow, as fact. Now they had scientific justification for their hatred.

The idea grew and traveled to America where early twentieth-century education pioneer John Franklin Bobbitt stated in a 1909 article in “Practical Eugenics” that “the blood of the race [should] be kept high and pure, like mountain streams [and] society . . . must prevent the weaklings at the bottom from mingling their weakness in human currents.” Eugenical articles in newspapers, journals, and books contained advice on marriage, divorce, and most importantly, how to deal with race “poisons” (Hasian 31).

A 1933 article featured in, Margaret Sanger’s Birth Control Review, entitled “Eugenic Sterilization: An Urgent Need”, by Ernst Rudin, founder of the Nazi Society for Racial Hygiene and Hitler’s Director of Genetic Sterilization, “demanded that the ‘lower strata’ comprised of ten million Americans be involuntarily sterilized en masse”(45).

In her 1936 book, The Passing of the Great Race, Madison Grant, Eugenic spokeswoman and American Museum of Natural History trustee, writes that Nordics are “the white man par excellence” (Black 29). Thus, the groundwork toward modernization and the loss of individual freedom toward those individuals deemed unworthy were first made willingly by people who viewed themselves as elite. They would be the ones who would try to explain the “immutable physical, biological, and social differences between ‘race’ and ‘class’” (Hasian 22) to justify hatred and racism. Whether viewed as good by the elite, or bad by those labeled as unfit, eugenicism was felt by every U.S. citizens during the 1930s. A new form of rhetorical discourse arose whereby the ideals of American culture as they pertain to both time and place was revealed through eugenic thought—better known as the ‘Eugenic Creed’ (Hasian 14).
4. SCIENTIFIC EXPLANATIONS TO JUSTIFY RACIAL AND SOCIAL CLASS PREJUDICES

Science and reason in the 1930s by intelligent man provided a basis for “influential and eloquent thinkers” to name their race and class bigotry as a new science—negative eugenics (Black 31). Aided with millions of dollars, the Carnegie Foundation was set up “to encourage, in the broadest and most liberal manner, investigation, research, and discovery, and the application of knowledge to the improvement of mankind” (Black 31) and it would quickly set up a program to cut off “defective germ-plasm” (Black 32).

A zoologist, Charles Davenport, working for the Carnegie foundation in the Cold Springs Harbor Research Laboratory would eventually speak to the American Breeder’s Association about the need to “emphasize the value of superior blood and the menace to society of inferior blood” (Black 39). He created a “Family Record” questionnaire to “devise methods of recording the values of the blood of individuals, families, people, and races” (Black 44, 39). Thereafter, the Eugenics Record Office (ERO) would be formed and would remain in effect until 1938 when the name would change to the Genetics Record Office. Then in 1939, the Carnegie Institution who oversaw the ERO would quietly begin to “immediately and systematically dismant[le]” it. (Black 395).

In the first couple of decades of the twentieth century, “thousands of families eagerly filled out their ‘Record of Family Traits’ and rushed to mail them to eugenics for analysis by Davenport or other experts stationed at the Cold Spring Harbor Research Laboratory on Long Island (Hasian 31). Scientists then made sure of the quality of their ancestors and the future genetic superiority of their children. “The study of eugenics involved not only scientific rationalizations of class and race prejudices but also explorations of how men and women of the modern era were to accommodate to changing standards of sexual and reproductive behaviors”. In fact Margaret Sanger, who was born in an era of big families—one of eleven children—when motherhood was viewed as being a most “sacred role”, advocated and traveled across the nation promoting birth control. As a eugenicist, she encouraged more children for fit families and less for unfit families (Hasian 5).

Edwin Black states in his book, War Against the Weak: Eugenics and America’s Campaign to Create a Master Race, that “the racial purity and supremacy doctrines embraced by America’s pioneer eugenicists were not the ramblings of ignorant, unsophisticated men. They were [instead the] the ideals of some of the nation’s most respected and educated figures, each an expert in his scientific or cultural field, each revered for his erudition” (Black 31).

Perhaps it was because of this new age of thinking mankind’s intellectual superiors became overly concerned with perfecting the human race through the removal of any individual whom they who were deemed “unfit” (Black). In an effort to “create a superior Nordic race” (Black), eugenicists tried to control human mating and marriages to improve the humanity. Those people who had “unfit human traits such as feeblemindedness, epilepsy, criminality, insanity, alcoholism, pauperism, and many others” (Kansas State Fair) were labeled as inferior and involuntarily sterilized.

In his book, The Rhetoric of Eugenics in Anglo-American Thought, Marouf A. Hasain, Jr. states that “most Anglo-Americans heard about [eugenics] from the time of their infancy” and as “the word entered the public vocabulary it colored the way people perceived themselves and those around them” (30). People latched onto eugenics as an applied science when in reality there was very little evidence to back these theories up. Documents were misfiled, information was crafted collected and notably changed, and evidence was tampered with in order to justify racial and social class prejudices and sterilize and sequester those individuals who did not fit the upper-class, white ideal. Often authority figures misrepresented evidences to fit “their own personal, social, or economic agendas” (Hasian 31). He goes on to say that children born in the early decades of the twentieth century had no way of “escaping the rhetoric of eugenics” and “even before they were born, they themselves were objects of controversy and attention” (Hasian 35). That is because parents themselves were brought up with this doctrine. For many Anglo-American children, growing up with eugenics was a way of life, a perspective that informed a person’s everyday social interactions, thus a cultural identity for many Americans.

Those scholars and intellectuals even promulgated this idea to include competitions for the “fitter family” at state fairs with tests to determine which families “produced strong, healthy, intelligent children” (Kuhar). One brochure stated that, “this trophy and medal are worth more than the livestock sweepstakes or a Kansas Oil Well. For health is wealth and a sound mind in a sound body is the most priceless of human possessions”
In his book *The Rhetoric of Eugenics in Anglo-American Thought*, Marouf A. Hsain, Jr. explains that more than just “fitter families” and determining who were in those families was accomplished by this rhetoric. Indeed, it shaped a cultural identity whereby racism was encouraged by everyday citizens and wholesome families “trying to prove their fitness” (44). The process was set for them to legitimize the practice of and belief in a social construct of elitism. Fairground and exhibits throughout the country routinely set up charts showing the “differences between ‘normal’ and ‘abnormal’ children.” Fairgoers could follow out their ancestral lines to watch the hereditary power of the germ-plasm within their own families. These displays then went on to remind them that “unfit human threats such as feeblemindedness, epilepsy, criminality, insanity, alcoholism, pauperism, and many others run in families and are inherited in exactly the same way as color in guinea pigs.” Farmers questioned why they were so careful with the pedigrees of pig and cattle, yet failed to breed children choosing instead to “leave the ancestry of our children to chance or to ‘blind’ sentiments” (44).

5. EDUCATING THE YOUTH OF TOMORROW TO ENSURE SUPERIOR GENE POOLS

The National Education Association insisted that biological determinism be taught in school curriculums to “make sure that Americans understood the importance of racial ‘well-being’” (Hasain 36). Biology textbooks pointed to lower class degenerates such as Kallikaks and Jukes and labeled them the “true parasites” and focused on the eugenical superiority of the likes of Darwin and Bach (Hasain 36). Growing up in eugenics America in the first decades of the twentieth century, children were “constantly bombarded” (Hasain 37) with eugenic ideology. Alfred Binet invented the IQ test to determine if “mental retardation” was present in children and textbooks were screened to promote eugenics in the classroom. It was believed that mental defects were the result of “germ-plasm inherited from his or her parents as the cause of ‘adverse social status, criminality, or general ‘social maladjustment’” (Garland, “Eugenics”).

Therefore, parents were encouraged to make good unions and marriages. One commentator wrote in the *Nation* that “the study of eugenics was about ‘happiness’ and this involved moving beyond ‘social control that may improve or impair the racial qualities of future generations’ to a ‘broadened’ endeavor that heightened the ‘dignity’ of parenthood and ‘civil responsibility in general’” (Hasian 35).

An effort was made to create a new future for tomorrow’s children, one free from the burden and responsibility of the lower class. During the 1920s, steps were taken to ensure that the children of tomorrow would be educated to seek the best gene pools that would result in superior offspring. An article appearing in the British publication of the *Forthnightly Review* summarized the thought process of those in control of educating children in an effort to “stamp out” degeneracy. It stated that:

> Some knowledge of the newest of all sciences, eugenics, could advisedly be laid before the children in a simple, careful, and well-thought-out way. It is so easy to interest little people in the mysteries of botany and with that foundation everything can be kept pretty, poetic, and charming, yet true to nature, while the children’s minds are led along the lines that will finally result in their acceptance of the great truths of heredity and eugenics (Hasian 35).

This thought was also promulgated in English and American secondary schools that were “filled with the tales of Eugenics” because the belief was that “some of the most persuasive ideologies are those we adopt when we are young” (Hasian 35).

In the early twentieth century a movement was created and children were reared with the knowledge of the need to protect the “well-born” (Hasian 30). By the 1930s, these ideas were so ingrained in American culture that there was no turning back.

The early boy-scout literature *Handbook* of Baden-Powell was strongly influenced by eugenics with one copy stating that “misfits are among life’s most common tragedies . . . the annual loss to society amounts into billions but greater still is the loss to the individual—the undermining of his confidence and hope which robs him of his power.” Indeed “at its inception it was used to inculcate in the lower classes the values and ideals of the more privileged members of society.” Young readers of American boy-scout literature that was written by eugenicists were warned not to become a “parasite” by becoming part of the “submerged tenth” of society (Hasian 41-42). By the 1920s, “it was estimated that there were almost a million scouts in the United States.
alone” (Hasian 41) and that strongly influenced the boys who would become young men of the 1930s. They would be indoctrinated into believing in a lower class of citizens and a higher social order of heredity. As stated in the Handbook for Scoutmasters, “scout leaders were advised that the ‘heredity’ of the boy is a heritage which accompanies him into life. It is a fixed influence limiting the boy’s possibilities. The scoutmaster cannot change it (emphasis in the original)” (Hasian 41).

6. AN IN-DEPTH LOOK INTO 1930S DOGMA IN TEXTBOOK IDEOLOGY

The perception that children should be taught to believe in certain dogmas led to a perpetuation of a supercilious egotism that was developed through our education system in early elementary schools and carried throughout college. In a 1932 children’s textbook for use in elementary and middle schools entitled, The Simms History of South Carolina, written by Mary C. Simms Oliphant that “served as a primary textbook for generations of students” (Furman), white supremacy and social elitism are sometimes very openly apparent to the adult reader. However, to the influential mind of our innocent and naïve youth, these racist ideologies would not be so obvious. Often children are trained to believe that what is written in our textbooks is indeed fact.

To truly examine how ingrained the mentality of a period is, one has to look at an object that reflects that culture. The Simms History of South Carolina is only one of several books/textbooks that truly show how rampant racism was pushed on our youth to influence young minds. It has an obvious slant towards those who are fine wealthy families being the elite who are forced to care for the poor families. Ms. Simms Oliphant states that only poor people went to free schools that were “really [set up] for the benefit of the children of the poor” (Simms Oliphant 260). She goes on to say that “poorer people would have fared badly had not many communities made contributions to the free school funds” (Simms Oliphant 260). The better class educated their children at home “by means of private schools, tutors, and colleges at home and abroad” (Simms Oliphant 260). Wealthier children of South Carolinians whom were often the children of plantation owners, received splendid educations at home often hiring “tutors and governesses to live in their homes and teach” them (Simms Oliphant 260). It was the wealthy whose children went on to England or the continent for a higher education—again often the sons of plantation owners. A brief note should be inserted here about the fact that women’s equality is not yet reflected in this section as Ms. Simms Oliphant only mentioned the “boys” going off to school here (Simms Oliphant 260). It would indeed be many years until women were viewed as more than homemakers, wives, and mothers. In 1930s culture, this was considered a privilege and duty of women. Although some were outspoken in wanting more, it would be many years until the desires of modern femininity would come to fruition.

Ms. Simms Oliphant also speaks very negatively about African-Americans—at that time referred to as negroes. Indeed, not one mention is made throughout the whole book of negroes in a positive light. However, every mention is made of ‘negroes’ negatively. They are referred to as liars, thieves, criminals, evil doers, etc. In a chapter entitled Progress and the Mexican War, Ms. Simms Oliphant has the audacity to say that due to the ownership of slaves there was very “little poverty or actual suffering in the State”, only those poor whites—again a reference to class—who could not afford slaves were disadvantaged as they could not compete with the great number of slave owning plantations at that time (Simms Oliphant 192).

After Congress declared the State restored to the Union, Ms. Simms Oliphant explains to pupils that South Carolina entered “the darkest and bitterest period the State has ever known for the next nine years (1868-1877) when it was governed by a set of thieves and plunderers”—i.e. Republicans (Simms Oliphant 244). She explains that half of the legislatures were black people who could neither read nor write. Then in the very next line she states that “the State’s money was stolen by the legislatures” forcing higher taxes upon its citizens.

In the next chapter, Overthrow of the Radicals, she refers to the Klu-Klux Klan as only responding to the “dreadful condition of affairs forced [upon] the white people of the State [and had] to organize secretly for their own protection”. Thus, small bands were formed to frighten the negroes from the criminal activities that “increased greatly” due to the “thieving Radicals or Republicans” arming “companies of negro soldiers” and “refusing companies to be formed by white men.” She goes on to state that “houses were burned during the night” and “white women were often insulted if they appeared alone on the streets” because of the arming of negroes (Simms Oliphant 245).
Ms. Simms Oliphant’s biases attack both the poor and the negroes in a story about two negro commissioners of Barnwell and Richland counties who were “poorly educated” men that could barely read and write. After being appropriated $300,000 to run schools from 1871 to 1872, they stole every cent. According to the textbook the system was so corrupt that Jillson, the “white” superintendent, was helpless to overcome it. Only after the “scalawags” (southerners with Union sympathies) and the “carpet baggers” (northerners who moved to the south—often carrying all of their belongings in a carpet bag) were gone, did Colonel Thompson, State Superintendent of Education, “bring order out of fearful confusion into which the school system had fallen during Radical rule” (Simms Oliphant 262). It was after this removal of Radical rule that a law was passed to have separate schools for blacks and whites thereby resolving the school problem.

The biases in this book run so deep that it is laughable that she was applauded, commended, and praised for the writing of it. Even into the late 1980s, articles in newspaper clippings were written with great fan fare about the historical legacy of Ms. Simms Oliphant and her contributions to South Carolinian history. Finally with regards to race and class, she goes on to talk about the great acts of soldiers and prominent citizens who influenced and/or impacted South Carolina—none of these individuals are poor or black and all come from prominent families. Indeed, it is all about prestige and class.

The concluding chapter of the textbook entitled, Social Development, encourages children to think about whether the state should spend great sums to build a fine school system. Then it questions whether or not children should be forced to go to school after the State has paid for their education and who would monitor their attendance. Moreover, it asks them to consider how the “State should care for the feeble-minded and the very poor” (Simms Oliphant 299). She encourages students to think about the right to vote, the treatment of criminals, and state decisions in citizen’s health care. Moreover, the question of liquor—or alcoholism as it is known by eugenicists—Ms. Simms Oliphant says is “one of the most troublesome and social political problems” (Simms Oliphant 301). Then she addresses moral issues such as care of the insane and those with nervous diseases—many of which we now know are neurological problems that can be maintained/cured with medications—and talks about the goal of restoring mental abilities so that these individuals may in time return to their homes. “County Almshouses”, or homes for the poor, should also be considered when thinking about what the State does to provide for its citizens (Simms Oliphant 303). It concludes with:

*You boys and girls will soon be men and women. You should feel that it is your pleasure and duty to take the lead in helping the development of your State. This book has told you how, in all periods of our history, South Carolina has produced fine and honorable men and women. The time has nearly come when you will be called upon to do your part in the future history of South Carolina (Simms Oliphant 305).*

These statements are interesting because if you look back to the role of eugenical thinking, you will see the same sentiments reflected there. The only difference is that the answers are not hinted at as in The Simms History of South Carolina. Instead they are specifically stated in the Kansas City Fair displays that reminded people of the “unfit human threats such as feeblemindedness, epilepsy, criminality, insanity, alcoholism, pauperism, and many others” such as being of a minority group as being not good enough to be a part of the elite class (Hasian 44).

As for Ms. Simms Oliphant, for her role in making such a “lasting impact on [the] education of thousands of South Carolina students” she was given an honorary Doctor of Humanities from Furman University (Furman). In a 1958 newspaper article, when asked about the final work she was completing on a state history textbook, Ms. Simms Oliphant stated “If students don’t like her New History, she [would] rate it a failure” (Walker). She then contributed her biggest influences to her grandfather whom, she says, strongly influenced everything she wrote having “told her a wonderful story [that] left an impression on everything [she’s] done” (Walker). It is interesting to note that her grandfather was a prominent citizen who kept records tracing the family’s elite heritage back several generations and was also a well-known slaveholder whose home was burned near the close of the civil war. Perhaps that is why we see so much social elitism and outright racism mixed with colonial views of “scalawags”, “carpet baggers”, and radical republicans. His sentiments surely rubbed off on his grandchild, Ms. Simms Oliphant, and are largely reflected in this textbook. It would be a stretch by any means to consider it a non-biased review of the history of South Carolina.
7. Modern Examination of the Errors in 1930s Mentality and its Consequences

Today, the writers of textbooks do not want to look too closely at the fact that the American ideal of equality has, perhaps, never existed and may never come to fruition. James W. Loewen, author of the book *Lies My Teacher Told Me*, suggests that there are a host of reasons why our textbooks omit troublesome facts, those being “pressure from a ‘ruling class’, pressure from textbook adoption committees, the wish to avoid ambiguities, a desire to shield children from harm or conflict, the perceived need to control children and avoid classroom disharmony, [and a] pressure to provide answers (25).” I would venture to say that there is a prevailing need to control the ideas and ideals of our youth.

Control was also the issue with eugenics. There was a need by those in authority to control their environments through modernistic and scientific thought. There was also a necessity to control a nation in crisis as dramatic changes to the economy and agriculture caused doubts. But most importantly there was a drive to become better than ourselves—a want to be above the rest both as individuals and as a nation. America sought to pave the road to intelligence through indoctrinated thought based on theories of the elite that became common place ideologies that reflected American culture. In light of all of these factors and we will never know, but perhaps because of them, mankind envisioned a utopian society and the rhetoric that they used engaged Anglo-American thought, resulting in their beliefs being forced upon those citizens deemed inferior.

Marouf A. Hasain, Jr. states that “Not all humans articulate their concerns in terms of propositional logic and yet they often are willing to take drastic actions on the basis of their belief in the importance of a few highly evocative words”. The use of language to motivate and inspire can influence people towards actions they otherwise might not have taken. Key words, such as ‘liberty’, in public or private deliberations shows that the apparent "reality of a situation" is just as important as the real one is “to motivate humans to act out social dramas that may make sense only when we understand the power of ideographs” (Hasian 9).

Anglo-Americans and others “believed that the existence of socially stratified communities seemed to provide natural evidence to the immutable physical, biological, and social differences between ‘races’ and ‘classes’. However, those who found themselves living ‘eugenically’ questioned the “necessities of life demand[ing] that there be an abandonment of the right to reproduce or the liberty of avoiding sterilization” (Hasian 22).

It is interesting to note that Harry L. Laughlin who authored the Model Sterilization Act and made it available to "state and foreign governments" became:

*Germany's Hereditary Health Law in 1933. In appreciation, he was awarded an honorary degree from Heidelberg University in 1936. After World War II, defending the forcible sterilization of 2 million people, Nazi lawyers cited this law and pointed out that the U.S. Supreme Court, in *Buck v. Bell*, had declared such laws constitutional (“Buck v. Bell”).*

By 1940, some 35,878 people were forcibly sterilized or castrated (Black 123) for feeblemindedness, epilepsy, criminality, insanity, alcoholism, pauperism or any other defect that they could think of to justify their racism.

Thirty U.S. States have laws that lead to over 60,000 cases of sterilization (Black xvii) to be forced upon people of whom Justice Oliver Wendell Holmes said that by doing so we would prevent society from “being swamped by incompetence” (“Buck v. Bell”). Indeed, his popularity grew so much that in 1931, the celebration of his 19th year as a Justice of the Supreme Court was broadcast across the nation and speeches heralded him as “America’s most respected man of law” (Black 119).

What is hard to fathom is that during the depression era, people became virtual paupers overnight. Who was there to stand up for them and on what grounds did they have to be forcibly sterilized? When Germany’s infamous Nuremberg Laws (1935) came under criticism of the world, the United States’ opinion started to turn.

Although eugenics was a form of rhetorical discourse that represented the ideology of a cultural time and place—1930s America, their effects would be felt well into the 1970s. By 1938, the Carnegie Foundation in response to increased Nazi violence and agitation spreading throughout Europe and in an effort to “completely cleanse the continent of Jews” (Black 393) and the “highly publicized atrocities” of the Nazis'
invasion of Poland that would ignite WWII, the Eugenics Records Office was permanently closed. However, it still existed in some sense even if just to maintain records. Only now it was referred to as the “Genetics Records Office” or sometimes simply the “Records Office” (Black 396).

Unfortunately, the laws put into effect by eugenic America were still on the books and still are today. Legislation has never been passed to overturn them. Although they are not currently enforced, sterilization of 15,000 Americans would occur during the 1940s, 10,000 in the 1950s, “thousands more in the 1960s”, and there would still be cases in the 1970s (Black 398). An accurate number would be hard as some were small children who were never told that they were getting the procedure, only that they were having a surgery for their health. However, it is estimated that almost 70,000 individuals were sterilized in the United States during the “first seven decades of our century” (Black 398).

8. HAVE WE REALLY CHANGED?

In conclusion, the utopian ideal of the 1930s would both haunt and entice American thought. Various agencies, publications, and websites, among many other sources, advocate and promote a return to eugenicism. Books are still being written about how we could solve life’s problems by eliminating the defective and unwanted. The modernist mentality of the twentieth century has never really left. Indeed, they have only become more alarming as scientific and medical advances present the very real possibility of a genetically engineered race of individuals.

A 1979 article entitled “Biology and Social Order” in The Human Life Review, written by Robert A. Brungs, calls for a plan to remove all eggs from adolescent girls and obtain sperm samples from adolescent boys. After this “harvesting’, teenagers would be neutered” (Chapter 105 – “Eugenics”). The harvested egg and sperm sample then would undergo a battery of tests and “only the ‘best’ would be kept for future implantation in mothers deemed ‘fit’ for the task.” Randall Craig Fasnacht agrees in his 1992 book, Life Child, The End of Poverty, stating that the “licensing of parents will solve poverty and all of man’s other ills” (“Chapter 105 – Eugenics”). He alleges that the National Debt will be erased by 2020 if only “fit” parents had children. According to Fasnacht, this would also eliminate “crime, illegitimacy (of course!), unemployment, school dropouts, drug use and teen pregnancy” (“Chapter 105 – Eugenics”).

Regarding 1930s mentality, what C.S. Lewis writes in his book, The Screwtape Letters, correctly summarizes the mentality of the elite. He states that “dens of crime” are not those perpetrated by people who are obviously evil, instead they are the actions of “quiet men in clean, carpeted and well-lighted offices, by quite men with white collars and cut fingernails and smooth-shaven cheeks who do not raise their voices” (Lewis, Preface ).

REFERENCES


PERSONAL REVELATIONS

ABSTRACT

Recent research indicates that people have different ideas concerning what type of information they feel is most revealing depending on whether they are the ones judging personality or the ones whose personality is being judged. Specifically, disclosers believe that telling someone about his or her values is substantially more informative than discussing less important individuating information, while receivers of information downplay this difference in quality (Pronin, Fleming, & Steffel, 2008). The present study attempted to determine whether the disclosers’ suspicions are correct. Small groups of participants mutually divulged either core personal values (e.g., my religion is very important to me) or interesting individuating facts (e.g., I like to ride horses) and then made personality judgments about themselves and the other group members. We then compared the discloser’s self-rated personality traits to trait judgments made by his or her fellow group members. We found that neither condition provided a clear general advantage in obtaining self-other agreement. However, it does seem that these two types of information are differentially informative depending upon the domain of the trait judgment.

KEYWORDS: Self-disclosure, Values, Actor-Observer, Asymmetric Insight, Personal Facts

CODY BROOKS. Dr. Beer approached me about gaining research experience in his personality assessment lab while I was taking his personality psychology class during my junior year at Upstate. I found the research concept very interesting and was eager to begin working with him. While working on the project I was able to deepen my understanding of the personality psychology research process that we were learning about in his classroom. I am very thankful to Dr. Beer for providing me the opportunity to gain such a vast amount of specialized training in personality psychology research. I was excited to showcase our work at the SC Upstate Research Symposium and enjoyed discussing our findings on the effect that various types of personal revelations have on the accuracy of personality judgment. I currently work as a marketing associate for Vessel Medical and plan to eventually pursue graduate study in either the field of personality or social psychology. Wherever my professional and academic endeavors take me I know that I will always be able to attribute a great deal of my thirst for intellectual attainment to the experience I gained in Dr. Beer's research laboratory and classroom.

DR. ANDREW BEER is an Assistant Professor of Psychology in his 4th year at Upstate. He has earned a Ph.D. from the University of Iowa and has published articles in several Journals, including: Journal of Personality, Journal of Research in Personality, Journal of Personality Assessment, Journal of Personality and Social Psychology, and Science. His research focuses mainly on personality assessment—specifically judgments of personality made in early stages of acquaintance. His published work highlights aspects of situations that foster accurate first impressions as well as the nature of the personality judgment process as it occurs in the person perceiver. Dr. Beer enjoys working with undergraduate students with professional academic aspirations and has a research program designed to incorporate interested students at all phases of the process.
1. INTRODUCTION

To build interpersonal relationships with strangers requires one to obtain certain information about them in order to learn who they are, what they are like, and ultimately, what sort of typical behavior to expect from them. Thus, building interpersonal relationships involves learning about personality. What does the process of learning about someone's personality entail? What information needs to be gathered in order to accurately judge someone's personality? There is an extensive collection of literature in personality and social psychology aimed toward addressing these intriguing questions (for a review, see Funder, 1995).

One interesting finding from social psychology is that individuals tend to believe that revelation of personal values helps others judge their personality more easily than more mundane, though perhaps individuating, information. In other words, revealers believe that information related to values is crucial to others' ability to understand them, whereas other types of information are largely useless. However, from the judge's perspective, things are slightly different. While judges agree that values are more informative than other personal facts, they view other facts as more important than the revealer does, and values as less important than the revealer does (Pronin, Fleming, & Steffel, 2008).

This begs the question: which type of information actually fosters more accurate personality judgment? Actors (or revealers, in this case) and observers (judges) do not always agree about what type of information is most relevant in judging personality (Andersen & Ross, 1984; Pronin, Kruger, Savitsky, & Ross, 2001). The present study was designed to assess the usefulness of these two types of personal information in judging personality.

Perhaps the best way to begin understanding personality perceptions of strangers is to examine how people perceive personality in those with whom they are well acquainted. How accurate are individuals in judging the personality of close others? The acquaintanceship effect suggests that as people get to know each other, they become better judges of each other's personality (Beer & Watson, 2008).

The purpose of the present study was to examine individuals' ability to make personality judgments of others based on different types of personal information they receive. Value revelations were compared to the revelations of interesting and distinguishing facts. We intended to decipher which type of information leads to greater accuracy in personality judgment.

2. THE PRESENT STUDY

2.1 Method

Three hundred thirty-six USC Upstate students participated voluntarily in the study. Subjects were recruited primarily through the Psychology Research Participant Sign-up System (SONA) at USC Upstate in exchange for introductory level Psychology research participation credit.

Participants met in small group sessions (approximately 2-5 per group). They completed a self-report version of the Big Five Inventory (BFI; John & Srivastava, 1999). Then, they either a) provided three of their most important values or b) three interesting and unique facts about themselves.

After providing all the requested personal information, participants revealed their values or interesting facts to the remaining group members. Observers then utilized the targets' personal information to complete peer-rated versions of the BFI pertaining to the target's personality.

2.2 Results

Table 1 provides descriptive statistics for all of the Big Five traits subdivided by condition and self versus peer ratings.

Table 2 provides self-other agreement correlations by condition. Self and peer ratings were compared to calculate agreement correlations (the extent to which a self rating of someone correlates with averaged peer ratings of that person). A review of Table 2 clearly demonstrates that neither condition presented a clear advantage in terms of overall self-other agreement. However, it is intriguing to observe the differences in agreement correlations for various traits across conditions. For instance, self-other agreement for
neuroticism increased considerably in the core values condition compared to distinguishing facts. Conversely, mundane facts seemed to result in greater self-other agreement for conscientiousness.

Table 1. Descriptive Statistics Subdivided by Condition and Self Versus Peer Ratings

<table>
<thead>
<tr>
<th>Variable</th>
<th>Self</th>
<th>Peer</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>21.92 5.76</td>
<td>21.23 3.32</td>
<td>.15</td>
</tr>
<tr>
<td>Extraversion</td>
<td>27.74 6.52</td>
<td>26.16 6.04</td>
<td>.25</td>
</tr>
<tr>
<td>Openness</td>
<td>35.07 5.81</td>
<td>33.11 4.28</td>
<td>.38</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>35.94 4.94</td>
<td>33.60 4.40</td>
<td>.50</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>32.91 4.98</td>
<td>33.25 4.03</td>
<td>-.08</td>
</tr>
</tbody>
</table>

Table 2. Self-Other Agreement by Condition

<table>
<thead>
<tr>
<th>Variable</th>
<th>Self</th>
<th>Peer</th>
<th>Agreement Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>22.21 6.01</td>
<td>20.63 3.56</td>
<td>.20*</td>
</tr>
<tr>
<td>Extraversion</td>
<td>28.20 5.72</td>
<td>26.56 5.60</td>
<td>.29*</td>
</tr>
<tr>
<td>Openness</td>
<td>35.35 6.01</td>
<td>33.67 4.88</td>
<td>.31*</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>35.96 5.52</td>
<td>35.12 4.19</td>
<td>.17*</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>32.97 5.34</td>
<td>33.40 4.35</td>
<td>-.09</td>
</tr>
</tbody>
</table>

Note. See text for details regarding the calculation of significance tests. * indicates significant at p < .05. ** indicates significant at p <.001.
3. CONCLUSIONS

Although the present study found some significant differences in self-other agreement for various traits across conditions, it fails to identify a single type of personal information as more useful in attaining greater self-other agreement. However, the differences in agreement suggest that different types of personal information possess varying degrees of usefulness, depending on the trait being judged.

It is interesting to note that the greatest self-other agreement in both conditions was found with respect to extraversion. Also, this correlation did not differ greatly across conditions. This may be attributable to extraversion’s visibility factor. Thus, participants may be arriving at high self-other agreement on extraversion via some other means, perhaps a combination of actors’ verbal and nonverbal communication or actors’ mannerisms. It would be interesting to repeat the present procedure without the physical presence of actors. In doing so, judges would be forced to utilize only the personal information at their disposal, either distinguishing facts or core values.

The differing self-other agreement with respect to conscientiousness and neuroticism across conditions is perplexing. Revelations of distinguishing facts were often related to habitual behaviors, offering a possible explanation for the significant agreement with respect to conscientiousness under this condition. What is it about revelations of core values that allows for significant agreement with respect to neuroticism? Future study into this area should be attempted in order to address this intriguing question.

REFERENCES


