

# UNDERGRADUATE *and* GRADUATE research conference



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**Abstract**

Polyethylene is widely used in plastic production, which has become a significant source of pollution. This project tested the use of Greater Wax Moth (*Galleria mellonella*) larvae in the elimination of polyethylene plastic. This insect was chosen because it typically consumes beeswax, which shares a functionally similar structure to polyethylene. We compared the survival and successful metamorphosis of populations of larvae living in a matrix of beeswax to those in a matrix of polyethylene. Twenty-five larvae were separated into cups containing either wax or polyethylene beads. We hypothesized that the average number of larvae that completed their life cycle in polyethylene would be equal to those in beeswax. Our data showed that larvae eating polyethylene were as likely to make it to adulthood as those consuming beeswax. This means that *G. mellonella* may be a viable method for reducing plastic waste.

**Introduction**

Wax moths can go through up to three full generations per year, interrupted by a stage of adult estivation during the hot summer months and larval estivation in the cold winter months. Female moths lay 300-600 eggs inside of a weak colony of honey bees that then hatch after 3-5 days. Wax moths are a common pest to honey bees as they consume bees wax and the various impurities found within it. In approximately 19 days larva metamorphose to the pupal form. Under conditions with limited food this process can last up to 5 months. The pupal stage last approximately 19 days; in relatively limited food this stage can last up to 10 months before ecdisis to the imago (adult moth).

Figure 2. The comparison of the number of individual moths in each life stage surviving in plastic and wax.

Average Number of Individuals in each Class in Polyethylene and Wax Matrix

Life Stage	Polyethylene (Blue)	Beeswax (Red)
Adults	~7	~8
Pupa	~12	~10
Larva	~6	~5
Egg	~1	~1

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# UNDERGRADUATE *Abstracts*

## **ALTMAN, C.R.** Keystone High School. *Co-Occurring Disorders.*

Mental health disorders often coincide with a substance abuse disorder; this is known as co-occurring disorders. This poster discusses the imbalance that takes place in an addict's brain, as well as treatment for someone suffering from a co-occurring disorder. While we know how to treat these problems, the poster further analyzes flaws in current mental health care systems and barriers to the treatment of patients.

*Sponsor: Mr. Conrad Warner (Social Studies Teacher)*

## **ANGER, R.W.** Keystone High School. *The Perpetuation of Cultural Trauma in Mesopotamian Society.*

Early Mesopotamian societies faced challenges from near constant threats of warfare, disease, and natural disasters. This poster seeks to determine if the culture that arose in this situation was one that perpetuated trauma throughout generations. Focus will be placed on the emergence of cultural trauma, the perpetuation of this trauma through law, and the potential effect of in-utero trauma on Mesopotamians.

*Sponsor: Mr. Conrad Warner (Social Studies Teacher)*

## **ANSELL, M., DRAKSLER, L., ROBINSON, D., and VELAZQUEZ, E.** Department of Psychology Senior Seminar. *Clarion University's Anonymous Reporting Options for Title IX Violations.*

According to researchers, only 7% of American colleges provide an anonymous online option for reporting Title IX violations (Wiersma-Mosley and Dilorento, 2018). Many universities do not have anonymous reporting options or attempt to hide their resources, possibly to cover up their sexual violence statistics (Edwards, Sessarego, & Schmidt, 2019). Because of this, over 90% of Title IX violations that occur on college campuses go unreported (Ellman-Golan, 2017). This study examines anonymous reporting on Clarion University's campus and in Pennsylvania's State System of Higher Education. We collaborated with the Title IX Team and the Office of Social Equity to get the most accurate and useful data. After conducting our student survey ( $N=261$ ), we found that many students were initially unaware that they were able to anonymously report Title IX violations but believed they would be more likely to report anonymously once informed of the option. The second part of the study used descriptive research to examine which Pennsylvania state schools offered anonymous reporting. We found that six of the 14 state schools offer no anonymous reporting options.

*Faculty Sponsor: Dr. Jeanne Slattery*

## **ASHENFELDER, C.M. and FRAGALE, J.E.** Department of Nursing. *Lateral Violence among Registered Nurses.*

Lateral violence is a major concern in health care today for multiple reasons. Lateral violence is harmful and purposeful behavior in the workplace that contributes to poor working conditions in the nursing field. When lateral violence occurs, understaffing, lower quality patient care, and medication errors are three major consequences of this behavior. This research proposal is intended to evaluate the effectiveness of educating staff members surrounding the topic of lateral violence. The chosen population for research is 200 registered nurses among three health care facilities in Pennsylvania. The objective is to properly educate staff in order to recognize and eliminate or decrease the occurrence of lateral violence among registered nurses in the workplace. Before educational sessions are implemented, staff members will complete questionnaires in order to determine the existing knowledge base related to lateral violence. Once a knowledge base is collected,

educational sessions will be held that convey information related to the occurrence, consequences, and other pertinent information related to lateral violence as it occurs in the workplace. One month after the educational session, a post-education questionnaire will be administered in order to evaluate changes in lateral violence related to the effectiveness of the educational session. Keywords for the data search included nursing, violence, lateral/horizontal, and workplace.

*Faculty Sponsor: Dr. Robin Bilan*

**BEARY, M.A.** Keystone High School. *Education and Democracy.*

This poster analyzes the relationship between democracy and education ranging from the earliest democracy in Ancient Athens through modern democracies. The poster analyzes types of education in various democracies, impacts of an educated citizenry on the success of democracies, causes of the failure of democracy, and the responsibility of citizens and states in education.

*Sponsor: Mr. Conrad Warner (Social Studies Teacher)*

**BERARDUCCI, J. and BOYD, M.** Department of Nursing. *The Effects of Nursing Burnout Between Pediatric and Adult Hospice Nurses.*

Nursing burnout rates are extremely high all over the world. However, in pediatric and adult hospice nursing, they are even higher due to the emotional effects that the career has on the nurses. The studies showed that there were main areas emotionally that affected the nurses. These were depersonalization, emotional exhaustion, and low personal accomplishments. What was found within this study is that sociodemographic, occupational and psychological factors also played a major role in the burnout of these nurses. With keeping all of these in mind, we conducted a systematic review on current research regarding the burnout in both pediatric and adult hospice and how to help these nurses not become so burnt out so quickly. Our aim is to investigate between pediatric and adult hospice burnout rates among nurses. We are looking to decrease burnout and increase awareness.

*Faculty Sponsor: Dr. Robin Bilan*

**BOODJEH, S., BOIE, A., LEHMAN, M., and PENDOLINO, A.** Department of Psychology Senior Seminar. *The Examination of the Relationship between Negative and Positive Coping Skills and Self-Esteem of College Students.*

Given the college scenario, students are challenged with unique stressors. Students can manage these stressors with a wide variety of coping skills, both positive and negative. These stressors can contribute to a student's self-esteem (Hicdurmaz & Karahan, 2017). Self-esteem is defined as an individual's overall sense of worth or value. We hypothesize that if a student suffers from high stress in combination with negative coping skills (drugs, high amounts of alcohol, social isolation etc.), it can decrease their overall self-esteem. If a student were to counteract high stress with positive coping (exercise, meditation, therapy, etc.) it can preserve their self-esteem through trying times. In our study, we surveyed over 100 Clarion University students using the Rosenberg Self-Esteem Scale, the Brief COPE, and the Perceived Stress Scale to see if the results support the hypothesis. We were hoping to obtain at least 200 respondents for our study, but only received 162. We had to remove 60 participants because they either did not fully complete the survey, or they were graduate students. Self-report data is not the most reliable data obtained, but we found a correlation of 0.67 (P-Value =.00001) between those who practice negative coping strategies. We also found a relationship between negative coping skills and self-esteem (.31 correlation and P-Value = .00152). The students who took the survey were found to have higher stress. Finally, positive coping skills were used more than negative coping skills.

*Faculty Sponsor: Dr. Jeanne M. Slattery*

**BROTHERS, N.D.** Department of Social Sciences (History). *Orientalism and Its Challenger*.

The British during the early 1500s colonized India but had their views on the nation's people. These views are commonly termed as Orientalism, which views India and other parts of Asia as an underdeveloped area that needs the aid of areas such as Europe. Ernest Havell is a 20th century British author who went against these traditional British views and sought out to fight how developed India was in the early 20th century. Compared to traditional Orientalist views, Havell takes his experiences and studies of Indian history to develop his own way of seeing India as a developed nation through its arts, religious connections and preservation of historical knowledge. Havell used art history to look back on the history of India and went against the Orientalist views of the British by arguing that India was more developed and cultural than the British perceived them. Havell was able to develop his idea on India because he looked past British views and saw all the ways India was developed with art.

*Faculty Sponsor: Dr. Jeffrey Diamond*

**CRIST, A.E., COLUSSY, J.M., KORDISH, M.J., and MERTZ, L.M.** Department of Psychology  
Senior Seminar. *Does Mirroring Physical Behavior in a Conversation Affect Rapport?*

For many people, having a conversation with someone can be something that causes stress and anxiety which can make communication awkward and hard to understand. Using non-verbals during conversation can lead to increased understanding as well as overall likeability of both parties. In this study, each of the 21 participants (N=21) were randomly assigned to the control or experimental group. The experimental group participants' physical behaviors were mirrored by the confederate during a four-minute conversation. At the end the participants filled out a three-question survey where they rated the conversation with the confederate on a scale of 1 (very low) to 5 (very high) regarding how they felt about the conversation. The average number of behaviors mirrored for each of the experimental group participants was compared with the rating among the control group participants to see if there was any relationship among the number of behaviors mirrored and the rating. Although we did not find any significant difference between the two groups, we did however find a close relationship within the experimental group using the Welch t-test ( $p = 0.0527$ ). This was found despite the statistical low power, leading us to believe that with more participants our hypothesis would be proven with significant numbers.

*Faculty Sponsor: Dr. Jeanne Slattery*

**CRUP, B.J., HOROWITZ SOYOS, R.G., PETERS, S.L., and SHANKLE, K.A.** Department of Psychology Senior Seminar. *Do Psychology Students Perceive Themselves as Work Ready?*

Do undergraduate students feel they possess the appropriate skills and knowledge needed to help them after graduation? Beddoe, Hay, Maidment, and Ballantyne (2018) concluded that university professors felt their students possessed the appropriate knowledge to effectively work and grow after graduation. Students, however, had mixed emotions and, although willing to put in the work to improve their abilities, they still felt reluctant regarding their work readiness. Recognizing students' perception of work readiness can help universities improve developmental areas, as well as identify areas that are being cultivated effectively. A survey taken from Ciarocco and Strohmetz (2016) was sent out through the psychology department to Clarion University psychology majors and minors, asking for participation in a 60-questioned survey (N=38). The questions covered informed consent, basic demographics, and questions regarding communication, analytical literacy, collaboration, and personal development. Our findings showed that there were significant differences in the average rating by underclassman and upperclassman of communication skills, analytic inquiry skills, and collaboration skills. Interestingly, we found there to be no significant difference regarding

professional development skills. Limitations of this study included a small population size, as well as the overall length of the survey, as this led to many participants failing to complete the survey.

*Faculty Sponsor: Dr. Jeanne Slattery*

**DULEY, H., NIESPODZIANSKI, N., MERANDO, Y., MARSHALL, J., and LI, C.** Department of Chemistry, Mathematics, and Physics (Physics). *EDS Analysis of Icosahedral Quasicrystalline Thin Film in  $Al_{65}Cu_{25}Fe_{15}$  Alloy Prepared by Arc-Melting.*

We are working with an  $Al_{65}Cu_{25}Fe_{15}$  alloy which is well-known for Icosahedral Quasicrystal. The as-prepared  $Al_{65}Cu_{25}Fe_{15}$  alloy was mechanically crushed to small pieces to expose the interesting slabs. The obtained small pieces are mounted on SEM stub with double-sided carbon tape. Previous studies on this alloy has revealed the existence of a thin film layer, which is believed to be of icosahedral quasicrystalline structure. While icosahedral quasicrystalline phase in bulk form has been reported before, this phase in thin film form has not been reported. This project aims at providing evidence for the icosahedral quasicrystalline nature of the thin film, by compositional and crystal structure analysis. For compositional analysis, Energy Dispersive x-ray Spectroscopy (EDS) will be used. To ensure the quality, the analysis needs to be carried with the incident electron beam perpendicular to the surface of the thin film. For this purpose, a procedure has been established and promising results have been obtained. An extensive survey was carried out to locate pieces that contain slabs of interest and are suitable for EDS analysis. Quantitative data about the composition of the thin film will be extracted from the EDS raw data and be compared to that of the standard quasicrystalline phase in this alloy. For structure analysis, Electron Back Scattering Diffraction (EBSD) will be used and patterns with five-fold symmetry are expected.

*Faculty Sponsor: Dr. Chunfei Li*

**FINCH, B. MATZ, C., and MORRISON, I.** Department of Education. *Start 'em Young: Fostering Feminism in Female Students.*

This presentation will take female role models from mythology, literature and pop culture and show how they can help inspire young girls in the classroom and everyday life. This presentation will showcase powerful female characters from multiple media forms and identify how to use these role models in the classroom. Often, favorite characters from books and movies have a much greater impact on our development than we realize, and by looking at multiple grade levels, we are examining how to carry this impact all the way from elementary to high school. By using fictional characters that are more familiar to students, instead of historical figures, we are hoping to draw a greater connection between the role model and the student.

*Faculty Sponsor: Dr. Jesse Haight*

**HANSFORD, J.A.** Keystone High School. *Physical Geography and Culture.*

This poster analyzes the historical accuracy of the philosophy of Baron de Montesquieu. Montesquieu's work presents the idea that every civilization's social structure, gender roles, economy, religion, and government was formed solely due to the climate, soil, and natural features of the land they lived in. I use the civilizations Mesopotamia, Egypt, Minoa, Greece, Mongolia, China, and Persia in this poster to support this claim.

*Sponsor: Mr. Conrad Warner (Social Studies Teacher)*

**HASSELMAN, K.** Department of Management and Marketing. *Marketing Problems of the Clarion County YMCA.*

The Clarion County YMCA is a successful, nonprofit organization that caters to and is centered on the community. However, just like any other organization, it faces many challenges, specifically in dealing with marketing. The YMCA prides itself in being more than “a gym and swim.” This is apparent in its advertising statement “The Y. So Much More.” A public pool, wellness center, full size gymnasium, childcare, and multi-aged programming are just some of the amenities offered. Even in this unique and diverse establishment, there are deeper issues that need addressed to further the membership and success of the YMCA. Therefore, the purpose of this study is to identify community needs and to what extent are the current programs at the Clarion YMCA are meeting them. This project will conduct a members’ survey to provide a solution to YMCA. Past literature in this area suggest important concepts to follow. For example, customer preferences change quickly, so customer satisfaction and expectations with facilities, equipment, price, programs, and staff need to be analyzed on a regular basis (Gocłowska, 2019). Service quality plays an important role in determining satisfaction. Thus, this study will use a combination of SERVQUAL, SQAS, and QUESC models to determine service quality (Jasinkas, 2013). The marketing problems of the YMCA can be better understood to continue the growth of membership and to improve community involvement. This project will be of great use for the YMCA to increase its success in all aspects of the organization.

*Faculty Sponsor: Dr. Nripendra Singh*

**HOFFMAN, J.M.** Keystone High School. *The Analysis of Economics and Morality.*

This poster analyzes the relationship between morals and money everywhere that trade occurs. Morality and economy have been two of the most substantial aspects of life in the United States and elsewhere for as long as we have been able to write, and it's necessary for these two subjects to be taken into careful consideration and to be stable for any society to truly flourish. Although they are needed in every society, they do not usually blend well. This can be observed in many different cultures, from the wealthy environment in Washington, D.C., where laws are literally created, to the illegal, impoverished setting of the black market where human organs are sold. Economy and morality clash even in the eldest of settings, such as the society of the northern-Canadian Inuits. My research explains how the economy influences people's moral standards in every part of the world.

*Sponsor: Mr. Conrad Warner (Social Studies Teacher)*

**KLEIN, C. and ARAVIND, V.R.** Department of Chemistry, Mathematics, and Physics (Physics). *Intelligent Tutors for Learning Mathematics Concepts.*

Modern society is made possible by the accumulation of all the science, technology, and mathematics that have been studied in the past; these advancements of the past are used every day by billions of people around the world. To continue improving the world with advances in these disciplines, it is important that we make learning accessible to future generation of students. To facilitate learning at scale, we create an intelligent tutoring system that can teach students concepts in introductory mathematics. In this project, we demonstrate one such tutor that enables learning concepts in 2-dimensional coordinate geometry, a vital topic in introductory undergraduate mathematics. This tutor challenges students with a problem, provides immediate feedback to students' answers, provides timely hints to scaffold student learning, and reinforces the knowledge by repeating questions on a given topic. This way, the tutor is designed to enhance student learning, boost self-confidence and self-esteem in students, and improve student retention.

*Faculty Sponsor: Dr. Vasudeva Rao Aravind*

**LAKATOS, H.G.** Department of Communication Sciences & Disorders. *Spanish Vocabulary Acquisition in Monolingual English-Speaking Preschoolers.*

Previous studies have shown that a second language is most easily acquired through early exposure, immersion, and holistic teaching strategies. Direct vocabulary and comprehension instruction embedded within book reading activities has specifically been shown to help children demonstrate significant gains in vocabulary comprehension. This practice of teaching English vocabulary to both native English speakers and English Language Learners has proven extremely beneficial; however, there is very little information available to guide teachers and SLPs in teaching Spanish to English-speaking children. The purpose of this study was to fill this gap by answering the following research questions: First, are the evidence-based strategies for vocabulary breadth that have been found to be effective for teaching English vocabulary equally effective in teaching monolingual English-speaking children Spanish? Second, do receptive vocabulary levels in English have a relationship to target word learning in Spanish? To investigate these questions, five preschoolers were taught Spanish vocabulary three days a week for three weeks. Fifteen target Spanish vocabulary words were taught using evidence-based explicit instruction and joint storybook reading. The children's understanding of 15 control words and the 15 words that were targeted during instruction was measured using researcher-designed picture vocabulary tests. The receptive vocabulary measures were administered before the first week of instruction, at the end of each week of instruction, and immediately following the final week of instruction. Findings regarding the children's word-learning and its relationship to initial English vocabulary levels will be discussed.

*Faculty Sponsor: Dr. Melissa Brydon*

**LAVAN, C.W.** Keystone High School. *The Women of Ancient Athens.*

This research poster examines the treatment of women in Ancient Athens. Although there is no singular cause of the rise of this patriarchal society, there are several factors that led to male dominance. Factors such as male shoulder strength, physical geography, and the militarization of Greek society led to patriarchy. Male dominance was reinforced through religious rituals, political participation, marital structure, access to education, and an upbringing that pushed women into household roles in adulthood.

*Sponsor: Mr. Conrad Warner (Social Studies Teacher)*

**LEHMAN, M., PETERS, S. AURANDT, S., CARPENTER, M., CRIST, A., KORDISH, M., BOIE, A., ANSELL, M., BOODJEH, S., DRAKSLER, L., KING, W., MAINES, J., MCGREW, H., RODRIGUEZ, T., SCHWAB, B., and OSNOWSKI, E.** Psychology Department Senior Seminar. *Gender Preferences for Children: Males and Females Have Different Goals.*

Studying gender preference for children is a way of both understanding parenting decisions and values, as well as gender equity. They reflect prominent reinforcers and societal attitudes in a given country. In an online survey of Clarion University students ( $N = 286$ , 83% female), we asked participants about their preferences for their first, second, and third children. Both males and females preferred male children, especially for first children. For female participants, this preference balanced out across all children, assuming three children – which is probably an overestimate. Male participants had a strong preference for having male children and all male children and did not reach gender balance across their children. These decisions seem to reflect two issues: preference for a like-gendered child and for a male child.

*Faculty Sponsor: Jeanne M. Slattery*

**LOHNER, J.R.** Department of Special Education. *The Effect of Tier 2 Reading Intervention of Fundations on a Second Grade Student's Fluency and Comprehension.*

As a student teacher for becoming a Reading Specialist, I am conducting research on the effectiveness of reading intervention on a second-grade student at X Elementary. This school uses school-wide Multi-Tiered Systems of Support (MTSS) to intervene in reading and math, which includes Tier 1-3, with Tier 3 being the most intensive form of intervention. The school uses Star assessments for universal screening and monthly progress monitoring. After every monthly testing, students' scores and collaboration with grade-level teachers are used to inform educational decisions with regard to groupings of the tiers. For my student, Student E, the intervention being used is the second level of Fundations three days a week, and math two days per week. My research will only focus on the reading intervention. Fundations is a Direct Instruction scripted intervention program which mainly focuses on phonics, but also includes aspects of fluency, comprehension, and vocabulary. The three main goals of this 11-week intervention for Student E include: increasing fluency, increasing the standard score on the Reading Star test, and increasing accuracy in answering comprehension questions from a text.

*Faculty Sponsor: Dr. Young-Young Kim*

**MARSHALL, J. and DULEY, H.** Department of Chemistry Mathematics and Physics (Physics). *Spherical Particles in As-Prepared  $Al_{65}Cu_{25}Fe_{15}$  Alloy by Arc-Melting.*

The  $Al_{65}Cu_{25}Fe_{15}$  alloy is a well-known quasicrystalline material. It is known for being able to produce a pure icosahedral quasicrystalline phase. However, when the alloy is prepared by arc-melting, newer features occur within the porous section of the material. These features consist of slabs, spheres, and pentagonal dodecahedrons. This study focuses on the spherical particles and sets out to show that the neighboring particles are of the same crystal. The spherical particles tend to form in rows in the direction of the slab-shaped  $\lambda$  phase. It is believed that despite appearing independently, the spheres may overall be a part of a single crystal. To show this a Scanning Electron Microscope (SEM) and Electron Backscattering Diffraction (EBSD) technique is used. EBSD patterns can be generated from a large area and carry little uncertainty with their measurements. The main issue with EBSD is if a good image can be obtained from a rough surface. The  $Al_{65}Cu_{25}Fe_{15}$  alloy prepared by arc-melting was broken into smaller pieces to reveal the features within the pores. The specimen was mounted on an SEM stub via carbon tape. Prior to the experiment, a survey was conducted to locate viable pieces from a specimen to be used for this study. These pieces needed to be small and stand out on relatively high sections of the material. Preliminary results are promising.

*Faculty Sponsor: Dr. Chunfei Li*

**MONG, B.R.** Keystone High School. *Increasing School Volunteerism.*

School mission statements often state goals such as developing responsibility or creating academic tools for the future; in order for that to be accomplished, volunteer programs need to be supported. Volunteer programs are avenues for students to receive skills through volunteer work and can be used in professional life. Many school volunteer programs are still in their infancy, so they are learning by trial and error. In order to increase school volunteerism, you need to have leadership, dedication, and relationships. Once these traits are established in a volunteer program, a positive impact will occur.

*Sponsor: Mr. Conrad Warner (Social Studies Teacher)*

**REYES, A.Y.** Keystone High School. 2020. *Women's Rights in Athens vs. Sparta: How Military Policy Affects Women's Rights.*

Athens and Sparta are two ancient Greek city-states that were located close to each other. In Athens women had no rights at all, while Sparta gave their women equal rights to those of the men in their society. One potential reason for this was the way they prioritized their militaries. In Athens, men had a reduced military service requirement relative to Sparta, so they were able to be home more often and could do other trades such as farming and selling goods. This relegated women to reproduction and maintaining the household. In Sparta men were needed in the military for their entire life, which left women responsible for all work that kept their society going, this then incentivized the granting of women's rights.

*Sponsor: Mr. Conrad Warner (Social Studies Teacher)*

**ROBBINS, M. and DAVIS, K.** Department of Nursing. *Proper Use of Hand Hygiene and Personal Protective Equipment (PPE).*

Hand hygiene and proper Personal Protective Equipment (PPE) have a definitive role in the health care system associated with the spread of infections. This study compares the actual adherence to the rules and regulations even though healthcare workers are aware of the protocol that is already in place at the facility. Nurses were given a questionnaire to complete. The researchers subsequently provided education on proper use of PPE and how to stop the spread of infection using proper hand hygiene. Finally, the nurses were discreetly observed to compare how many of them followed the protocols for PPE and hand hygiene guidelines after the educational in-service was completed. The researchers expect to prove in the total number of cases of spread of the specific infection we were following in this specific facility. We potentially identified a correlation of using PPE and hand hygiene with the care our patients receive and what they unwittingly will be exposed to. With these results, we believe we need to hold nurses to a higher standard, continually provide education, and use "secret shoppers" to monitor their adherence to standard infection prevention.

*Faculty Sponsor: Dr. Robin Bilan*

**SCOTT, J., and HOLLAND, I.** Department of Management and Marketing. *Influence of Social Media Campaigns on Customer Decision Making and Awareness.*

Even though social media is a significant part of business management in the world today, many businesses aren't sure exactly how to operate it effectively. For companies that do not have a social media presence, the first step is to create some accounts and create a successful campaign that can attract and engage customers. The purpose of this study is to examine how social media campaigns, most importantly keen to earned media, can successfully encourage customer reaction and awareness of an online towing and rigging equipment retailer located in northwestern Pennsylvania. Social media is a significant part of business management in the world today. The ecosystem of social media comprises the use of both digital and traditional media, unlike in the past where social media was thought of as a standalone marketing plan. The conversations that are communicated through these social media sites are a focus in developing a campaign that is focused on earned media. These conversations are what will help evaluate a company and determine which route they might be going (either losing or gaining business). Companies must focus on consumer conversations because consumers will ultimately be the biggest factor of influence among other consumers. What is significant about social media is that marketers can monitor consumers' movements from awareness of a company to actual engagement. This is a descriptive study. Social media campaigns will be developed, and Facebook analytics will be used to assess the customer engagement on Facebook.

*Faculty Sponsor: Dr. Nripendra Singh*

**THOMPSON, C.** Keystone High School. *The History of Infectious Disease.*

Since the beginning of humanity, disease has always been one of our greatest enemies. As population density has increased and trade and travel routes expanded, so has the impact of disease. This poster seeks to examine causes of the rise and spread of infectious disease, as well as the factors that have facilitated the spread of infectious diseases throughout history.

*Sponsor: Mr. Conrad Warner (Social Studies Teacher)*

**WEAVER, R.D.** Keystone High School. *Human Nature and the Social Contract.*

Throughout history, humans have discussed and explained the theory of human nature. Thomas Hobbes, John Locke, and Jean Jacques-Rousseau were philosophers during the Age of Enlightenment that focused on human nature and the social contract. The social contract sparked the way humans would act in a society, not only then, but for generations to come. My poster will discuss the different viewpoints of Hobbes, Locke, and Rousseau and how the social contract has led to government and home environments influencing human nature.

*Sponsor: Mr. Conrad Warner (Social Studies Teacher)*

**WOLFGONG, S.E.** Keystone High School. *Public Defender Effectiveness.*

Public perceptions often lead to negative views of the quality of outcomes from public defender services. Qualitative data collected from outcomes in city-wide data from Philadelphia and Denver, paired with state-level data from Illinois, Louisiana, California, and Georgia indicate that factors such as built in biases, interdependence on overburdened public defenders, and under-resourcing can lead to public defenders performing triage, leading to these negative perceptions. This poster analyzes those factors and how they're seen as barriers when comparing public defender effectiveness with their private counterpart.

*Sponsor: Mr. Conrad Warner (Social Studies Teacher)*

# GRADUATE *Abstract*

**BEACH, H.E.** Master of Clinical Mental Health Counseling Degree Program (Counseling).

*Benzodiazepines and Related Compounds.*

Anxiety disorders are the most commonly identified form of mental illnesses, affecting almost 34% of the general population at some time. Further, possibly 22% of individuals struggle with insomnia. The benzodiazepines (BZs) were introduced first in 1960 as a new class of anti-anxiety compounds. BZs were first conceptualized as a safe and non-addicting alternative to the more dangerous barbiturates then in use. BZs have been found to be useful either as the primary treatment or as an adjunct for anxiety disorders, insomnia, muscle spasms, and the emergency control of seizures. However, BZs are associated with addiction, and are often misused either alone or in combination with other drugs. The benzodiazepine receptor agonists (alternatively called Z-compounds, BRAs, or most accurately, nonbenzodiazepines) are often used to treat insomnia. The nonbenzodiazepines are more selective on receptor sites than the BZs, however, and up until recently they were thought to have a lower misuse potential and danger threshold than the BZs. A third class of drugs, benzodiazepine antagonists, is represented by the short-acting compound Flumazenil. Flumazenil has clinical application in managing BZ overdose and in hastening recovery from BZ sedation and anesthesia; however, there are inherent dangers in using this medication as well, such as convulsions, seizures, and cardiac arrhythmias with routine use. Benzodiazepines and related compounds offer distinct therapeutic benefits, but they must be used with caution.

*Faculty Sponsor: Dr. Mark Kilwein*

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