The Impact of the Environment on Child Delinquency

Destanee Williams and Dr. Julie A. Hibdon
Department of Criminology and Criminal Justice

SIU Southern Illinois University CARBONDALE

Abstract

According to social disorganization theory (Shaw and McCay (1969), the physical neighborhood or environment can contribute to child delinquency. The purpose of this study was to create a rapid systematic review of published work from 2015-2019 that examine three environmental factors that have an impact on child delinquency. The three factors observed were peer delinquency, educational attainment, and socioeconomic factors. To help this study, journal articles were critically analyzed to learn the impact the factors have on child delinquency. Suggestions are made to improve interventions used to reduce delinquent behaviors.

Key Concepts

- Social Disorganization, is a state of society characterized by the breakdown of effective social control resulting in a lack of functional integration between groups, conflicting social attitudes and personal maladjustment
- Child delinquency, a conduct by juvenile characterized by antisocial behavior that is beyond parental control and therefore subject to legal action
- Socioeconomic factors, involving a combination of social and economic factors
- Peer delinquency the power or influence a social group exerts on an individual or individuals
- Social Control theory, the attachment or bonding of people with conventional people such as friends, family members or loved ones, institutions, activities and beliefs that make people conform to society norms.

Methodology

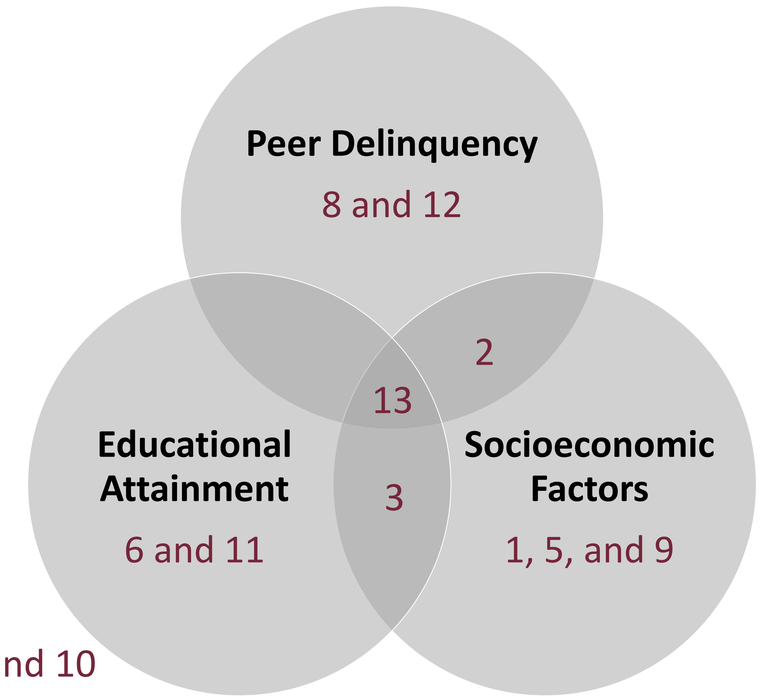
- Social Disorganization was identified and related to child delinquency.
- Identified environmental factors impacting youth, age 14-18.
- Systematically reviewed journal articles published between the years of 2015-2019.

Acknowledgements

I would like to thank the McNair Scholars Program of Southern Illinois University, Carbondale and the Department of Criminology and Criminal Justice. I would also like to thank Jorden Thomas for her help and support.

Findings

Significance of environmental factors in child delinquency based on a rapid review of published work.



Peer Delinquency

- Low levels of self control, parental attachment, and school commitment are predicted to influence the general tendency to engage in delinquent conduct but not have a crime- specific effect [8].
- Adolescents without identity commitments, or without motivation to explore new commitments, are thought to be more likely to conform to peer influences due to lack of strong beliefs in their own [2].

Educational Attainment

- United States juvenile offenders suggest there is not a lack of interest in pursuing education among this population, but rather a disconnection with educational systems when education providers are perceived not to care about students' progress [6].
- Parents that are more likely to obtain education are inherently more likely to raise children in ways that are less conducive to crime [3].

Socioeconomic Factors

- There is considerable evidence to demonstrate that low socioeconomic status is associated with negative adolescent outcome [5].
- Having a low socioeconomic status may accumulate overtime to increase the likelihood of adolescents delinquent behavior and future criminality [5].

Conclusion

- Socioeconomic factors, peer delinquency and educational attainment have an impact on child delinquency.
- Improvements to intervention strategies used to reduce child delinquency.
- More targeted research to produce stronger plans to reduce juvenile delinquency rates.
- Significant reductions in delinquency rates can be attributed to more effective and positive resources, like mentors and stronger programming.
- Each neighborhood is different, the effectiveness of prevention programs may depend on certain conditions, such as the theoretical foundation, intensity, format, and components of the program.

Future Study

- Focus on demographics (location, race, and gender)
- Expand database utilization
- Develop a survey

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Golgi-Cox Analysis on the Primary Somatosensory Cortex (S1) of the Naked Mole-Rat *(Heterocephalus glaber)*

Areaj P. Mubarak[1], Natalee Hite[2], Joseph L. Cheatwood[1], Diana K. Sarko[1]
[1]Department of Anatomy, Southern Illinois University School of Medicine, Carbondale, IL
[2]Department of Physiology, Southern Illinois University School of Medicine, Carbondale, IL

SIU MEDICINE

Introduction

The naked mole-rat (*Heterocephalus glaber)* is a burrowing rodent native to hot, dry regions of Eastern Africa, such as Somalia, Central Ethiopia, and parts of Northern and Eastern Kenya.

Figure 1: Body Morphology of the Naked Mole-Rat (Catania & Remple, 2002).

They depend almost solely on their tactile hairs and incisors, to which their tactile hairs are at their highest concentration at the muzzle and tail. A study conducted by Catania and Remple in 2002 showed that 31% of the primary somatosensory cortex was represented by the incisors **(figure 2).** Due to the animal's poor visual acuity as well as its poor auditory abilities (Jarvis & Sherman, 2005), the somatosensory cortex - containing the dominant tactile sensory inputs - is able to occupy expanded regions of the brain, including areas that are generally devoted to vision. The same study found that S1 was also larger in size compared to other mammalian species, and was displaced more caudally.

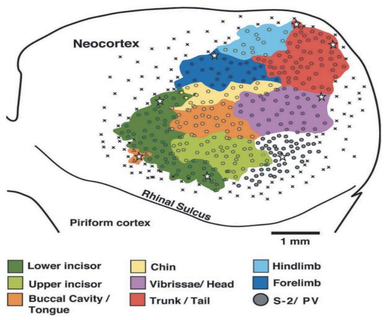

Figure 2: Somatotopy of S1 in the Naked Mole-Rat (Catania & Remple, 2002).

Golgi staining is a type of histology used to study neuronal morphology. This form of staining was discovered by Camillo Golgi, an Italian physician, in 1873. This allowed for the viewing of dendrites, axons and spines of about 1-3% of the neurons present. This is usually done through the infusion of silver nitrate ($AgNO_3$) into the neurons. Alternatively, other metals such as gold and mercury have also been utilized for Golgi staining.

Purpose

Naked mole-rats have unique specializations in their S1. Understanding the neuronal characteristics and quantifications of the neurons present in S1 will allow us to contribute to the field of comparative neuroanatomy, and will help us to better understand the roles of the different types of neurons in connection to the different sensory features represented in the primary somatosensory cortex.

Methods

Day 1 (June 24th)	• Brain extraction • Brains placed in Cox solution
Day 3 (June 26th)	• Replace brains in new Cox solution
Day 13 (July 2nd)	• Tissue protection
Day 14 (July 3rd)	• Tissue protection
Day 21 (July 11th)	• Brain sectioning
Day 23 (July 15th)	• Tissue development • Mounting
Day 25 (July 17th-19th)	• Analysis

Figure 3: Timeline of the Experiment. Highlighted events indicate project step completion. Methods obtained and adjusted as needed from Zaqout & Kaindl, 2016.

- **Subjects**
  - Two adult naked mole rats (approx. 60g in weight) were used for this study. All procedures were approved by the SIU IACUC.
- **Brain Extraction**
  - Subject brains were extracted for impregnation following euthanization of the animals.
- **Impregnation**
  - Halved brain samples were immersed in Golgi-Cox impregnation solution, then tissue protectant for 7 days each.
- **Sectioning**
  - Brain samples were sectioned into 100-200 uM thick slices using a vibratome.
- **Staining and Mounting**
  - Sectioned samples were developed and counterstained using 1% cresyl violet and 5% sodium thiosulfate.
  - After staining, samples were mounted, cover-slipped, and stored until analysis.
- **Analyzing the Primary Somatosensory Cortex**
  - Imaging of S1 with Leica 4500 light microscope.
  - Image processing with Adobe Photoshop.
  - Qualitative & quantitative analysis of dendritic arborizations and spines with Fiji software.

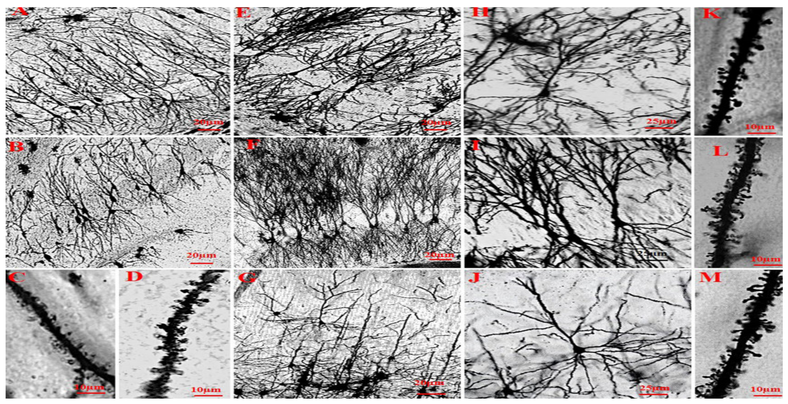

Figure 4: Example of Golgi-Cox Staining on Rat Brain (Maiti et al., 2015).

Conclusion

- Due to the experimental constraints regarding time limitation from the extensive process in congruence with supply delay, this study remains of interest.
- Our results will consist of both qualitative and quantitative forms of analysis on the neurons in S1:
  - Neuron morphology
  - Cell soma area (μm^2) and volume (μm^3)
  - Dendritic length (μM)
  - Dendritic spine density (spines/μm)
  - Sholl analysis
- Future research is important to find suggestions regarding the importance of neuroanatomical aspects:
  - What significance do the different morphologies of neurons bring about?
  - How does neuroplasticity narrate the physical implications of phantom pain?

Future Directions

- This study will be continued throughout the Spring semester. The brain sample analyzed in the current project will be used as a control. A tooth extraction on the lower incisor will be administered and a Golgi-Nissl analysis will be done with the subject to understand the dynamics of neuroplasticity following tooth loss.
- Concepts that are obtained from this research can ultimately be applied to medicine, impacting the way neuroplasticity in the pathology of neurodegenerative diseases such as Alzheimer's disease, Amyotrophic Lateral Sclerosis, or phantom pain is understood.

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How Accurate are Label Claims in CBD Products?

Jacob Janicki, Laxmi Sagwan-Barkdoll and Aldwin Anterola
Southern Illinois University Department of Plant Biology

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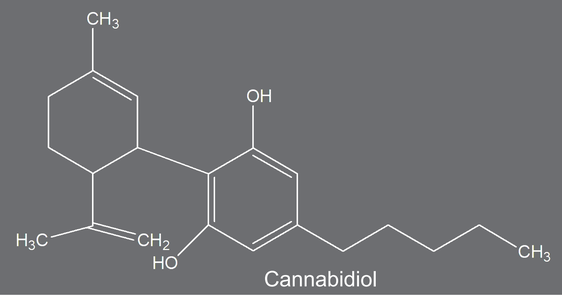

Cannabidiol

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Introduction

Cannabidiol (CBD) is a popular cannabinoid commonly found and extracted from *Cannabis sativa* L. Many medical benefits from CBD have been discovered in recent years and has become popular among pharmaceutical and supplement companies. A large number of CBD products released every year may or may not be regulated depending on the state where they are produced and sold. Due to lack of sufficient regulation, the CBD content of these products will need to be tested and verified.

Objective

The purpose of this study was to measure the amount of CBD in four randomly selected CBD products available in the Southern Illinois area to determine the accuracy of the CBD content in these products as displayed in their labels.

Methodology

Samples: Four different brands of "CBD oil" were purchased from local retail shops, and stored at room temperature

Sample 1 Sample 2 Sample 3 Sample 4

Extraction: Each sample of CBD oil was extracted using the same extraction method, as follows:

- 1 mL of sample was extracted in 9 mL of 1-pentanol and was vortexed for 15 seconds.
- 1 mL of extract was diluted in 9 mL of methanol bringing the extract to a dilution factor of 100. Mixture was vortexed for 15 seconds.
- 0.5 mL of diluted extract was diluted further with methanol to a final volume of 10.0 mL, and vortexed for 15 seconds, bringing the mixture to a final dilution factor of 2000.
- Diluted extract was then filtered through a 0.22 µm filter and 1 mL of final filtered diluted solution was transferred to a vial for HPLC analysis.

Results

Table 1: Accuracy of CBD label claims based on experimentally determined amounts of CBD

Samples	Experimentally determined CBD concentration (mg/mL)	Calculated CBD concentration based on label (mg/mL)	Percent error of label claim on CBD content (%)
1	6.91±0.84	8	16
2	7.67±0.80	9*	17
3	10.58±0.59	10	5
4	5.90±0.66	5	15

*assumes hemp extract has 100% CBD

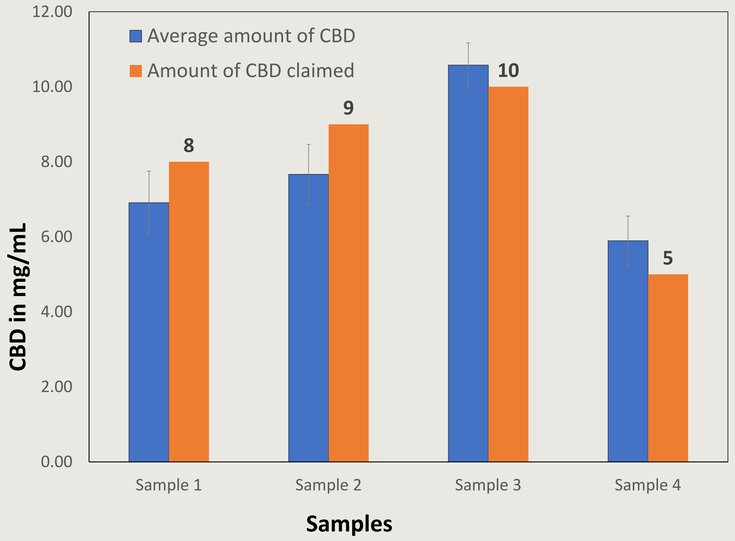

Figure 1: Average experimentally determined amount of CBD compared to CBD label claim in each sample

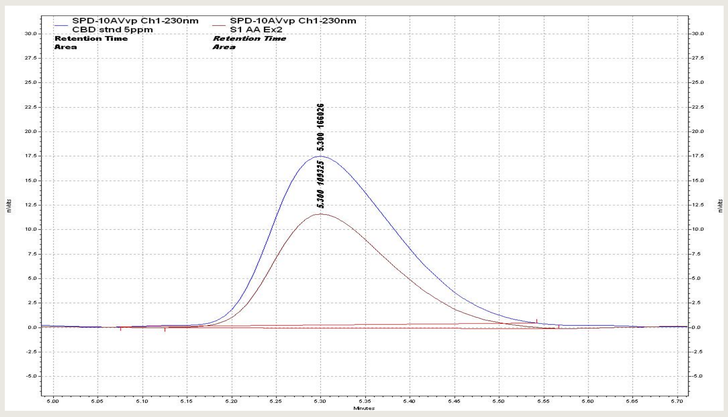

Figure 2: HPLC chromatogram of a standard CBD peak overlaid to Sample 1 CBD peak

Discussion

- Samples 1 and 2 had lower amounts of CBD than what were calculated from their labels, although Sample 2 did not explicitly state any amount of CBD but only the amount of hemp extract.
- Samples 3 and 4 had higher amounts of CBD than what were calculated from their labels, although Sample 3 is within the range of our experimental standard deviation.
- Sample 3 included a value for the amount of hemp extract besides the amount of CBD, from which amount of CBD in hemp extract can be calculated (81%). This would be higher for Sample 2 which would then have 85% CBD in hemp extract.
- The average cost of CBD oil is around $30 for a 30 ml bottle. Sample 4 is priced as such, but contains the least CBD per ml. Sample 3 is the most economical, which we purchased for $31 for a 60 ml bottle, and contains the most CBD per ml.
- Methanol evaporates very quickly and may have caused some variation between extractions. It is also worth noting that methanol reacts with olive oil based solutions such as Sample 1 and 2. When methanol is mixed with olive oil the solution turns very turbid. More research would be needed to determine if this has an effect on the variability of results from the extractions.

Conclusions

- The labeling of CBD oil products is consistent from brand to brand, which may be due to varying regulations in each state.
- The actual amount of CBD in different CBD oils may be higher or lower than what is claimed in the label by about 15% in most cases. At least 1 product is accurately labeled within 5% error.
- While prices of CBD oils vary by a wide range, the prices do not necessarily reflect the amount of CBD in the product.
- Pentanol extraction and dilution with methanol for HPLC analysis is well suited for quantifying CBD in oil, with acceptable relative standard deviations of 6-12%.

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Toward Developing Immunoassays Using the HE4 Biomarker to Improve the Early Detection of Epithelial Ovarian Cancer

Jessica Jurak, Robinson Karunanithy, and Dr. Poopalasingam Sivakumar
Department of Physics, Southern Illinois University Carbondale
Carbondale, IL 62901

SIU Southern Illinois University CARBONDALE

Introduction

Despite only accounting for 3% of all new cancer cases, epithelial ovarian cancer (EOC) is the fifth most common cause of death in women [1]. EOC is essentially asymptomatic in its early stages, therefore, its diagnosis typically occurs during stage III-IV. This late-stage diagnosis causes a 5-year survival rate of only 17%-29% due to the futility of treatments against advanced malignancy [1]. If, however, detection occurs early, during a mild, localized stage, the 5-year survival rate increases to 90% [1].

A promising technique to improve early detection of EOC is the recent development of invasive tests for the natural biomarkers, including cancer antigen 125 (CA125) and human epididymis protein 4 (HE4), present in the human blood plasma.

CA125 has been FDA-approved for clinical use for many years. However, elevations in HE4 serum levels have been observed in patients with malignant EOC at both localized and metastasized stages. To that end, HE4 is considerably more sensitive than CA125 in EOC detection, particularly for early-stage malignancy as opposed to late-stage [2]. More importantly, however, when compared to the diagnostic accuracy of CA125, HE4 demonstrates a much higher specificity for EOC, rendering no false-positive results.

This study utilized immunoassay techniques to measure concentrations of HE4 in a synthetic serum in an effort to innovate a more accurate early detection method. The antibody in our immunoassay was modified with a magnetic particle for purification purposes, and the HE4 antigen was modified with a SiO_2 label responsible for creating a unique signal, which will be detected using laser-induced breakdown spectroscopy (LIBS). Successful bioconjugation, required for the immunoassay, was confirmed using ultraviolet-visible spectroscopy (UV-VIS).

Methodology

LIBS Experimental Setup

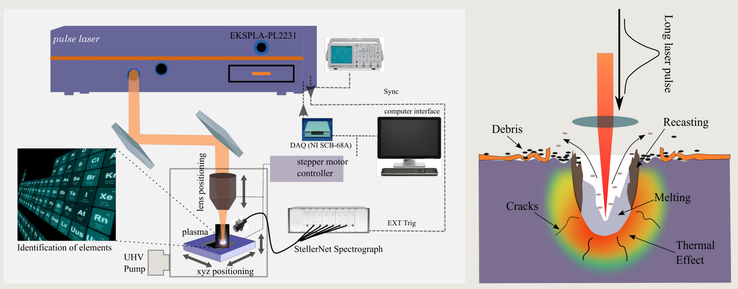


Fig. 1. (a) Schematic of automated LIBS experiment using EKSPLA picosecond (duration 30ps) and high-resolution StellarNet spectrograph **(b)** mechanism of laser ablation and formation of crater. Ablation pattern is controlled XY motorized stage.

Bioconjugation

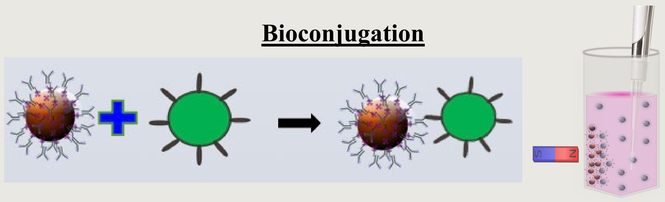


Fig. 2. (i) 1.5 µm diameter of Fe3O4 particles, pre-modified with protein-A; **(ii)** 1 µm diameter of SiO2, pre-modified with an amine; **(iii)** conjugation of pre-modified magnetic particles with anti-HE4 monoclonal antibodies and diluted with phosphate-buffered solution (PBS); **(iv)** washout unbound SiO2 particles with applied magnet.

Results

LIBS Calibration Curve for SiO_2

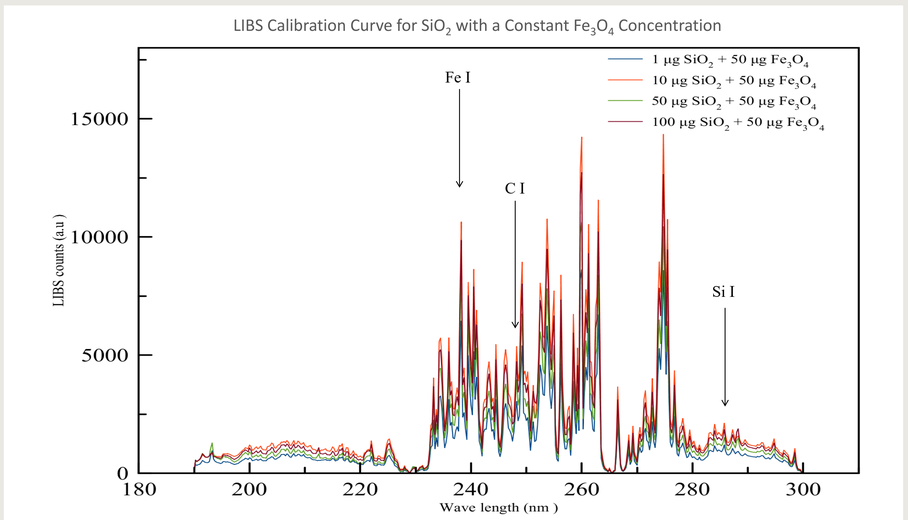
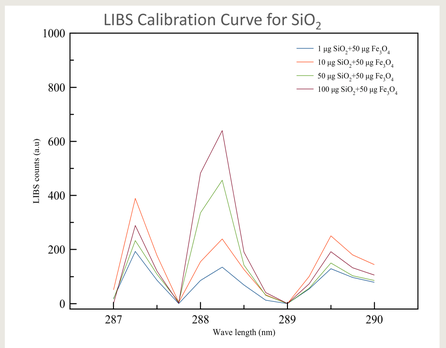


Fig. 3. Average (150 laser pulse) LIBS spectra from 225 nm to 330 nm of a mixture of SiO_2 and Fe_3O_4 by made ablating the sample with 20 mJ, showing the specific reference peaks of Si and Fe, respectively.



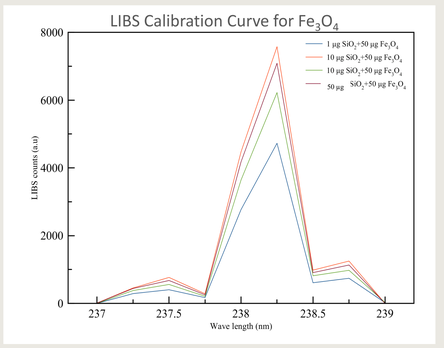


Fig. 4. LIBS emission spectrum for each varied concentration of SiO_2 mixed with a constant amount (50 µg) of Fe_3O_4. **(a)** emission of Si I (288.1 nm) **(b)** emission of Fe I 238.2 nm

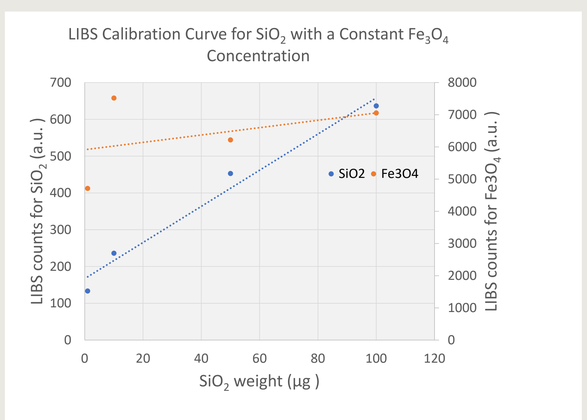


Fig. 5. (a) The calibration curve illustrates the LIBS counts (a.u.) for each concentration of SiO_2. The estimated limit of detection for SiO_2 particles using LIBS is approximately 82.06 LIBS signal counts. **(b)** Image of the ablated SiO_2 and Fe_3O_4 sample on membrane filter (pore size ~0.8 µm).

UV-VIS Spectra for Antibody Absorbance

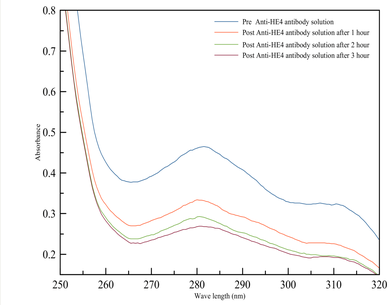
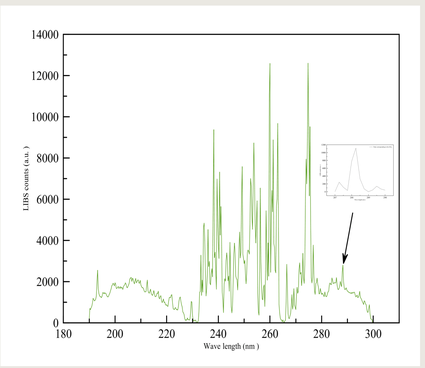


Fig. 6. The UV-VIS spectra above shows the absorbance readings measured at 280 nm for set concentrations of protein A-modified Fe_3O_4 magnetic particles coupled to the anti-HE4 antibody. The nanodrop was set such that 1 absorbance = 1 mg/mL. After 3 hours, the coupling efficiency was estimated approximately ~ 48%.

LIBS SiO_2 Detection within the Immunoassay



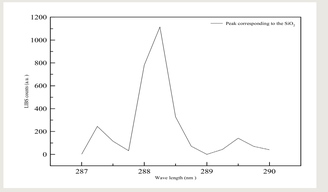


Fig. 7. The LIBS spectra shows the SiO_2 peak from the developed immunoassay. Emission of Si may contribute from unbounded SiO2; optimization of assay is needed.

Conclusion

Although we created a strong SiO_2 calibration curve, the LIBS spectra of the Fe reference peak were supposed to remain constant, showing a consistent concentration of Fe_3O_4. This error could be attributed to the instrument itself, which has a 5%-10% error. Additionally, the first step of the bioconjugation process of the immunoassay was achieved, and successful conjugation efficiency was shown using UV-VIS. Additionally, preliminary results show sensitive detection of HE4 using bioconjugation with LIBS technique.

Future Directions

The elemental concentration, down to the part-per-million level, of the successful immunoassays can be determined using LIBS. To interpret the final data, we plan to plot the intensities of Si-specific spectral emission lines for each respective HE4 concentration.

Developing immunoassay with LIBS to detect multiple biomarkers (CA125 &HE4) simultaneously to improve sensitivity and specificity

Finally, after successfully measuring lowing concentrations of serum HE4 in a synthetic sample, we plan to use our novel detection method in human blood samples to determine HE4 levels from a natural serum.

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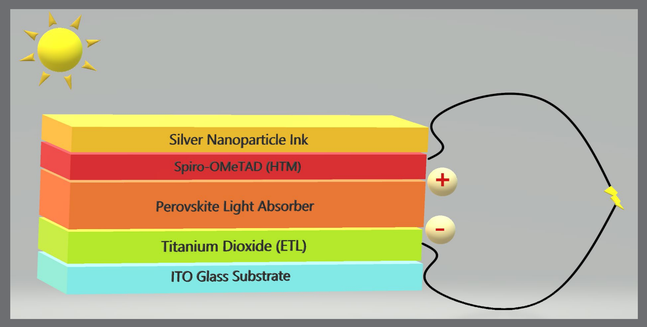
Organic-Inorganic Titanium Halide Perovskites for Photovoltaic Application

Christian Rose; Dr. Kanchan Mondal
Mechanical Engineering and Energy Processes



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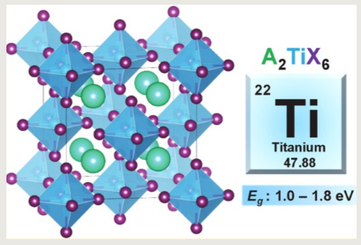
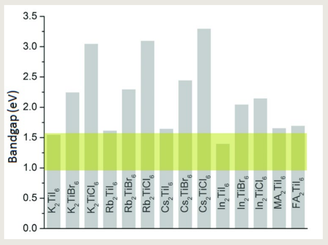
Introduction

Currently, the most efficient perovskite solar cells (PSCs) rival the efficiency of the market-dominating silicon-based solar cells. Perovskite solar panels are desirable because they are much cheaper to produce and are more versatile than their silicon counterpart. PSCs are very thin and can be produced as a flexible film through roll to roll processing. The current downfalls of these solar cells are their lack of stability and the toxicity of the highest performing lead-based cells. The focus of this research is to work with titanium-based perovskites in an effort to produce efficiencies comparable to the efficiencies achieved by lead-based cells. To this point, only two other universities in the country have experimented with titanium-based PSCs. Researchers led by Dr. Ming-Gang Ju and PhD candidate Min Chen from the Universities of Nebraska and Brown, respectively, have predicted the absorption characteristics of a family of titanium-halide perovskites using Density Functional Theory (DFT). In addition, they were able to fabricate a completely inorganic cell that achieved an efficiency of 3.3%.





Model of the tetravalent perovskite chemical structure and predicted bandgaps obtained from the report of Dr. Ju et al.

Methodology

Perovskite Synthesis

- $FAI(s) + PbI_2(s) \xrightarrow{\text{in DMF}} FAPbI_3\ (aq)$
- $2FAI(s) + TiI_4(s) \xrightarrow{\text{in DMF}} FA_2TiI_6(aq)$
- $2FAI(s) + TiCl_4(l) \xrightarrow{\text{in DMF}} FA_2TiCl_4I_2\ (aq)$

Solution Experimentation

- Heated at Several Temperatures (90-140°C)
- Exposed for Various Durations (20-60 minutes)
- Submerged in 60°C Bath for 24 Hours

Electron Transport Layer

- Titanium Isopropoxide Solution Prepared
- Spin-Coating Techniques Investigated

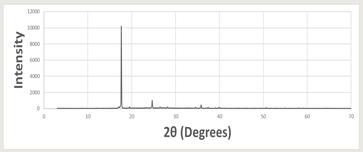
Characterization

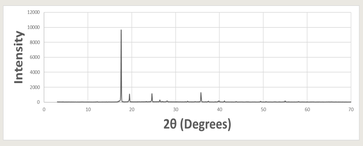
- X-Ray Diffraction (XRD)
- UV-Vis Spectroscopy (UV-Vis)
- Scanning Electron Microscopy (SEM)

Results

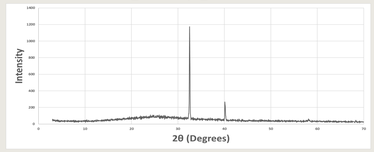
X-Ray Diffraction

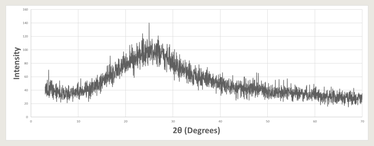
FA_2TiI_6 Samples





$FA_2TiCl_4I_2$ Samples

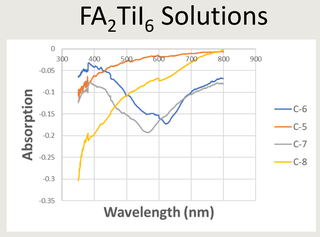


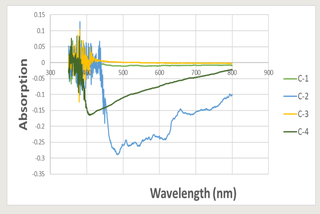


Significant peaks were observed for all FA_2TiI_6 "C" samples. Sample D-5 also produced clear peaks; however, it was the only sample of the $FA_2TiCl_4I_2$ solution to produce useable XRD results. Small shifts in peaks were noticed between "C" samples indicating the sensitivity of crystallization to heat exposure. Further experiments will be conducted on both solutions to establish the crystal structure of these materials.

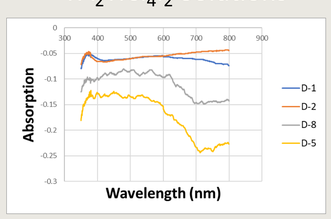
UV-Vis Spectroscopy

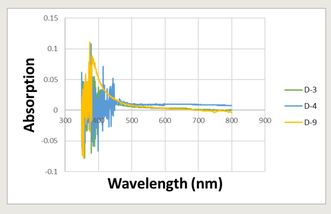
FA_2TiI_6 Solutions





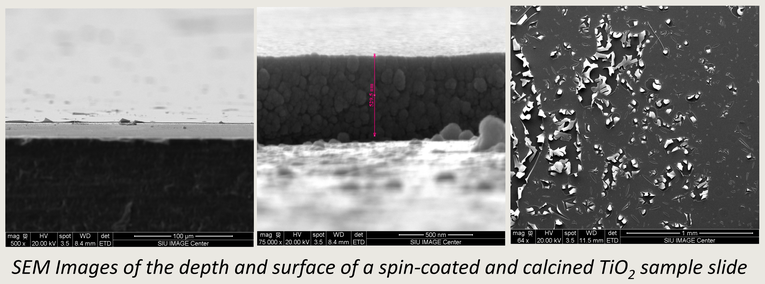
$FA_2TiCl_4I_2$ Solutions



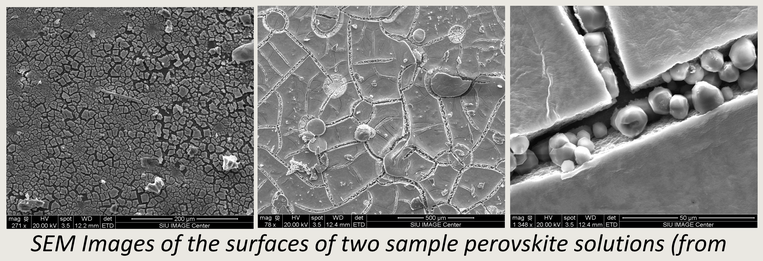


The absorption spectra from the UV-Vis Testing is displayed above. The results obtained were inconsistent and underline the importance of heat exposure during the crystallization process. D-9 produced the most desired spectrum of all samples.

SEM Images



SEM Images of the depth and surface of a spin-coated and calcined TiO_2 sample slide



SEM Images of the surfaces of two sample perovskite solutions (from left to right): C-7 at 200 µm, D-3 at 500 µm, D-3 at 50 µm

Discussion and Conclusions

- Titanium Halide Perovskites Formed
  - FA_2TiI_6 & $FA_2TiCl_4I_2$
- Electron Transport Layer Synthesized
  - Titanium Isopropoxide Solution
- X-Ray Diffraction Performed
  - Crystal Structure of FA_2TiI_6 Observed
- UV-Vis Absorption Spectra Obtained
  - Inconsistent Results
- SEM Images Gathered
  - Surfaces of Perovskites and TiO_2 Observed
- Fabrication Techniques Explored
  - Trial and Error for Spin-Coating Techniques

Future Outlook

- Further investigation of Perovskite Crystal Structure
  - Endeavor Software for Modelling
- Conversion of UV-Vis Results to Tauc Plot
  - Bandgap Calculation
- Hole Transport Membrane Synthesis
  - Materials Prepared
- Solar Cell Fabrication
- Current Voltage Testing
  - Short Circuit Current & Open Circuit Voltage
  - Fill Factor
  - Photoelectric Conversion Efficiency

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- Supported, in part, by the McNair Scholars Program.

Drone Based Monitoring of Harmful Algal Blooms: Preliminary Data Collection and Procedural Understanding

Luis Prado, Dr. Ruopu Li

Department of Geography and Environmental Resources

Southern Illinois University Carbondale

WHAT IS THE ISSUE?

Abstract

Harmful Algal Blooms (HABs) contribute negatively to environmental and human health. Corresponding with rapid changes in global climate and continual trends of anthropogenic waterway pollution, humanity faces HABs as an intensifying threat (Gilbert, 2013; Moore et al. 2008). Key to combat this growing concern is the ability to study and monitor the bodies of water in which communities intend to protect. An increasingly explored solution is the utilization of Unmanned Aerial Vehicles (UAVs) and the building of relationships between remotely sensed data and physical characteristics of HABs. This study focused on a possible preliminary methodology to be applied to such research, including processes and techniques for water sample collection, image capture, and water sample analysis, while posing hypothetical approaches for spectral analysis and future model building. Results illustrated a positive outlook on the employment of the explored methodology to future studies with success in the posed systems of data collection and the potential for further analysis and application.

Key Concepts

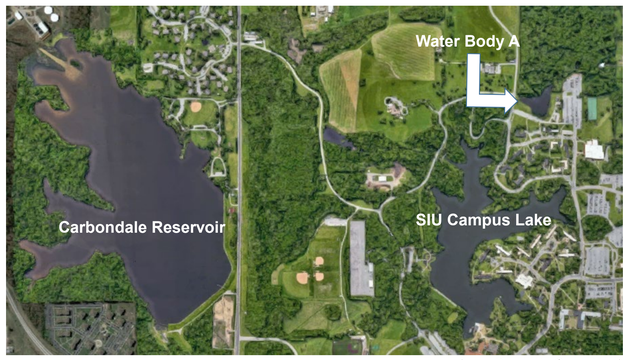
- Harmful Algal Blooms(HABs)
- Water Quality
- Remote Sensing
- Unmanned Aerial Vehicles(UAVs)

WHAT HAVE WE DONE?

Methodology

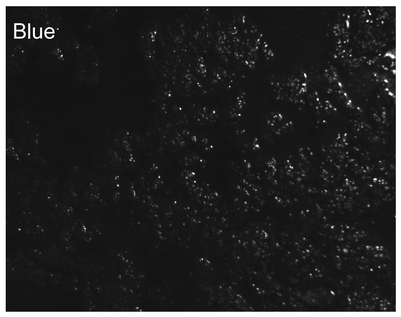
- **Field Sampling** → Image Collection → Water Sample Collection
- **Water Sample Analysis** → Chl-a Detection → DNA Isolation → QPCR
- **Image Analysis** → Reflectance Calibration → Spectral Band Averaging → Index Decision
- **Model Construction** → Correlation Between Spectral Data and HABs Presence

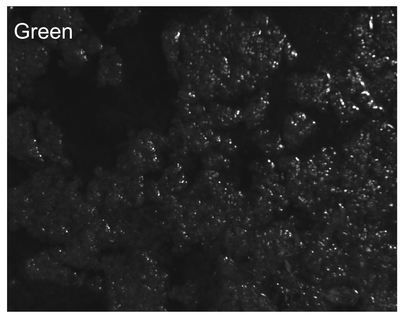
Study Area

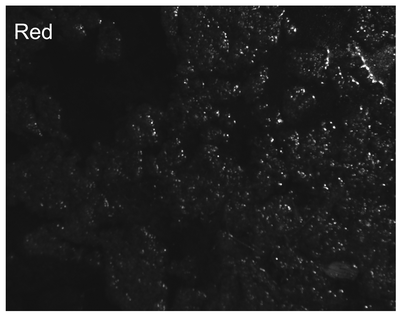


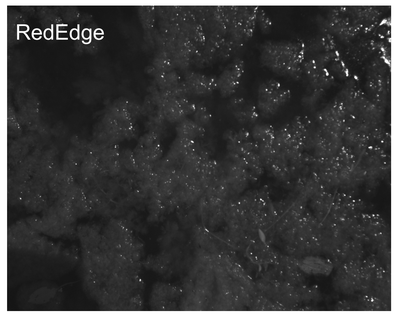
(Image Provided by Google Maps)

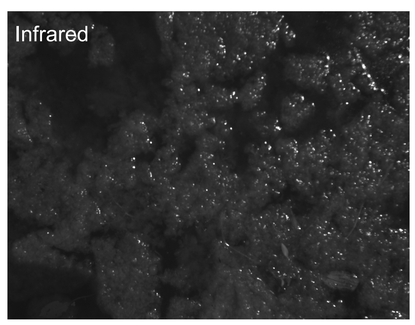
Results











Sample no.	Volume of sample/ml	Concentration of algae, g/L	Weight of wet samples for Chl. A	Chl. A concentration(mg/L extract)	Chl. A concentration(mg/L sample)
1	1000	19.66	0.482	4.52	1.84
2	500	14.89	0.487	2.46	0.752
3	500	9.82	0.462	2.13	0.45
4	500	21.70	0.466	4.73	2.20
5	500	24.76	0.489	3.65	1.850
6	400	7.72	0.485	4.30	0.68
7	1000	9.23	0.606	2.93	0.44
8	500	11.21	0.479	2.96	0.69
9	500	15.02	0.473	4.77	1.51
10	500	11.08	0.509	6.62	1.44
11	500	43.39	0.514	12.91	10.90

WHAT DOES THIS MEAN?

Conclusion and Discussion

- Solidified Procedures for Productive Data Collection
- Chl-a Detection
- Theoretical Understanding of Image Analysis and Model Construction
- Established Groundwork for Further Application

WHAT IS NEXT?

Future Endeavors

(Images Provided by Lindsey McKinzie)

Established Foundational Knowledge and Experience through Study + Extended Timeline and Funding through REACH Grant = Anticipated Fruition of Larger Research Scopes

Acknowledgements

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The History of African Americans in Organized Medicine and Frontier Medicine, 1850 - 1914

Jawaun Valentine & Dr. Pamela Smoot
Southern Illinois University Carbondale, Department of History

SIU Southern Illinois University CARBONDALE

Abstract

It was not until African American historians such as Kenneth Hamilton and Nell Painter, began to publish books and articles did history include African American migrants who settled in the West. They contend that they were an integral part of its settlement and its character despite the numerous challenges they encountered. Yet, African Americans managed to establish all-black towns complete with institutions and professionals of their own race including educators, journalists, realtors, architects, and nurses. However, there was no mention of African American physicians. This study explores the lives of these frontier physicians with emphasis on Dr. George A. Tann, the transition of medicine from frontier to organized medicine, and the struggles of African Americans to obtain formal training in medicine.

Objectives

The objective of this research project is to unearth the narratives and history of African Americans on the Western Frontier and in medicine through the analysis of primary and secondary documents.

Key Terms

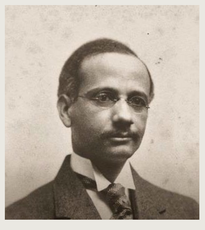
Frontier Medicine: Medicine administered by physicians who had little or no professional medical training and relied heavily on remedies derived from Native American medicine, available flora, and other experiences.

Professional Medicine: Medicine practiced by individuals who had obtained a Medical Degree from a recognized Medical School.

Pioneers in Medicine

Dr. John McCune Smith
The earliest an African American had entered the medical profession was in 1837 when James McCune Smith obtained his medical degree at the University of Glasgow in Scotland.

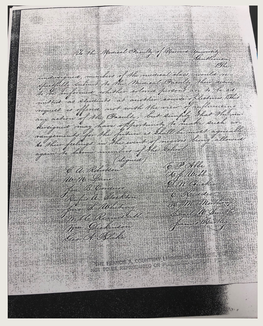
Dr. David Jones Peck
The first African American man to obtain a medical degree from a recognized university in the United States was David Jones Peck from Rush University in 1846. While at Rush, Peck's education career was in jeopardy when several of his white classmates complained about his race and enrollment in the program. The president, Dr. Daniel Brainard, left the decision to dismiss Peck from medical school to his classmates with the majority voting in favor of Peck.



Dr. Rebecca Lee Crumpler
The first African American woman to obtain a medical degree was Rebecca Lee Crumpler 18 years later at the New England Female Medical College (NEFMC) in 1864. Her experience in medical school was much different than those of African American males.

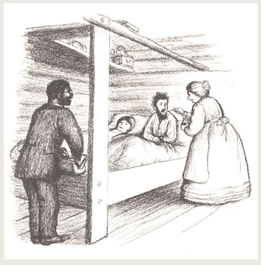
Organized and Frontier Medicine

Martin Delaney



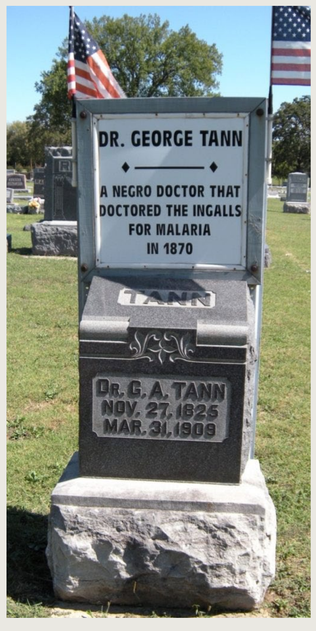
Amidst the achievements of early African American medical professionals, many of them struggled with racism and discrimination including Martin Delaney. He sought a medical degree from Harvard University Medical School in 1850. His white classmates successfully petitioned the Medical School faculty for his expulsion. Delany's dismissal came despite his outstanding recommendations from former employers, mentors, and community leaders.

Dr. George A. Tann



During Reconstruction, thousands of African Americans migrated west escaping mob violence in the south. Once settled, there was a need for physicians of their own race. Dr. George A. Tann would answer the call.

He was a successful frontier physician in Northern Oklahoma and Southern Kansas from 1870 to 1902. His story was brought to prominence through Laura Ingalls Wilder's 'Little House on the Prairie' series. In the year 1870, Dr. Tann went to the Ingall's house and cured Laura and her sister of malaria. As the frontier population increased came the practice of organized medicine. Dr. Tann possessed no formal medical degree and was contacted by the Northern Judicial District of the Cherokee Nation. It issued a list of individuals practicing medicine within its borders without valid medical degrees mandating that they cease practicing medicine. Dr. Tann's extensive medical career ended in 1902.



Blacks in Medicine: Future Research

African Americans sought an education in medicine and were often denied, but not discouraged from achieving their dream. After the era of their struggles, came the subsequent establishment of seven African American medical schools between 1868-1904.

Dr. Henry Fitzbutler

- an exceptional physician and educator. He lobbied Kentucky's legislature until it granted approval of the first black-owned medical college in Louisville. Founded in 1888, the Louisville National Medical College's purpose was to train African American doctors. Approximately 150 doctors graduated from the college before it encountered financial hardship and closed in 1907.

Flexner Report

- The medical schools for African Americans were shattered by *Flexner Report* whose author, Dr. Abraham Flexner, called for a more stringent curriculum among medical schools and the rigorous training of its future doctors. He successfully recommended the closing of those that were substandard.

After 1923, only two black medical colleges remained from the previous nine, Howard University and Meharry Medical Colleges. It would be worthwhile to examine the decline of black medical colleges with more voracity in the future, to explore the lives of other African Americans frontier physicians, and their possible acclimation into the era of organized medicine. It would be of great consequence to also investigate the role of women in medical care as nurses, midwives, and most importantly, as physicians. Looking to the future, the history of African Americans in medicine is largely a wellspring of information providing insight to experiences of African Americans since the eighteenth century. More research should be conducted in order to delve deeper into this topic and uncover the stories of more African American frontier physicians, because it is likely that their were others.

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Mikele Howard, "Henry Fitzbutler (1842-1901)," September 5, 2018. https://www.blackpast.org.; and *Notable Kentucky African Americans,* "Louisville National Medical College," NKAA Entry, "Fitzbutler Henry." https://nkaa.uky.edu. November 12, 2018. Accessed 07/10/2019.

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I would like to thank my mentor Dr. Pamela A. Smoot for her guidance, the McNair scholars program for providing such a wonderful opportunity, and the COLA Dean's office providing and work space. This research would not have been possible without SIU Reference Librarians Matt Borowicz and Philip Howze, the Harvard University medical school Archives, and the Historical libraries and State Archives of Colorado, Kansas, Nebraska, and Oklahoma and their efforts to assist me in with this project. I would remiss if I did not acknowledge Ms. Rhetta Seymour and Ms. Jorden Thomas for their patience and dedication to the McNair scholars program.

Civil Asset Forfeiture and Excessive Fees in the American Criminal Justice System: A Blatant Constitution Violation?

Joshua McCray & Dr. Benjamin Bricker
Political Science Department
History and Political Science Major

SIU Southern Illinois University CARBONDALE

Abstract

Asset forfeiture is a practice that has existed in the United States since the founding of this country. However, since the 1970s civil asset forfeiture in particular has been a common tactic used by police in their fight on the War on Drugs in the United States. The impact of asset forfeiture and often particularly civil asset forfeiture on policing has been widely discussed in the academic community. However, even though civil asset forfeiture is a popular tool used by law enforcement, it has gained a lot of critics both by academics and the American public. Along with excessive fines levied by police and the court system civil asset forfeiture is a highly controversial policing method with numerous constitutional violations and racist practices and racial profiling.

Objectives

- Understand court cases and laws that have impacted civil asset forfeiture
- Examine the Ferguson Justice Department Report on fees in Ferguson, Missouri
- Examine racial bias in asset forfeiture and administration of court fees

Cases

- **Timbs v. Indiana (2019) -** Incorporated Eighth Amendment Excessive fines clause
- **Austin v. United States (1993) -** Excessive fines case attempting to seize home and business
- **Bennis v. Michigan (1996) -** "Innocent owner defense" Fifth Amendment takings clause with property/ Fourteenth Due Process clause

Laws

- **Comprehensive Crime Control Act of 1984** - Allows states to keep forfeiture proceeds creates equitable sharing
- **Civil Asset Forfeiture Reform Act 2000 -** Shifts burden of proof from individual to government and also creates a uniform innocent owner defense
- **Comprehensive Drug Abuse and Prevention Act -** Creates modern day civil asset forfeiture and sparks legislation beginning War on Drugs

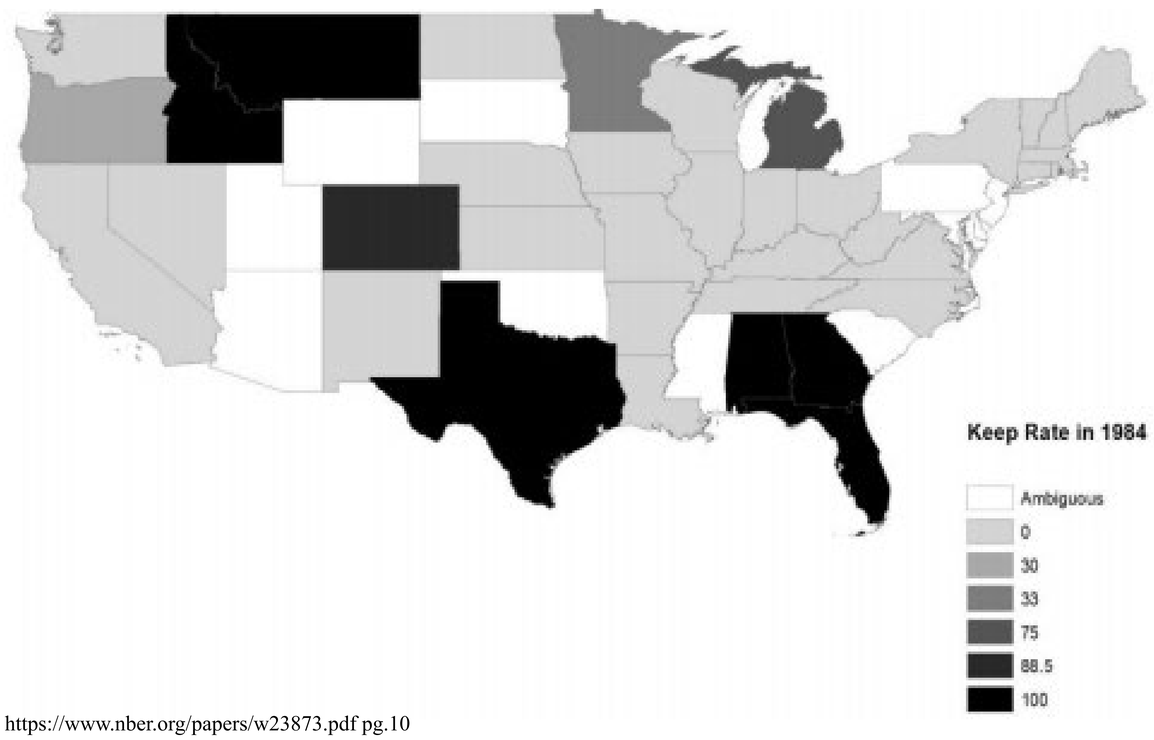
Excessive Fees

- Communities rely on fees levied by the court to generate revenue for their community
- Ferguson, Missouri was investigated by Department of Justice
- Report found that Ferguson, Missouri targeted people of color to generate community revenue
- Faced fines for ordinance/ traffic violations and required to pay cash at courthouse

Policing for Profit

- Law enforcement agencies often police communities with the largest financial incentives.
- In Chicago and Montgomery, Alabama the majority of seizures and stops occur in low income minority neighborhoods.
- Seizures and searches often target minorities due to their lack of access to national banks.
- Police use forfeiture to generate revenue both for community as well there own budgets.

State Keep Rate 1984



https://www.nber.org/papers/w23873.pdf pg.10

- Prior to 1984 CCCA
- No equitable sharing laws
- No federal forfeiture funds
- States with 100% keep are located in deep South and Northwest
- Florida, Georgia, Alabama, and Texas: history of slavery, Jim Crow, and racial oppression
- Idaho and Montana: sparsely populated states
- Forfeiture highly prominent due to a small tax base
- 100% states are traditionally red and supporters of Nixon and Reagan.

Equitable Sharing

- Created under President Reagan with 1984 CCCA
- Federal Legislation that allows states to keep 100% of proceeds from state forfeitures
- Allows states to share in proceeds of federal forfeiture
- States also practiced Adoptive Forfeitures (e.g. Missouri)
- States utilize federal government to avoid state regulations on forfeiture so they can receive 80% of forfeiture proceeds
- Adoptive Forfeiture ended in 2015 under Attorney General Eric Holder due to abuse

Three Types of Forfeiture

- **Administrative** (by the agency)
- **Civil *In rem*** (against the property)
- **Criminal *in personam*** (against the person)

Proposals for Reform

- End equitable sharing
- End civil asset forfeiture and require all forfeitures to be *in personam*
- Raise the burden of proof from preponderance of the evidence to beyond a reasonable doubt
- Require charge and conviction for forfeiture
- Pass legislation that requires CAFRA to apply to states
- End the War on Drugs
- Require budgets for police agencies be generated by the tax payers and other community incentives instead of using asset forfeiture to generate revenue
- Allow legal representation during forfeiture proceedings
- Law enforcement agencies get one chance at forfeiture and conviction

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- Dr. Jose Najar (Professor History Dept.)
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Regulations of Commercial Dog Food Across America: A Review

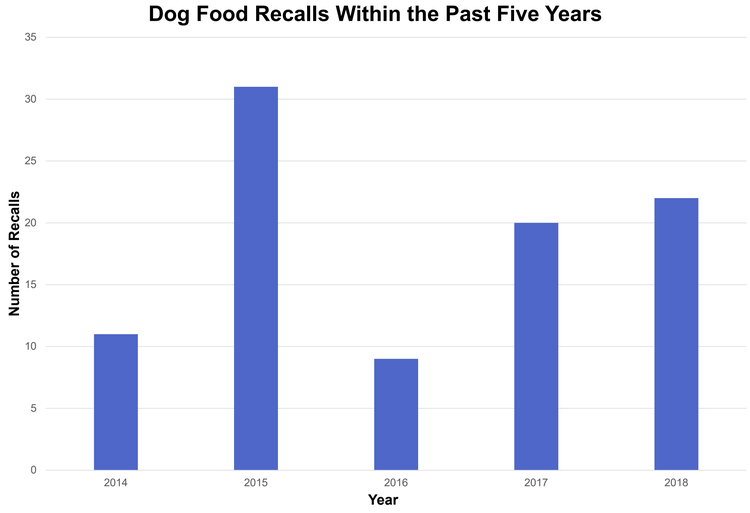
Kaitlin M. Faust and Dr. Erin Perry
Department of Agriculture, Southern Illinois University, Carbondale IL

Abstract

The evaluation of foods used for the nutrition of domestic animals is a matter of great importance. A major function of feed regulation is to safeguard the health of animals, and a critical component of that function is to ensure that animal feed and feed ingredients are appropriately and safely used as provided by the product label. Prepared foods for dogs are no exception, and the pet food industry aims to provide safe, palatable, digestible, and nutritionally balanced foods for pet animals at prices affordable by the human owner. Although pet food falls under regulations, who enforce these regulations, and why are there so many recalls happening in the United States? The objective of this project was to investigate the mislabeling, regulatory guidelines, and the nutritional aspects of commercial dog foods. We found that the FDA controls the majority of the regulations with the help of the State Department of Agriculture. We also observed through available published research that mislabeling of products and false claims on pet food are the leading causes of pet food recalls. In a future direction to this research, a questionnaire will be sent out to Veterinarian offices of State Department of Agriculture for each state to assess the similarities and dissimilarities between their current regulations and guidelines for commercial dog foods.

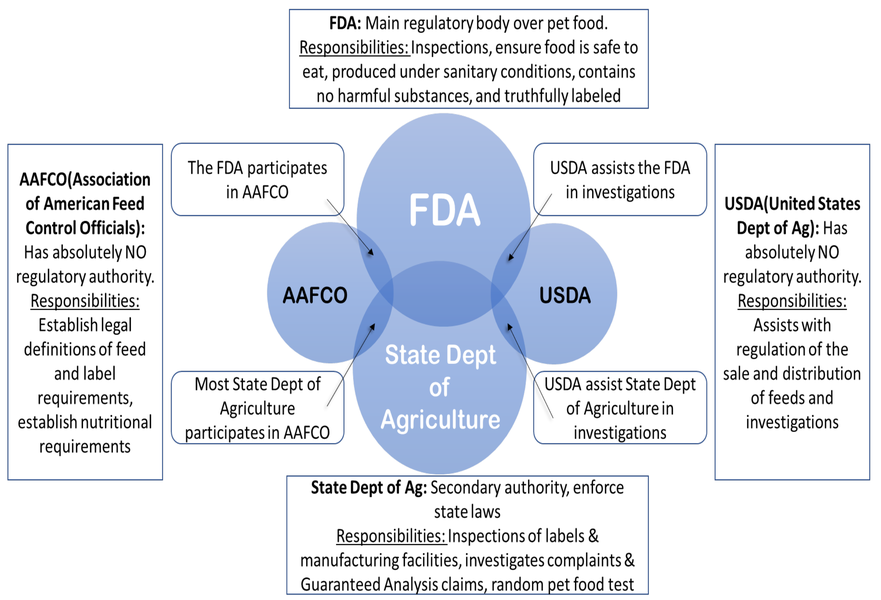
Findings

Recognizing Recalls



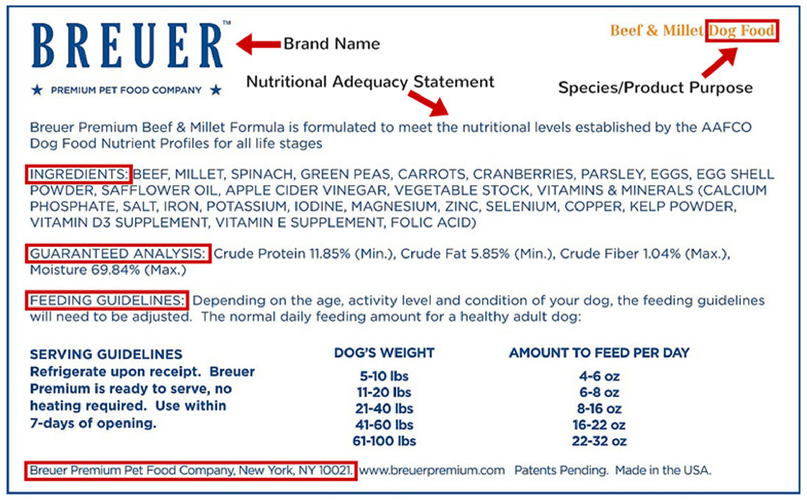
1. Blue Buffalo has had at least EIGHT dog food recalls. Recall justification varies from salmonella contamination to the presence of propylene glycol (a chemical found in anti-freeze).
2. In early 2017, Evanger's was forced to recall batches of their dog food due to contamination with Pento-Barbital (a euthanasia drug)
3. Diamond Pet Food were forced to issue numerous dog food recalls including multiple occasions of salmonella contamination.
4. Nature's Variety has issued at least five dog food recalls in the past seven years for salmonella contamination and choking hazards.
5. Iams has been owned by 4 different producers. When switching producers there is always a potential for a change in ingredients, ingredient sources, and manufacturing plants.

Regulations



Labeling

- Pet food labeling is regulated at two levels:
  - Require proper identification of the product, net quantity statement, name and place of business of the manufacturer or distributor, and proper listing of all the ingredients in the product in order from most to least based on weight
  - Reviews specific claims on pet food (e.g. low magnesium, joint control, weight control, etc)



Mislabeling

- Mislabeling of dog feed has become a widespread problem. This arises conflict because it shows that the feed is not properly labeled which could cause issues with toxicological safety, palatability, and nutritional suitability.
- Many studies have been conducted on mislabeling of feeds. In a recent study that analyzed 40 products, while only 10 of them were properly labeled. 13 out of 14 brands tested presented at least one mislabeled product. 3 out of 4 feeds were contaminated with 1 of 7 animal species not listed on the label. The most frequently contaminants identified were pork, chicken, and turkey.
- Mislabeling causes many health issues and can even result in death of the animal. Contaminants can either have too much, too little, a nonexistence of a nutrient, or a additive of an ingredient not listed.

Conclusion

- The health of the animal is the primary concern and finding the source to the toxic chemicals and making sure that these recalls are being accounted for.
- Not only holding accountability within commercial dog food recalls but ensuring that agencies and companies are being held responsible for the discrepancies that have occurred.
- Enforcing future uniformity within the state's regulations will help alleviate future discrepancies not only with recalls but with mislabeling issues as well.
- Future research is important to gaining an understanding of differences in regulations as well as why products that contain health hazards to pets are hitting the market . Researchers should address questions such as the following: where are the discrepancies taking place within the agencies/companies and what is an efficient way to conduct uniformity within states regulations?

Future Direction

- The next step is forming a questionnaire. The questions that will be formed will be based on the information needed to conduct the missing pieces of regulations and understand why there are so many mislabeling and recalls. . This questionnaire will be sent out to all 50 states. Each state will be sent to the Department of Agriculture office as well as the State's Veterinary office.
- After receiving the questionnaire back, results will be compiled, and further investigation and research will be conducted with the agencies.
- Below is an example that is portrayed on the questionnaire.

Question #6:	**How many products were non-compliant with labeling requirements in 2018? Please provide a list of all products/companies that were identified as non-compliant in 2018.**
Notes:	

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Does Location Matter?

Domestic Violence From A Geographical Perspective

Shalane Scott & Dr. Julie Hibdon

Department of Criminology & Criminal Justice

SIU Southern Illinois University CARBONDALE

Abstract

The objective of this study is to examine domestic violence from a geographical perspective. Using Seattle, Washington Police incident data and the Seattle, Washington government website, the types of domestic violence and how each case was handled is analyzed. There are few research studies on domestic violence from a geographical perspective. Research has shown there is a relationship between location and domestic violence. In this study compared to others, we examine domestic violence on 10 specific streets instead of a large city. This research examines the relationship between alcohol accessibility by foot and domestic violence. Using google maps we were able to see the proximity between alcohol accessibility and each street address. The study also examines the availability of women's shelter by foot, and domestic violence within low income houses. What we discovered was only 2 out of the 10 addresses examined were considered low income housing. Only 5 out of the 10 address have access to alcohol compared to what many articles have mentioned. Lastly, out of the 10 streets only 4 had access to a women's shelter.

Hypotheses

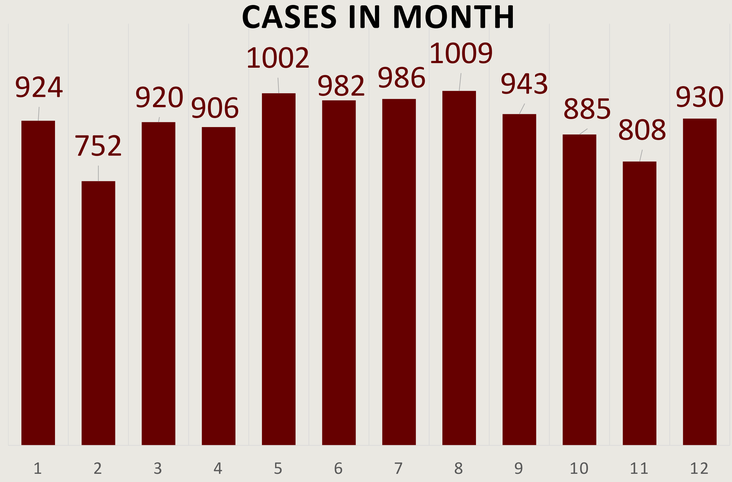
- ❖There are more domestic violence incidents in low income houses.
- ❖Alcohol accessibility increases domestic violence.
- ❖Lacking accessible resources increases domestic violence.
- ❖Police have a delayed response to domestic violence or they do not respond.

Methodology

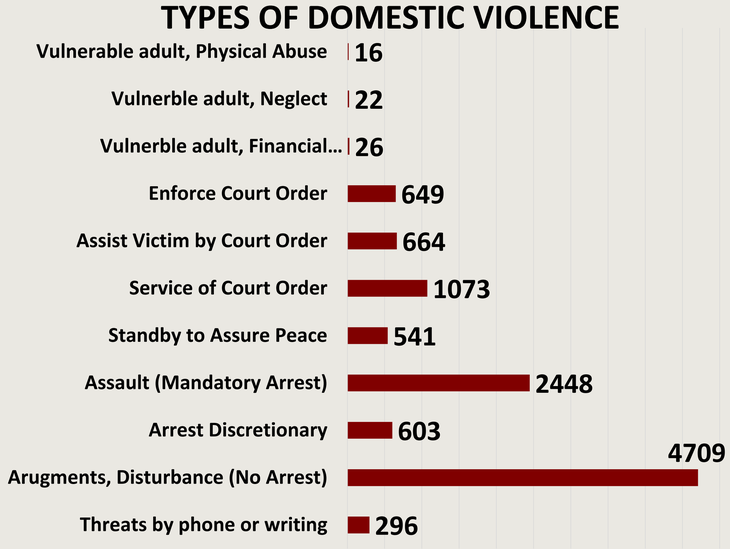
- Analyzed Months
- Gathered/Analyzed Streets
- Examined Reports
- Google Earth
  - Compared to Articles
  - Analyzed Physical Locations
- Examined the Handling of Reports
- Proximity
  - Alcohol
  - Women's Shelter

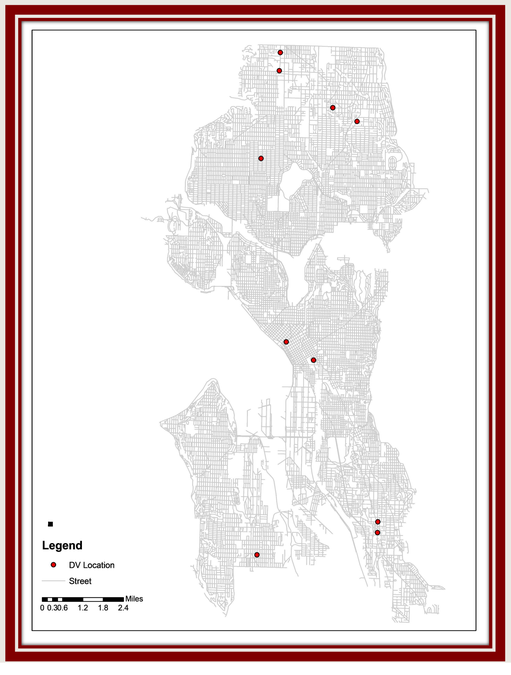
Results

CASES IN MONTH



TYPES OF DOMESTIC VIOLENCE





HANDLING OF REPORTS

Assistance Rendered	2510
Physical Arrest Made	1696
Report Written (No Arrest)	5439
Unable to Locate Incident or Complainant	512

PROXIMITY TO ALCOHOL & WOMEN'S SHELTER

Address	Frequency	Alcohol	Shelter
325 9 AV	22	2 minutes	7 minutes
13030 LINDEN AV N	21	11 minutes	8 minutes
149 NW 80 ST	19	8 minutes	52 minutes
1902 2 AV	18	3 taverns - 2 minutes	1 minute
4206 S CHICAGO ST	18	30 minutes	10 minutes
11004 14 AV NE	17	13 minutes	31 minutes
2741 NE 103 ST	17	2 taverns - 17 minutes	38 minutes
4219 S OTHELLO ST	17	25 minutes	3 and 5 minutes
9052 17 AV SW	16	3 minutes	1 hour and 58 minutes
14100 LINDEN AV N	39	10 minutes	17 minutes

Conclusion

- ❖The accessibility of alcohol did not affect the amount of domestic violence.
- ❖The lack of resources for domestic violence victims did not affect the rate of domestic violence.
- ❖Police do respond to domestic violence victims and want to take action.
- ❖The majority of the victims do not want the offender arrested.
- ❖There are certain months that have an increase in domestic violence.
- ❖Domestic violence happens in other homes besides low income houses.

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