ABSTRACT
WRITING AND POSTER DESIGN
• **Abstracts** are due March 1. All abstracts must have titles. These are submitted online. We will send you the link.

• **Posters** are due April 13 (but people are encouraged to print elsewhere). Posters are submitted online. The Aresty Center has poster templates available for download at [https://aresty.rutgers.edu/research-symposium/poster-design-and-printing](https://aresty.rutgers.edu/research-symposium/poster-design-and-printing).

• **Symposium** is April 29th in the Livingston Student Center. There are two sessions (AM and PM) and students will select which one they prefer when they submit their abstracts.

• **Group projects** should submit one abstract/poster that lists the name of everyone in the group.

• **Faculty mentors** must be given time to review abstracts and posters. Students who submit posters without faculty approval will not be permitted to present.
YOUR SYMPOSIUM AUDIENCE IS DIVERSE

Your audience will include:

Experts in your field
- Your professors
- Colleagues
- Students in your major

Intelligent non-experts
- Professors outside your field
- Graduate students outside your field
- Judges

Novices
- Friends
- Family
- Prospective students

Your abstract, poster and presentation itself should be able to balance the demands of each of these groups.
THE PARTS OF A POSTER

1. **Abstract or Introduction:** What is the research question and why is it important?

2. **Background or Overview:** How does it relate to previous work and how is your approach different?

3. **Materials and Methods:** What is the method for answering the question?

4. **Results:** What did you find?

5. **Conclusions:** What are the implications for your field, businesses, or individuals?

6. **Citations:** Who influenced this work or made it possible?
WHAT MAKES AN EFFECTIVE POSTER?

Consider the following posters and discuss these questions:

1. Where does your eye go first when you view a poster?

2. Compare images on the various posters. What purpose do the charts and graphs play? What makes them more or less clear?

3. What makes the flow (the arrangement of the sections) easier or harder to follow?

4. What do you notice about the amount of text and use of white space on various posters?

5. At what point does it become hard to keep reading a poster?
Obesity Propensity Differentially Alters Locus Coeruleus Norepinephrine Neural Activity

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Backgrounds

Obesity is associated with a variety of metabolic and lifestyle disruptions, including reduced mood, lower quality of life scores, and an elevated risk for cardiovascular diseases. It is a widespread health issue in the United States. According to the Center for Disease Control and Prevention, more than one-third (35.7%) of American adults are categorized as obese.

Food intake is regulated by several projections to brain areas. One of which is the locus coeruleus norepinephrine (LC-NE) system. The LC-NE is an important modulator of affect, stress response, and sympathetic activation. Despite this, little is known of obesity’s influences on the LC-NE system.

Single-unit electrophysiology is a reliable technique to directly characterize neuron firing patterns. When utilized in vivo, electrophysiology could be used to investigate sensory, motor, and regulatory neurons in their intact circuitry. Likewise, locus coeruleus neurons demonstrate spontaneous and biphasic responses to painful sensations that can be observed through electrophysiology.

Motivations & Approach

- Given the high number of afflicted Americans, obesity and its propensity are important research topics.
- Novel understandings of obesity’s influences on the LC-NE system could provide insights to future treatments.
- Locus coeruleus neurons exhibit reliable biphasic responses that are also sensitive to specific physiological manipulations.
- Previous electrophysiology experiments by the Bello Lab have demonstrated that dietary induced binge-eating dampens locus coeruleus activation.
- The aim of this experiment is to characterize the effects of obesity propensity on the LC-NE circuitry.

Materials & Methods

- The present study utilizes obesity animal models in Sprague-Dawley rats selectively bred to be obese-prone (OP) or resistant (OR).
- These two strains are further split into groups fed either high-fat (45%), low-fat (10%), or control diets ad lib 10 weeks.
- See table below for grouping summary.
- Non-invasive cardiovascular data was taken at the 10th week.
- The locus coeruleus neurons of these animals were subsequently recorded through single-unit in vivo electrophysiology under isoflurane anesthesia.
- During each electrophysiology recording, 3 minutes of spontaneous activity was recorded followed by 50 trials of contralateral sciatic nerve stimulations applied at 0.2 Hz.
- 2-10 cells were recorded per rat and the data was compiled into averaged peri-stimulus histograms for analysis.

Results

- Figure A: Body weight progression of each group across the ten-week time span with their designated diet. After week 10, the OP animals demonstrated a roughly 25% higher body weight than the OR animals. High-fat diet also increased body weight as expected, to a lesser extent.
- Figure B: The final recording body weight of each group. Bar indicates average body weight ± SEM. Each group exhibited significantly different body weight ranges.
- Figure C: Cardiovascular data taken on week 10. Bar indicates mean ± SEM. Systolic and diastolic values demonstrated no significant differences between groups. The heart rate of the OR group (275 ± 12 bpm; p = 0.31) was significantly slower than that of the OP group (313 ± 23 bpm; p = 0.01). At the same time, the high-fat group (275 ± 11 bpm) also had significantly slower heart rate than the low-fat group (321 ± 15.4 bpm; p = 0.93). However, no strain-diet interactions were detected.
- Figure D: Strain of spontaneous activity. X-axis indicates time from stimulation. This histogram revealed significant strain effects in the evoked spontaneous activity of the firing pattern. For rate analysis, see figure F and G below. OP animals also visibly demonstrated a shorter inhibition period indicated by the earlier recovery phase.
- Figure E: Diet of evoked activity. X-axis indicates time from stimulation. This histogram showed no significant dietary effects.
- Figure F: Rate data of spontaneous discharge. Bar indicates mean ± SEM. There was a higher spontaneous discharge rate for OP (151 ± 0.18 Hz) compared to OR (72 ± 0.09 Hz; p = 0.001). Post-hoc analysis further revealed that the OP-CD spontaneous activity is significantly different than the three other groups. Similarly, OP demonstrated heightened tonic activity (300 ms before stimulus onset, 1.87 ± 0.90 Hz, bar graph not shown) than OR (1.53 ± 0.80 Hz; p = 0.01).
- Figure G: Rate data of evoked activity firing. The OP group (6.45 ± 0.39 Hz) exhibited lower evoked firing rate than the OR group (8.42 ± 0.34 Hz; p = 0.15).

Conclusions

- The obesity rat models sufficiently represent the phenotypes of human obesity by having reached the top 75% of the body weights with food ad lib.
- The OP group expressed significantly dampened evoked activation of the LC-NE system versus the OR group.
- The OP animals also expressed an elevated level in the spontaneous discharge rate of locus coeruleus neurons compared with the OR animals.
- The signal-to-noise ratio analysis revealed that the groups of different obesity propensities responds differently to high- and low-fat diets.

Discussion

The present data are the first evidences for the involvement of the LC-NE in obesity susceptibility. Similarly, these results provide further insights into the chronic influences of obesity on the LC-NE system and, therefore, on mood and sympathetic activity. These findings provide grounds for LC-NE targeting treatments of obesity-related emotional disorders.

To complement this experiment, an additional group of non-selected strain of Sprague-Dawley rats will be recorded after appropriate dietary conditioning to represent the theoretical baseline of obesity propensity. Furthermore, the relationship between obesity propensity and the fat-content level in diets is also a topic of interest.

Future research directions look to investigate mechanisms of mood and neurochemistry modulated by LC-NE activity in the context of obesity using LC-NE targeting treatments of obesity.

Acknowledgements

We would like to thank the Artery Research Center for providing the necessary funding for this experiment. Additional thanks go to the members of the Bello Lab who made this project possible.
Are Haspin and Bub1 kinases redundant for female meiotic chromosome segregation in Drosophila?

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The chromosomal passenger complex is required for accurate spindle assembly

- The chromosomal passenger complex (CPC) regulates spindle assembly and chromosome segregation. It is composed of four proteins and localizes in a ring around chromatin to organize the spindle in meiosis [2].

- When CPC member proteins INCENP and Aurora B (4a) are knocked down in oocytes, CPC ring localization is not observed and no spindle assemblies [3].

- There is also evidence for CPC localization at centromeres in early metaphase during female meiotic spindle assembly (S. Radford, personal communication).

Haspin and Bub1 kinases recruit CPC subunits

- Through interaction with Pds5, Haspin kinase phosphorylates Histone H3 at Thr3 and recruits the CPC member protein Survivin, which positions Aurora B at centromeres in mitosis [4].

- The phosphorylation of histone H3 at Thr12 by Bub1 kinase recruits Shugoshin protein MEI-3332 to centromeres, which in turn contributes to the localization of CPC member Borealin and activation of Aurora B [5].

Haspin is not independently essential for chromosome segregation in oocytes

- In order to get a deletion of Haspin, we used a Minos element 418 bp upstream of the coding region to excise the gene. 225 excisions were obtained, but no deletions.

- These data collected using a 65% knockdown of Haspin suggest that Haspin kinase is not required for mitosis or female meiosis.

- This scoring for nondisjunction events in females expressing this same Haspin RNAi indicates that Haspin is not essential for accurate chromosome segregation in oocytes.

Bub1 is not essential for female meiotic chromosome segregation

- Expression of Bub1 RNAi in various tissues was performed using a 98% knockdown of Bub1 transcript. These results suggest Bub1 is not required for mitosis or female meiosis.

- Females expressing Bub1 RNAi in their germline did not have increased nondisjunction events. This indicates that Bub1 is not essential for accurate chromosome segregation in oocytes.

References


Acknowledgements

We would like to thank TRIP at Harvard University for RNAi lines; the Rutgers University Division of Life Sciences and the Arsey Research Center for funding; and the members of the McKim lab for all of their assistance and continued support.
Abstract

Mutations in the Axinless Telangectasia Mutated (ATM) gene cause a neurodegenerative disorder known as Axinless Telangectasia (A-T). When the ATM protein is altered, it leads to the prevention of DNA repair, a weakening of the immune system, and an impairment of movement and coordination, among other symptoms. Our aim is to use human embryonic kidney cells (HEK293) and A-T affected induced pluripotent stem cells (iPSCs) to better understand the mechanisms behind the disease. Through the use of various genome editing techniques, we plan to insert a known sequence surrounded by 2 "LoxP" sites into the HEK 293 cells to replace a specific region. This is done with A-T that it will be removable with the addition of an enzyme known as Cre recombinase at the LoxP sites. These cells have been chosen for their relative hardness and the ease with which they can be transduced as a positive control for future experiments. We intend on working with the iPSCs in order to learn more about the effects of genome editing and study the causation/repair of the problems associated with A-T. Then, cellular function can be assessed by such methods as radiation treatment to see if genome correction can occur in the cells of affected individuals and how it will affect these cells.

Methods

The experiment began with 6408 (anti-bodies sensitive) HEK293 cells (pictured below) planted in medium without G418. They were then grown in a monolayer on a plate until they had become confluent (covered most of the plate).

These cells were then transfected using the CRISPR/Cas9-9 Gene Expression directed to exon 6 of the ATM gene by guide RNA. The guide RNA finds the target sequence, which leads to the binding of Cas9 to the target site and a double strand break proximal (according to pictured below). This promotes homologous repair of the genome.

The donor DNA sequence from the designed plasmid (pictured below) is then inserted into this double-strand break during the transfection through homologous recombination to replace the recently excised DNA. This leads to some cells carrying G418 resistance conferred on it by the neomycin resistance gene (neo) contained in the plasmid originally. The plasmid was cut at the Keel and Accl (not shown) therefore targeting the plasmid to promote homologous recombination. These sites do not interrupt the inserted parts of the plasmid. Green Fluorescent Protein (GFP) was also transcribed into the cells, and successfully transfected cells would mean fluorescence would be observable in them within 24-48 hours, as seen above.

Since the cells now have this new gene, they can be placed in medium that contains G418. Cells that survive and grow as a monolayer have been "selected" as they must carry G418 resistance. All cells beyond this point should contain the neo gene as well as the LoxP sites.

Once these cells are confluent, they are plated at a density of 1 cell per well in a 96 well plate to be able to track results to specific clonal cell lines. If homologous directed repair is observed, these cells shouldn’t be mixed up with non-homologous combined cells, so non-homologous combination doesn’t insert the LoxP sites where we want them to be. These cells become confluent in the 96 well plate and are then re-cultured for further DNA analysis.

These collected cells are then lysed to recover DNA. Then, using a technique called "polyacrylamide nuclear acid purification" the DNA is separated from the other parts of the lysed cells and collected.

Combining this DNA with primers of known length and sequence, a Polymerase Chain Reaction (PCR) is started. This allows us to amplify the quantity of the relevant DNA sought out by the primers so that when they later run on a gel, there will be more DNA and thus a stronger band.

After running the gel electrophoresis with this amplified DNA, we expect to see a band in the region corresponding to the primers, which would indicate that the donor sequence had inserted into the HEK293 genome.

Conclusions

There are still many more samples left to test, but the positive results seen in Figure 3 show that it is possible to insert the desired neoamycin resistance sequence in the genome at the correct location. We want to expand upon these results and garner further proof of the successful homologous recombination. There were a couple of experiments run with TALENs as well that did not progress as far as this CRISPR one, so if we’re nice to see that work since it has its own benefits, such as greater specificity of targeting. We can use what we have learned and confirmed from this experiment to try to correct mutations in afflicted individuals to see if this can change the observed symptomolohogenes. Since these cells can serve as a positive control, this also allows us to work with the various genome editing techniques and see how effectively and efficiently they work for future studies, especially in iPSCs. Genome editing is the future of biotechnology and has the potential to help the lives of many people with debilitating genetic defects. Having full control of the mutations associated with this disease opens up a world of possibilities in studying and potentially curing A-T.

References


Acknowledgements

Thank you to Dr. Ronald Hart and Dr. Jennifer Moore for providing me with guidance, assistance, training, and the knowledge necessary to complete this project. I’d also like to thank Michael D’Ecclessis, Alana Toro-Ramos, and Mavis Swordel for putting up with me and helping me through whatever problems I had even when I may have seemed like a lost cause.
Examining whether CED-3 cleaves RPM-1 to promote neuronal regeneration in C. elegans
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Abstract

Neurons of the human central nervous system do not regenerate well after injuries such as stroke or spinal cord injury. Currently, effective therapies to treat these injuries are lacking, but researchers are working towards the ultimate goal of promoting neuronal regeneration and completely restoring neuronal function. To achieve this goal, a more complete understanding of the neuronal intrinsic and extrinsic factors regulating regeneration is needed. In recent years, a C. elegans model for studying regeneration was developed using a pulsed laser to sever axons of individual fluorescently labeled neurons. Regeneration of these neurons can then be analyzed over the next several hours and days by measuring the extent of re-growth. A laser axotomy setup and the laser axotomy protocol were established in the lab. In addition, the Driscoll lab determined that the apoptotic executioner protein CED-3 promotes regeneration through the conserved DLK-1-MAPK/ERK pathways. CED-3 may be modulating DLK-1 activity through the DLK-1 negative regulator RPM-1, an E3 ubiquitin ligase. RPM-1 has two putative CED-3 caspase cleavage sites. Furthermore, the F-box protein FSN-1, which acts in conjunction with RPM-1 to ubiquitinate DLK-1, is also being investigated. Our working model proposes that CED-3 cleaves RPM-1 in response to neuronal injury allowing DLK-1 to promote regeneration. The ced-3, rpm-1, and fsn-1 mutants were selectively crossed and preliminary data indicate that the ced-3, rpm-1, double mutant displays similar regenerative outgrowth to the rpm-1 strain, suggesting that CED-3 may cleave RPM-1 to promote regeneration. Similarly, the ced-3, fsn-1 double mutant displays similar regenerative outgrowth to the fsn-1 strain, suggesting FSN-1 operates downstream of CED-3.

Laser axotomy paradigm

Figure 1. C. elegans are mounted and immobilized on slides using agarose pads and 0.01 um polystyrene microbeads and GFP labeled ALM touch neurons are visualized. Laser pulses (435 nm) are then used to cut ALM axons. Worms are rescued from the slide, allowed to recover for 24 hours, and remounted to measure regenerative outgrowth.

Driscoll lab laser axotomy setup

Figure 2. The Driscoll lab’s laser axotomy setup (i). The fluorescent ALM neuron is visualized and crosshair denoting laser target is aligned with the axon (ii). Laser pulses are used to sever the axon, confirmed by a gap in fluorescence (iii).

24 hour regenerative outgrowth

Figure 3. GFP labeled wild type ALM touch neuron before laser axotomy (i), immediately after axotomy (ii), and then 24 hours later (iii). Wild type ALM neurons generate approximately 100 um of regenerative outgrowth during the first 24 h after axotomy.

Working model for CED-3 regeneration pathway

Figure 4. Neuronal injury leads to an influx of calcium into the cell that is amplified by the ER calcium chaperone CRT-1 (calreticulin). CED-3 binds to calcium through two putative EF hand domains which leads to oligomerization of CED-3 and CED-3 binding. CED-3 can then auto-activate (similar mechanism as apoptosis) and promote regeneration through the DLK-1 MAPK pathway, possibly by cleavage/inactivation of a complex formed by RPM-1 (an E3 ubiquitin ligase and negative regulator of DLK-1) and FSN-1.

Does CED-3 act through RPM-1/FSN-1 to promote regeneration?

Figure 5. Wild type ALM neurons expressing GFP prior to axotomy (i), immediately after axotomy (ii), and 24 h later (iii). Mutations in ced-3 decrease 24 h regrowth (iv), while rpm-1 (v), ced-3 rpm-1 (vi), fsn-1 (vii), and ced-3 fsn-1 (viii) all regenerate more than wild type. The rpm-1 and fsn-1 mutations are epistatic to ced-3 suggesting that RPM-1/FSN-1 acts downstream of CED-3.

Regenerative outgrowth in ced-3, rpm-1, and fsn-1

Figure 6. Regenerative outgrowth measured 24 h after laser axotomy indicates ced-3 mutants regenerate approximately half of wild type animals. rpm-1, ced-3, rpm-1, fsn-1, and ced-3 fsn-1 animals regenerate significantly more than wild type. (T-test * P = 0.05)

Putative RPM-1 cleavage sites

Figure 7. Two putative cleavage sites have been identified in RPM-1. Future studies include mutating either or both of these sites to determine if the point mutations will impact regeneration.

Summary

C. elegans were used as an in vivo model to study neuronal regeneration where neurons visualized using GFP are axotomized using a pulsed laser and new regenerative outgrowth measured. The Driscoll lab identified a novel regeneration pathway involving the core apoptotic proteins CED-3 and executioner caspase CED-4 and executioner caspase CED-3. CED-3 appears to act through the conserved DLK-2 regeneration pathway to promote regeneration but exactly how remains unclear. One possible mechanism for CED-3 modulation of the DLK-2 pathway being investigated is that CED-3 cleaves RPM-1, an E3 ubiquitin ligase and negative regulator of DLK-1, which contains two putative caspase cleavage sites. A ced-3 mutant was crossed with an rpm-1 and an fsn-1 mutant and were tested for regeneration along with each single mutant. Data indicates that ced-3 mutants regenerate less than wild type while rpm-1, fsn-1, ced-3 rpm-1, and ced-3 fsn-1 mutants regenerate more than wild type and ced-3. This suggests that CED-3 may promote regeneration through the DLK-1 pathway by cleaving the negative regulator RPM-1.

References


ABSTRACT

Investigations have indicated that aerobic fitness is strongly associated with reduced risk of mortality from both cardiovascular and non-cardiovascular diseases (Laakkanen et al., 2001). One proposed mechanism for the protective effect of cardiovascular fitness is attenuation of cardiovascular reactivity (CVR) to psychological stress and improved recovery from stressors (Spalding et al., 2004). In contrast, trait anxiety and hostility have been shown to be independent risk factors for coronary heart disease (CHD) (Miller et al., 1996). Therefore, the purpose of this study was to examine the relationships between aerobic fitness and trait anxiety on CVR and recovery from psychological stressors. A secondary purpose was to examine the moderating influence of aerobic fitness on the trait anxiety and stress-related CVR relationship.

HYPOTHESES

1. Greater aerobically fit individuals will exhibit lower levels of CVR and faster recovery in response to psychological stress.
2. Individuals with higher trait anxiety levels will evidence greater cardiovascular responses to psychological stress.
3. Aerobic fitness will moderate the relationship between trait anxiety and cardiovascular stress responses.

RESULTS

- A significant rise in DBP was observed in the low fit group during the Stroop task, p.<0.05.
- Greater high frequency HRV was observed for fit individuals at baseline and during the 5-min recovery period, p.<0.05.
- High anxiety group displayed higher SBP and DBP for the Stroop task, trending towards significance, p.<0.05.
- No significant relationships between hostility and CVR or recovery from stress were found, p.<0.05.

CONCLUSIONS

- Greater anxiety is associated with greater CV reactivity and slower DBP recovery from psychological stressors. These results further suggest that aerobic fitness training may increase the ability of cardiovascular systems to control responses to acute stressors.
- Second, the stressors were effective as demonstrated by the CV variables as well as lower HF-HRV (parasympathetic cardiac control) during psychological stress exposure.
- Contrary to our expectations, trait hostility was not associated with CV stress responses.
- Physical fitness was associated with attenuated DBP responses to the Stroop task and although not statistically significant, also had a moderate effect on SBP responses.
- Fitness was related to lower HR and DBP values at rest, suggesting that lower absolute cardiovascular oscillations in fit individuals may explain the attenuated stress responses observed among fit individuals.
- Fitness was associated with high frequency HRV at baseline and during recovery, indicating higher vagally-mediated respiratory sinus arrhythmia.
- Associations between aerobic fitness and attenuated cardiovascular reactivity may provide an additional mechanism through which exercise may lead to improvements in cardiovascular health and decreased risk for adverse cardiovascular outcomes, including hypertension and coronary heart disease.

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Walking Through Italian Literature and Film
Mihaela Sanderson, Aresty Center Research Assistant to Professor Andrea Baldi, Ph.D
Rutgers University - School of Arts and Sciences - Department of Italian

Introduction

Engaging in what at first seems like an ordinary fact of life, upon reflection we realize that walking becomes viva in establishing our perception of place. An essential kinesthetic behavior helps us alter our surroundings and use our environment to shape our philosophical thinking. In the moment we start walking, we essentially define the topography and the landscape of the city from an unique, individual perspective. By that very act, as passersby, we become the sole architects in redefining and mapping the city in a new, different way. The common practice of walking not only permits us to geographically elaborate on the countless facets of the outside world, but often leads us to serious thought, consideration, reflection and soul searching.

Background

The Walking Through Italian Literature and Film research project originated from the larger concept of flânerie. The objective of this research project is to supplement the base for a new course designed to examine different literary texts and films, all bound by a common theme i.e. the practice of walking. Through the practice of walking we are engaged in defining not only the geography of the space, but we are projecting new dimensions of cultural memory, the prioritization of individual freedom in relation to an ever-changing socio-economic framework, marked by the constant scientific and technological progress of the modernity. Among such literary texts, Marilde Serao’s realist short story entitled Una Fioria is perfectly detecting such dynamics. In this short story Serao not only reveals the practice of walking and the mapping of the city from that individual perspective, but also exposes the cultural practices and different characteristics pertaining to the social dimensions of that time.

My research aimed to study the representation of walking in the Italian Literature and Film of the 19th and 20th century. I have solely worked on the short story Una Fioria written by Matilde Serao. The first step in my research was to break down and organize the protagonist’s journey into four main sections. Two documents found at the New York Public Library were essential. After carefully studying a map of the city of Naples during 1899, the document entitled The Risanamento della Citta di Napoli del 1899, which I translated from Italian into English, I reconstructed and captured in digital maps (Google Maps) the main character’s journey in order to reach a deeper understanding of the relationship between the protagonist and her urban environment. Such relationships shed light on historical intricacies, social and cultural dynamics of that period.

Discussion

The main character’s meandering experience on the streets of Naples is strictly delimited by specific geographical parameters and in conformity with the reality of her social dimension. Serao’s story sets the stage of a broken Naples, in which the cityscape is minutely observed through the visual, auditory and olfactory senses, thus revealing the spatial relationship within the city as bound two distinct spheres: the bright, dominant squares anchoring luxurious shops, and the dark slums of the city marked by the lack of sanitation, the accumulation of sewage, high rates of disease, crime and poverty.

While working on the short story I have come across two particular details which influenced my research and at the same time guided its outcome. Such findings are closely connected to Naples’ major urban intervention started in 1885 as a result of a serious cholera outbreak, and later on, the intense destruction of World War II. Both events radically changed the architecture of the most historic districts of the city. However, it was Naples’ urban rehabilitation that enabled extensively the replacement of pre-existing structures with new buildings, roads and squares. In reality, instead of solving the problems, it created a facade meant to conceal the poverty and the degradation of those areas. As a result, I have created a map that exposes the changes brought by the Rehabilitation, which helps us appreciate the city as it was then, as well as the struggles of the Neapolitan people.

Serao’s use of the practice of walking within the city space is an important tool that highlights much larger issues of social injustice and economic disparities, universal themes that calls for further research in order to better understand the past in relation to today’s social and cultural practices.

Glossary

Kinesthetic: the use of the body and senses to learn about the world around you.
Flânerie: a 19th/20th century French term denoting strolling, idling. The term was further explored in 19th century in the writings of Charles Baudelaire accumulating the significant meaning of the casual wanderer, the observer and the reporter of the street life in the modern city.
Una Fioria - The Flower girl
Risanamento della Città di Napoli - 1899 - Rehabilitation of the City of Naples 1899 document, but project initiated in 1885, a year after the cholera outbreak in 1884.

Acknowledgements

I would like to express my gratitude to Professor Baldi for giving me this extraordinary opportunity to learn and grow, for his encouragement, continued support, and guidance throughout the year. Many thanks to Francesca Gianetti, Digital Humanities Librarian Research at Archibald S. Alexander Library for providing me with a crash course in digital mapping. I cannot express enough thanks to the Aresty Research Center, the School of Arts and Sciences, and to my friends Nicolotta Romano and Carol Cofone for their invaluable advice. I would also like to acknowledge the New York Public Library staff, especially the map division for their patience and help provided during my week long stay while doing research.
ABSTRACTS ARE MICROCOSMS OF POSTERS

• **Title** – A succinct description of the study or its findings. This is also the title of the poster.

• **Introduction** – What is the research question and why is it important?

• **Background** – How is your specific approach unique?

• **Methods or mode of analysis** - What is the method for addressing your question?

• **Results** - What did you find?

• **Conclusions** – What are the implications? Why should we care?
The Relationship between Undergraduate Research Participation and Subsequent Research Performance of Early Career STEM Graduate Students

Undergraduate research experiences have been adopted across higher education institutions. However, most studies examining benefits derived from undergraduate research rely on self-report of skill development.

This study used an empirical assessment of research skills to investigate associations between undergraduate research experiences and research skill performance in graduate school. Research experience characteristics including duration, autonomy, collaboration, and motivation were also examined.

Undergraduate research experience was linked to heightened graduate school performance in all research skills assessed. While autonomy and collaboration were highlighted in student interviews, duration was most strongly correlated to significant increases in research skill performance.

Based on these findings, we advocate for the inclusion of research experiences into the undergraduate science curriculum coupled with the creation of centralized offices of undergraduate research and faculty incentives for involving undergraduates in their research.

QUESTIONS/CONTACT US

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