

Issue 1

UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

UNDERGRADUATE RESEARCH JOURNAL



The University of North Carolina at Charlotte

TABLE OF CONTENTS

<i>The Criminal Cannibal: Examining the Similarities of Cannibalistic Offenders</i>	07
Brittany Carroll and Charisse T.M. Coston, Ph.D.	
<i>Racial Bias in Traffic Stops: The City Of Charlotte</i>	26
Carson Groulx and Anthony Fernandes, Ph.D.	
<i>The Study of COVID-19 Within the State of North Carolina in the United States</i>	49
Cesar Alzate and Zingjie Helen Li, Ph.D.	
<i>Crisis for the University Student: Changing Student Housing and Growing Cost Burden</i>	78
Connor Wood and J. Claire Schuch, Ph.D.	
<i>Practice What They Preach?: How Pre-Service Teachers’ Self-Efficacy in Culturally Relevant Teaching Practices Aligns with Their Perceptions of Diversity</i>	105
Faith Frayman, Cindy M. Gilson, Ph.D, Tehia Starker Glass, Ph.D, and Erin FitzPatrick, Ph.D.	
<i>Beyond the Knowledge Economy: Social Circus as an Intersectional Avenue to Global Aesthetics and Universal Ethics</i>	131
Krysta Rogden and Gretchen Alterowitz, M.F.A.	
<i>Cambridge Women and the Professional World: Navigating Gender Conservatism in the late Victorian Era</i>	146
Olivia Dobbs and Amanda Pipkin Ph.D.	
<i>Community and the Built Environment: The Physical and Social Consequences of Gentrification in Charlotte’s Lockwood</i>	161
Quinton Frederick and Nicole Peterson Ph.D.	

Introductory Letter

The Office of Undergraduate Research is proud to present the first issue of the University of North Carolina at Charlotte Undergraduate Research Journal. The journal introduces some of the very best faculty-mentored undergraduate research and scholarship from Charlotte, North Carolina's urban research university. The creation of this undergraduate research journal adds to the strength of the university as we achieve national prominence as an emerging, top-tier research university that prides itself on research and creativity, exemplary undergraduate, graduate and professional programs, civic and community engagement and innovation.

UNC Charlotte represents the heart of the city and the university that is committed to addressing cultural, economic, educational, environmental, health and social needs of the greater Charlotte Region. Our inclusive culture, renowned faculty and future-focused environment produces future researchers who are prepared to tackle the challenges that not only face our region, but the entire world. The articles that are presented in this issue are across various colleges and disciplines and highlight topics in the arts, education, and social issues.



Dr. Erin Banks, Assistant Dean
Office of Undergraduate Research
University of North Carolina at Charlotte

Congratulations to each of the scholars and faculty mentors featured in this journal as this is a culmination of a lengthy process of discovery filled with excitement, frustration, anticipation and delays due to COVID-19. Thank you to the Office of Undergraduate Research staff, faculty and student reviewers and Atkins Library who made the publication of the Undergraduate Research Journal possible.

I hope you enjoy and are enriched by the articles in this year's Undergraduate Research Journal.

Best Regards,

A handwritten signature in black ink that reads "Erin Banks". The signature is written in a cursive, flowing style.

Erin Banks, Ph.D.

Assistant Dean, Office of Undergraduate Research

ADVISORY BOARD

Dr. Joan Lorden

Provost and Vice Chancellor for
Academic Affairs
University of North Carolina Charlotte

Dr. Jayaraman Raja

Senior Associate Provost for Academic
Affairs
University of North Carolina Charlotte

Dr. John Smail

Associate Provost for Undergraduate
Education and Dean of University
College
University of North Carolina Charlotte

Dr. Rick Tankersley

Vice Chancellor for Economic Research
and Development
University of North Carolina Charlotte

Dr. Coral Wayland

Associate Dean of Curriculum, Office of
Undergraduate Education
University of North Carolina Charlotte

Dr. Heather Coffey

Associate Professor, Department of
Middle, Secondary, and K-12 Education
University of North Carolina Charlotte

Dr. Erik Byker

Associate Professor, Department of
Reading and Education
University of North Carolina Charlotte

Dr. Vaughn Schmutz

Associate Professor, Department of
Sociology
University of North Carolina Charlotte

Dr. Heather Perry

Associate Professor, Department of
History
University of North Carolina Charlotte

Dr. Banita Brown

Associate Dean for Academic and
Student Success
University of North Carolina Charlotte

MISSION

The University of North Carolina at Charlotte Undergraduate Research Journal is an open-access and peer reviewed journal of scholarly work conducted by undergraduate students. The goals of this journal are to: 1) provide a platform through which undergraduate students who conduct novel research at the University of North Carolina at Charlotte may publish their work, 2) allow students on the review board to experience the peer review process, and 3) share research that is conducted at the University of North Carolina at Charlotte with the Charlotte community and beyond. Manuscripts undergo a rigorous review process by a board of student and faculty reviewers. This journal features scholarly work from multiple disciplines.

WHAT IS UNDERGRADUATE RESEARCH?

Undergraduate research, as adopted by CUR (Council on Undergraduate Research), is a mentored investigation or creative inquiry conducted by undergraduates that seeks to make a scholarly or artistic contribution to knowledge. In addition, it is a high impact practice that greatly affects a student's academic career and success while also contributing to our society by adding to our global knowledge. Disseminating one's research findings is part of a holistic research experience, and the University of North Carolina at Charlotte Undergraduate Research Journal serves as a platform for students to communicate their research to the global community.

Authors hold the copyright in their individual contributions to this volume, which is published under a Creative Commons Attribution 4.0 (CC-BY) license (<https://creativecommons.org/licenses/by/4.0/>). More information on this journal's copyright policies is available at <https://journals.charlotte.edu/index.php/urj/about/submissions>.

ACKNOWLEDGEMENTS

It is with great pleasure that we present the first issue of the University of North Carolina at Charlotte's first Undergraduate Research Journal. We would like to thank the Atkins Library staff for their expertise and support in producing this journal. We give special thanks to the authors who submitted their manuscripts for publication in this inaugural issue and their faculty advisors for their mentorship. We would also like to give many thanks to the editorial board and to Charlotte's faculty and student reviewers for their invaluable time and expertise.



Dr. Erin Banks
Editor-in-Chief
Assistant Dean
Office of Undergraduate Research



Dr. Nhi Cao
Editor-in-Chief
Program Coordinator
Office of Undergraduate Research



Jemina Soerman
Editor
Graduate Assistant
Office of Undergraduate Research

THE CRIMINAL CANNIBAL: EXAMINING THE SIMILARITIES OF CANNIBALISTIC OFFENDERS

Department of Criminal Justice and Criminology
Brittany Carroll and Charisse T.M. Coston, Ph.D.

Abstract

Cannibalism is sometimes practiced by particularly violent offenders. This article discusses this behavior as it presents across 26 individual offenders convicted of murder. The similarities examined among these offenders present uniting features within the sample. These features include similar murder methods utilized, parts of the body consumed, and presence of sexual assault and/or necrophilia. Discussion of these similarities concludes that, while there are a variety of similar characteristics, it is necessary to utilize empirical phenomenological interview techniques in order to understand the significance of these behaviors to the individuals practicing them.

Keywords: cannibalism, violent crime, paraphilia, homicide, serial murder



Brittany E. Carroll

Brittany is a 2020 graduate of the University of North Carolina at Charlotte. During her time at UNCC, she attained a bachelor of science in Psychology and a bachelor of arts in Criminal Justice, graduating summa cum laude. Her research interests lie in examination of the violent offender and their psychopathology, as well as in examination of paraphilia and sexual disorders. She hopes to someday work as a clinician and educator, but in the meantime enjoys painting and caring for her three pet rats.



FACULTY ADVISOR
Charisse T.M. Coston, Ph.D.

Dr. Charisse Coston is a criminologist who teaches courses in the subtopic areas of Victimology, Sexual Assault, Serial Murder, Criminal Justice Management and Policy, The Portrayal of Crime in Music, Correctional Field Experiences and Research Methods at the graduate and undergraduate levels. She is also a Teaching Affiliate in the Honors College, Global and International Studies, and Africana Studies. Her research activities and publications focus on the criminal victimization experiences within and between especially high-risk targets of criminal victimization both nationally and internationally.

Introduction

Cannibalism is an ancient behavior, traceable back to modern man's predecessors *Homo antecessor* of some 800,000 years ago and has been studied in the context of numerous cultures (Travis-Henikoff, 2008). Despite its importance in select rituals outside of Western culture (Lindenbaum, 2004), cannibalism has achieved a degree of fascination in the Western world through media such as the *Silence of the Lambs* franchise. Such pieces of media draw public attention to the archetype of a criminal cannibal as an individual who commits a murder and practices cannibalism of the victim's remains. These cannibals are set apart from those one might find in study of the Fore people of Papua New Guinea or the Wari people of rural South America (Travis-Henikoff, 2008), whose cannibalism takes place in the non-criminal, anthropological context of their cultures.

These are not the subjects of this inquiry. While there are no concise definitions of the criminal cannibal to this author's knowledge, a definition which draws from prior attempts to typologize criminal cannibals (Bell, 2003; Giorando et al., 2012; Lindenbaum, 2004; Travis-Henikoff, 2008) has been adapted for this study. As such, the criminal cannibal of the present study has been defined as an individual who knowingly and/or with intention consumes the body (or parts thereof) of an individual who has died at the hands of the offender. Anthropological instances of cultural and/or ritual cannibalism are not included under this label. Criminal cannibals also do not consume the flesh of others out of physiological need, but an internal motivation. As such, this study excludes individuals who had to eat another person's body in a survival situation. The subjects of this study must have preemptively intended to commit their crimes. Finally, the criminal cannibals of this study work in solitude. These subjects are not offenders who work in teams, but are "lone wolves" who act without accomplices. Groups of cannibals, such as the Chicago Rippers and Russia's Alexander and Lyudmila Spesivtsev, while rare, warrant their own indepen-

dent investigation.

The present study will investigate numerous similarities across these offenders' crimes. Finally, this study will make a call for a greater application of empirical phenomenological interview techniques with violent offenders generally, but specifically those with unusual behaviors such as cannibalism. The point will be contested that gaining greater insight into the actual motivations of these individuals, as well as their perceptions of their own behavior, will aid in the understanding of these complex offenders.

Literature Review

Despite the popularity of criminal cannibalism as a subject, attempts to find reliable information on this type of offender are often in vain, as this concentration is still yet to be robustly explored. Even general discussions of cannibalism as a behavior are scarce. Stone (2001) discussed the frequency at which cannibalism appeared among perpetrators of serial sexual homicide, finding that it was practiced by seven of the 98 offenders in his study. Lester and colleagues (2015) revealed that likely 9% of serial killers engage in cannibalism, and that these offenders were more likely than non-cannibals to be brutal in their murders, mentally ill, and have a history of childhood physical abuse, but were less likely to be married and to have had a mentally healthy mother.

While there is a relative lack of information on cannibalism in general, some specific variations of cannibalism have received more attention. For example, clinical vampirism, a subset of cannibalism also known as "Renfield syndrome", involves drinking blood, often as a means to achieve sexual pleasure (Aggrawal, 2009). In the past, the term "clinical vampirism" was used to encompass the consumption of dead flesh as well as blood (Prins, 1985). In addition to this, necrophagy, a variant of cannibalism that involves the consumption of dead flesh, is often found

alongside necrophilia research (Aggrawal, 2009; Aggrawal, 2011). Despite this information about the different presentations of cannibalism, little is known about why these variations specifically manifest.

Though there have been very few inquiries into the act of cannibalism itself, there have been many attempts to typify it. These types are often developed through an anthropological lens and are therefore not always directly applicable in criminological study. Such a system has been developed by Lindenbaum (2004), who organized cannibals by their intent, largely as it is influenced by culture and setting. Her classification system includes eight distinct categories: Survival cannibalism, endocannibalism (e.g., funerary cannibalism), exocannibalism (e.g., wartime cannibalism), medicinal cannibalism, psychopathological cannibalism, auto-cannibalism (or autophagy), sacrificial cannibalism, and innocent cannibalism (Lindenbaum, 2004) also known as “benign cannibalism”, in which the individual does not know they are consuming human flesh (Travis-Henikoff, 2008). Perhaps the most relevant to this study is psychopathological cannibalism, which involves the presence of some kind of severe mental disorder as the cause of the behavior (Lindenbaum, 2004). While this typology overall is extremely useful in anthropological studies, it falls short of recognizing the many behaviors present both under and beyond the “psychopathological cannibal” type.

Bell (2003) put forward a system of categories specifically for criminal cannibals. In this system, there are four unique types of cannibalism: Sexual cannibalism, aggression cannibalism, modern spiritual/ritual cannibalism, and epicurean and nutritional cannibalism. Sexual cannibalism, in which the body is consumed to achieve erotic pleasure (Bell, 2003), is perhaps the most applicable to this study’s subjects, but still fails to completely encompass their behaviors. Most recently, Giordano and colleagues (2012) posited an even more succinct categorization system. As with Lindenbaum (2004) and Bell (2003), Giordano and colleagues’ (2012) classification system

is based on the offenders' motivations and includes the three categories of lust (for sex or power), revenge, and delusion.

While it does not match the current views of the field, it is this author's opinion that typifying cannibalistic offenders is, while superficially useful, ultimately a tedious and subjective pursuit. The case of Richard Chase, an offender with schizophrenia (Biondi & Hecox, 1992), provides a good example of the faults in typifying these offenders. In the Giordano and colleagues (2012) scheme of typifying, Chase is classified as "type 3", or a delusional cannibal. While it is true that Chase was driven by delusions that he needed to drink blood in order to stay alive, it is also true that he certainly was not singularly interested in the preservation of his health. Chase sexually degraded the bodies of his two female victims, mutilating the breasts and uterus of the first and the uterus and anus of the second. He also managed to anally assault the second victim (Biondi & Hecox, 1992). This behavior certainly seems indicative of lust as a motivator as well as delusion.

Of similar problematic status is Jeffrey Dahmer. Dahmer, a serial killer from Milwaukee, Wisconsin, was responsible for the deaths of 17 young men and teenagers from 1979-1991 (Schwartz, 1992; Masters, 1993; Newton, 2006). Dahmer is considered a "type one", or a lust cannibal, by the Giordano and colleagues (2012) classification system. However, his case is similarly multifaceted. While Dahmer's motivation for cannibalism clearly had a lust component, as he would often become sexually excited while consuming parts of his victims, it also had a rich symbolism to him (Masters, 1993). Dahmer was quoted saying, "I suppose in an odd way it [cannibalism] made me feel as if they were even more a part of me." (Masters, 1993, p. 278). He felt that eating his victims caused them to "come alive in him" (Schwartz, 1992, p. 199), and that it would make him more powerful. This belief manifested in a sort of symbolic partialism, as he believed that eating the arms and hearts in particular of his victims would make him more powerful

(Purcell & Arrigo, 2006). This belief echoes the classification for the delusional cannibal. As with Chase, an overlap between cannibal “types” occurs here. It could be argued that Dahmer’s beliefs were an extension of his lust--a lust for power in addition to a sexual lust. Even if this is the case, it further reveals classification systems as flawed, as classification is then only a matter of coder opinion and therefore very subjective.

Even if these systems simply aim to classify offenders by their most striking characteristic, they still erase all but the offender’s primary motivation and reduce them and their actions to a one-word class. This is no way to understand the *entirety* of the offender. As such, while classification systems for offenders do exist, they will not be used in the present study.

Methods

The present study endeavored to examine the prevalence of the several similarities across documented cases of criminal cannibalism. Such characteristics included whether the offender was using illicit substances at the time of the crime, whether or not the offender had a psychotic disorder (such as schizophrenia or bipolar disorder), whether the offender engaged in necrophilic activities, and whether the offender engaged in sexual assault prior to the victim’s death. The body parts consumed and the murder methods used by the offenders were also examined. In order to explore the level of brutality these offenders display, whether or not the offenders engaged in overkill was discussed. In an attempt to understand what kind of offenders these individuals usually are, it is discussed how many had multiple victims, consistent victim types, and multiple instances of cannibalism. Finally, it was investigated how many of these offenders had documented fixations on cannibalism prior to committing their crimes.

For the purposes of studying such an aberrant group, specific definitions were employed to operationalize otherwise ambiguous terms. As such, a new definition has been developed for the

ambiguous blanket term of “necrophilia”. Historically, the study of paraphilias has yielded multiple classification systems for necrophilia, such as those of Wulffen (1908), Krafft-Ebing (1998), and Jones (1931). Rosman and Resnick’s (1989) classification system is perhaps the most parsimonious of these, seeking to break necrophilic behavior into two groups--that of the genuine or “true” necrophile and that of the pseudonecrophile (perhaps better understood as an opportunistic necrophile). Aggrawal (2011) expanded upon these classification systems through a ten-tiered hierarchy of necrophilia, with Class IX pertaining specifically to homicidal necrophilia, wherein the necrophile is so driven by the urge to engage sexually with the dead that he is willing to go to the lengths of homicide. This class most closely fits the subjects of this study (Aggrawal, 2011). Due to the diversity of actions taken by the individuals in this study, a “catch-all” definition of necrophilia has been tailored. Behaviors included under the general term of necrophilia are as follows: Penetration (penial, digital, oral, fisting, or with a foreign object) of the vagina, anus, or mouth of the corpse; frotteurism; masturbation over or adjacent to the corpse; sexualized degradation and/or mutilation; licking, sucking, and/or biting of the corpse; copulation with the body’s viscera (splanchnophilia); sexualized positioning/posing; sexual gratification achieved from fetishistic tokens, such as body parts, underwear, or jewelry; taking sexualized pictures/videos for later masturbatory use; undressing of the body unnecessary for dismemberment; and sleeping alongside the corpse.

Similarly, the term overkill found itself in a state of ambiguity. For the sake of ease, overkill in this study has been largely summarized by Ressler and colleagues’ (1995) definition, which refers to overkill as “the infliction of more injury than is necessary to kill a person” (p. 55). In addition to this definition, and for the sake of the particular nature of these cases, this definition was extended into the treatment of the body after death as well. The definition of overkill for the present study includes mutilation of the victim’s body during the commission of or shortly follow-

ing the victim's murder, with the desecration of the body going beyond that which is necessary to kill the victim, and (in particular to the topic of cannibalistic offenders) beyond that which is necessary to dismember the body for butchering and/or disposal.

Books, documentaries, news articles, and journal articles for this study were located by searching for sources on cannibalism, serial murder, and violent murder. Through careful examination, relevant sources were selected. The online database PsycINFO and the library website of the University of North Carolina at Charlotte were also utilized in this research, with search terms including "cannibalism", "anthropophagy", "necrophagy", "human", and "cannibal". A list of 77 potential subjects was compiled. Offenders on this list were examined and many were eliminated due to insufficient proof of cannibalism. Ultimately a total of 26 offenders were selected for this study. All of the individuals studied are male. The historical span of these crimes range from 1903 to 2016. Murder method was broken down into four categories by frequency of use. None of the offenders in this study used more than four methods to dispatch victims, though some used the same method multiple times. Simple percentages were used to determine the prevalence of behaviors across these individuals.

Results

Table 1

Similarities across Offenders

Name	Illicit substances	Psychotic disorder	Confirmed necrophilia	Sexual assault	Overkill	Multiple victims	Consistent victim type	Multiple cannibalized	Prior interest
Bryan, Peter		yes			yes	yes	yes		yes
Bychkov, Alexander					yes	yes	yes	yes	
Chase, Richard		yes	yes		yes	yes		yes	
Chikatilo, Andrei			yes		yes	yes		yes	yes
Clark, Bradfield			yes		yes				
Clark, Hadden		yes	yes		yes	yes	yes	yes	
Dahmer, Jeffrey			yes	yes		yes	yes	yes	
Dengiz, Ozgur						yes	yes		yes
Denke, Karl					yes	yes	yes	yes	
Dzhumagaliev, Nikolai		yes		yes	yes	yes	yes	yes	
Fentress, Albert				yes					
Fish, Albert		yes	yes	yes	yes	yes	yes	yes	yes
Griffiths, Stephen			yes		yes	yes	yes	yes	
Harrouff, Austin		yes			yes	yes			yes
Kemper, Edmund			yes		yes	yes	yes	yes	yes
Kroll, Joachim			yes	yes		yes		yes	
Meiwes, Armin									yes
Miyazaki, Tsutomu		yes	yes			yes	yes		
Morley, Anthony					yes				
Oberhansley, Joseph					yes	yes	yes		
Sagawa, Issei			yes						yes
Sanchez, Otty		yes			yes				
Sappington, Marc	yes	yes			yes	yes	yes	yes	yes
Singleton, Antron	yes				yes				yes
Woodmansee, Michael				yes	yes				
Yoo, Young-Chul					yes	yes	yes	yes	
Total	2	9	11	6	19	18	14	13	10
Percent of total	7.69	34.62	42.31	23.08	73.08	69.23	53.85	50.00	38.46

Note. This table displays a set of similarities across the offenders in the present study.

As shown in Table 1, of the 26 offenders it was found that only 7.69% (2) used an illicit substance at the time of their crimes. The illicit substance used in both of these cases was phenylclidine, or PCP. Nine, or 34.62%, of the offenders were diagnosed with a disorder that caused psychosis, with 11.54% (3) having insufficient data to make such a determination. Overkill was observed frequently amongst offenders in this study. A total of 73.08% (19) of all offenders displayed this behavior. Eighteen (69.23%) of the subjects had multiple victims. Interestingly, only 38.46% (10) of all offenders are known to have expressed a prior interest in cannibalism as a

concept, activity, or desire. The remaining 61.53% (16) lack sufficient information upon which to draw such conclusions.

Table 2

<i>Sexual Conduct</i>			
Name	Genitals/ breasts	Necrophilia	Sexual assault
Bryan, Peter			
Bychkov, Alexander			
Chase, Richard		yes	
Chikatilo, Andrei	yes	yes	
Clark, Bradfield	yes	yes	
Clark, Hadden		yes	
Dahmer, Jeffrey		yes	yes
Dengiz, Ozgur			
Denke, Karl			
Dzhumagaliev, Nikolai	yes		yes
Fentress, Albert	yes		yes
Fish, Albert	yes	yes	yes
Griffiths, Stephen		yes	
Harrouff, Austin			
Kemper, Edmund		yes	
Kroll, Joachim		yes	yes
Meiwes, Armin	yes		
Miyazaki, Tsutomu		yes	
Morley, Anthony			
Oberhansley, Joseph			
Sagawa, Issei	yes	yes	
Sanchez, Otty			
Sappington, Marc			
Singleton, Antron			
Woodmansee, Michael			yes
Yoo, Young-Chul			
Total	8	11	6
Percent of total	30.77	42.31	23.08

Note. This table demonstrates the presence of sexualized conduct in the offenders, as well as the overlap of these behaviors in the individual offenders.

As shown in Table 2, many of the subjects in this study engaged in various sexual acts

with their victims' bodies in addition to consuming sexualized body parts. While a confirmed 42.31% (11) of offenders engaged in necrophilia, only 23.03% (6) engaged in confirmed acts of sexual assault prior to death, and only 11.54% (3) of the total sample engaged in both sexual assault prior to the victim's death and necrophilia. In total, 26.92% (7) of the offenders consumed the genitalia/breasts of their victims, with 57.14% (4) of these also engaging in necrophilia and 28.57% (2) also engaging in sexual assault prior to death.

Table 3

<i>Body Parts Consumed</i>		
Part	Total	Percent
Leg	8	30.77
Genitals/breast	7	26.92
Face	5	19.23
Blood	4	15.38
Brain	4	15.38
Arm	3	11.54
Buttocks	3	11.54
Heart	3	11.54
Liver	3	11.54
Hand	2	7.69
Lungs	2	7.69
Belly	1	3.85
Chest	1	3.85
Foot	1	3.85
Kidneys	1	3.85
Unspecified	9	34.62

Note. This table demonstrates the rates at which specific parts of the body were consumed by offenders.

Despite the high prevalence of genital/breast consumption, Table 3 shows that these were not the most frequently consumed part of the body. The leg was consumed at the highest frequency at 30.77% (8). Pieces of the face follow, being consumed by 19.23% (5) of offenders. The brain was consumed by 15.38% (4) of the total offenders, as was blood. Other body parts, such

as the chest, belly, arm, hand, foot, and internal organs were consumed at a lower frequency. A considerable 34.62% (9) of the offenders consumed parts of the body that were unspecified.

Table 4

<i>Murder Method</i>				
Name	Primary	Secondary	Tertiary	Quaternary
Bryan, Peter	bludgeoning			
Bychkov, Alexander	bludgeoning	stabbing		
Chase, Richard	shooting			
Chikatilo, Andrei	strangulation	stabbing		
Clark, Bradfield	mutilation	-	-	-
Clark, Hadden	stabbing			
Dahmer, Jeffrey	strangulation	stabbing	beating	
Dengiz, Ozgur	shooting			
Denke, Karl	axing			
Dzhumagaliev, Nikolai	axing			
Fentress, Albert	shooting	-	-	-
Fish, Albert	strangulation	mutilation		
Griffiths, Stephen	crossbow	stabbing		
Harrouff, Austin	stabbing			
Kemper, Edmund	shooting	strangulation	stabbing	slit throat
Kroll, Joachim	strangulation			
Meiwes, Armin	stabbing	-	-	-
Miyazaki, Tsutomu	strangulation			
Morley, Anthony	slit throat	-	-	-
Oberhansley, Joseph	stabbing			
Sagawa, Issei	shooting	-	-	-
Sanchez, Otty	decapitation	-	-	-
Sappington, Marc	stabbing	shooting		
Singleton, Antron	stabbing	-	-	-
Woodmansee, Michael	stabbing	-	-	-
Yoo, Young-Chul	decapitation	bludgeoning		

Note. This table displays the murder methods utilized by offenders. As some offenders killed multiple victims in different ways, the frequency of methods utilized are displayed here.

^a As not all offenders had multiple victims, those who killed only once are designated in columns after the primary column with a dash.

As shown in Table 4, the methods used by offenders to kill their victims were placed in four categories: Primary method, secondary method, tertiary method, and quaternary method. Of the overall offenders, 30.77% (8) had only committed one murder, therefore restricting them to the primary method category. As displayed in Table 5, in the primary and secondary categories stabbing was the most frequently utilized method.

Discussion

The general absence of illicit substance use was of interest, as it demonstrated that this behavior is not usually the result of illegal drugs in the system. Both offenders to have used illicit drugs at the time of their attacks also had previous noted interest in cannibalism. This suggests that they were already intrigued by the subject, and therefore that the drugs likely functioned only to lower their inhibitions rather than as the impetus for their actions.

The majority of offenders in this study were not diagnosed with any mental disorders that may cause psychosis or psychotic episodes. Four of the nine who did have such a diagnosis were also the only recorded individuals in this study who consumed blood specifically, suggesting the presence of clinical vampirism (Prins, 1984). As clinical vampirism is often seen alongside psychotic disorders, this follows (Prins, 1985).

There is a fairly large prevalence of confirmed necrophiles in this study. This behavior is almost twice as prevalent as instances of confirmed sexual assault prior to death. Consumption of the genitalia/breasts of victims was also fairly common among both the necrophile group (36.36%) and the sexual assault group (33.33%). Only one of the 26 total offenders consumed the genitals of his victim without sexually assaulting the victim or engaging in necrophilia with the body--and it should be noted that this individual engaged in consensual sex with his victim prior to their death. These data suggest a potential internal semiosis associated with the consumption of

specific parts of the victims' bodies. This concept has found some recognition by researchers such as Aggrawal (2011), who has identified that almost any part of the body may bring about sexual gratification when consumed. The semiotics of these choices warrants further investigation, as it may shed light on offenders' perceptions of their decisions, as well as their views on sex and intimacy.

Beyond the realm of only sexuality, the symbolism of part consumption can be well-illustrated through examination of some cases. As previously discussed, Dahmer placed particular significance on the hearts and muscular arms of his victims, believing that these parts of the body were imbued with a special life and vitality and would make him more powerful (Purcell & Arrigo, 2006). This suggests that there is a symbolic importance to consumption for these offenders. For example, one of the two individuals to consume the hands of a victim had a severe deformity of his own hands. The significance of the selection of any body part is likely best understood through exploration of the individual offenders' cognitions and perceptions of self and others. It is this author's contention that interview of these offenders is necessary to attain this kind of understanding.

An impressive 73.08% (19) of offenders engaged in overkill of their victims. Some degree of excessive violence is to be expected in cases of cannibalism, as the act itself necessitates the butchering of the victim's body. This supports the finding of Lester and colleagues (2015) that cannibals are more brutal than their non-cannibal peers. Future studies should venture to compare these groups. Of the overall sample of offenders in this study, stabbing was consistently the preferred murder method. The high prevalence of stabbing in these cases functions as further evidence that there is a sexual component to these crimes, as it has been found that stabbing, particularly multiple stabbings, often takes place when a murder is sexually-motivated (Radojević et al., 2013).

Though some of the offenders only had one victim, those who had multiple victims had a consistent victim type 77.78% of the time. They also consumed parts from more than one victim 72.22% of the time, perhaps indicating that cannibalism, if not a motivation for the murders themselves, was at least a desirable outcome for the offender. This may also mean that the introduction of cannibalism to a repeat offender's behavior may be indicative of escalation. Despite this large prevalence of repeat cannibals, only 10 of the 26 overall offenders are documented as having expressed previous interest in cannibalism. The absence of data here is once again significant. Criminal cannibalism is necessarily a very intentional act. Even if murder can be accidental, one must either *want to* or *feel obligated to* engage in cannibalism. Therefore, the lack of information about whether or not individuals expressed an interest in cannibalism prior to their crimes illustrates that there is a lack of information about these individuals' cognitions and motivations.

As has been displayed repeatedly, there exists a considerable deficit of insight into how these offenders think. This author posits that this void could be glutted by using empirical phenomenological interview techniques with these offenders. Such interviewing would encourage the individual to share their perceptions about what they have done and how they felt about it (Skrapek, 2001), and would therefore go far in answering many of the unknowns about offenders of this kind.

Limitations

There are important limitations to the present study. The research gathered for this study comes from a collection of news articles, books, online articles, scholarly journal articles, and documentaries. Such resources, while carefully selected to be as reliable as possible, may exaggerate the facts of these cases due to their sensational nature. It is similarly possible that journalistic reporting may not accurately represent the nuance of some cases and may lack the rigor of scholarly articles. In addition, in some cases certain details of the crimes were not released due to

sealed records. For this reason, the extent of some of the offenders' crimes may not be known to the public, and therefore are not taken into account in the present study.

Cases utilized in this study span over 100 years. During this time, the fields of psychology and criminology have grown and changed. Because of this, some psychiatric diagnoses may not meet current diagnostic standards, as they were issued before the release of the most recent edition of the Diagnostic and Statistical Manual of Mental Disorders.

The majority (50.00%) of the offenders in this study are from the United States. This limits the generalizability of these results. Inclusion of cases from more countries should be considered in future studies. In addition, this study does not examine if the country in which the crime is committed has any effect on the characteristics of crimes. It may be of interest to future researchers to examine how trends in this behavior vary by country.

This study lacks a comparison group of non-cannibal violent offenders, and therefore the prevalence of the variables examined are unknown in the violent offender population. The present study also does not delve deeply into demographic breakdown of its sample. Future studies may wish to endeavor more thoroughly into the kinds of individuals who engage in these behaviors rather than exploring only the characteristics of their crimes.

Conclusions

This exploration of criminal cannibalism has revealed similarities across male offenders of this kind. In particular, it examines the sexualized nature of cannibalism and raises questions as to why offenders choose to consume the parts of the body that they do. The high prevalence of overkill among these offenders suggests a level of aggression and hostility.

Ultimately, this study contributes to the limited extant data on criminal cannibalism and attempts to advocate for the utilization of empirical phenomenology in the interview process of

this type of offender. It suggests there may exist internalized symbolism about the consumption of different parts of the body, and that there may be a deeper meaning to criminal cannibalism yet to be explored. Research going forward should endeavor to understand these individuals in the context of their thoughts and feelings on their behaviors. In order to understand the true motivations behind these bizarre acts, it is necessary to qualitatively explore the interior and subjective experiences of these offenders.

REFERENCES

- Aggrawal, A. (2009). *Forensic and medico-legal aspects of sexual crimes and unusual sexual practices*. CRC Press.
- Aggrawal, A. (2011). *Necrophilia: Forensic and medico-legal aspects*. CRC Press.
- Bell, R. (2003, Jul. 8). Cannibalism: The ancient taboo in modern times. Crime Library.
https://web.archive.org/web/20150109023236/www.crimelibrary.com/criminal_mind/psychology/cannibalism/index.html
- Biondi, R., & Hecox, W. (1992). *The Dracula killer*. Pocket Books.
- Giordano, B., White, J., & Lester, D. (2012). A typology of criminal cannibalism. *American Journal of Forensic Psychology*, 30(3), 35-44.
- Jones, E. (1931). *On the nightmare*. Hogarth Press.
- Krafft-Ebing, R.F. (1998) *Psychopathia sexualis*. Arcade Publishing. (Original work published 1886)
- Lester, D., White, J., & Giordano, B. (2015). Cannibalism. *OMEGA- Journal of Death and Dying*, 70(4), 428–435. <https://doi.org/10.1177/0030222815573732>
- Lindenbaum, S. (2004). Thinking about cannibalism. *Annual Review of Anthropology*, 33, 475–498. <https://doi.org/10.1146/annurev.anthro.33.070203.143758>
- Masters, B. (1993). *The shrine of Jeffrey Dahmer*. Hodder and Stoughton.
- Newton, M. (2006). *The encyclopedia of serial killers* (2nd Ed). Infobase Publishing.
- Prins, H. (1984). Vampirism—Legendary or clinical phenomenon? *Medicine, Science and Law*, 24(4), 283-293. <https://doi.org/10.1177/002580248402400411>

REFERENCES

- Prins, H. (1985). Vampirism—A clinical condition. *British Journal of Psychiatry*, 146(6), 666–668. <https://doi.org/10.1192/bjp.146.6.666>
- Purcell, C.E., & Arrigo, B.A. (2006). *The psychology of lust murder*. Academic Press.
- Radojević, N., Radnić, B., Petković, S., Miljen, M., Čurović, I., Čukić, D., Šoć, M., & Savić, S. (2013). Multiple stabbing in sex-related homicides. *Journal of Forensic and Legal Medicine*, 20(5), 502–507. <https://doi.org/10.1016/j.jflm.2013.03.005>
- Ressler, R.K., Douglas, J.E., and Burgess, A.W. (1995). *Sexual homicide: Patterns and motives*. The Free Press.
- Rosman, J. P., & Resnick, P. J. (1989). Sexual attraction to corpses: A psychiatric review of necrophilia. *Bulletin of the American Academy of Psychiatry & the Law*, 17(2), 153–163.
- Schwartz, A. (2011). *The man who could not kill enough: The secret murders of Milwaukee's Jeffrey Dahmer*. Citadel.
- Skrapec, C. (2001). Phenomenology and serial murder: Asking different questions. *Homicide Studies*, 5(1), 46–63. <https://doi.org/10.1177/1088767901005001004>
- Stone, M. (2001). Serial sexual homicide: Biological, psychological, and sociological aspects. *Journal of Personality Disorders*, 15(1), 1–18. <https://doi.org/10.1521/pedi.15.1.1.18646>
- Travis-Henikoff, C. A. (2008). *Dinner with a cannibal: The complete history of mankind's oldest taboo*. Santa Monica Press.
- Wulffen E. (1908). *Enzyklopädie der modernen kriminalistik*. Paul Langenscheidt.

RACIAL BIAS IN TRAFFIC STOPS: THE CITY OF CHARLOTTE

Department of Mathematics and Statistics

Carson Groulx and Anthony Fernandes, Ph.D.

Abstract

This study analyzes the traffic stops data published by the City of Charlotte in the years 2016-2017 and 2019-2020 to determine if there was any racial bias in the policing. *R* was used to examine 213,475 stops that involved Black and White drivers. The analysis showed that Black drivers were more likely to be searched, and more likely to be let off with a lighter consequence (e.g., verbal warning). White drivers were more likely to get a citation while Black drivers were more likely to get arrested. When restricted to stops with searches, White drivers were more likely to be given a citation or arrested while Black drivers were more likely to be let off without action. These results are further skewed against Black males between the ages of 18-25. Implications are discussed. The *R* script and dataset are made available to facilitate reproducible research.

Keywords: traffic stops, police bias, statistics, dataset



Carson Groulx

Carson Groulx is a graduating Senior at the University of North Carolina at Charlotte studying mathematics. Following graduation, he will pursue a master's degree in data science at UNC Charlotte. He would like to work in data analytics and enjoys researching social or technical problems where mathematics and statistics may be applied.



FACULTY ADVISOR

Anthony Fernandes, Ph.D.

Dr. Anthony Fernandes is an associate professor of mathematics education in the Department of Mathematics and Statistics at the University of North Carolina at Charlotte. His research focuses on the intersection of language and mathematics, especially the use of cultural and multimodal resources by emerging bilingual students. He draws on this research to prepare mathematics teachers to work with emerging bilingual students. Dr. Fernandes is also interested in developing the critical consciousness of future mathematics teachers by engaging them in the analysis of large publicly available datasets.

Introduction

Traffic stops remain the most common way of interaction between the police and members of the community and shapes the perception that members have about police (Baumgartner, Epp, & Shoub, 2018). Black drivers are stopped more frequently, even when they make up a smaller part of the driving population, which has led to debates over whether police are racially biased. Based on the arrest data, African Americans⁰¹ are arrested at higher rates for street crimes. Police use this data to justify stopping a disproportionate number of Black drivers, assuming that they will have a higher chance of finding contraband (Harris, 1999). Over time the policy has created a distrust of the police among Black communities. The issue is that Black drivers feel targeted, and not only those who may have committed crimes. For example, Philandro Castile, a 32-year-old African American school cafeteria worker, was stopped at least 49 times for minor offenses over a 13-year period before he was shot in a traffic stop by an officer who assumed he was reaching for a gun instead of his identification (Capecchi & Furber, 2016). Usually referred to as “driving while Black”, Castile’s experience of being stopped multiple times, usually for minor infractions, is not unusual for young Black males who are often the targets of traffic stops in the U.S. (Capecchi & Furber, 2016). The debate over police bias even extends outside the U.S. Consider Toronto, which exemplifies some of the conflicts in this debate. In 1989, the Toronto police prohibited gathering and publishing race-based statistics collected at traffic stops because they felt it might promote racial stereotyping (Toronto Police Service, 2003). In 2002 the department was internationally recognized as one of the leaders in promoting civil rights and relationships with the community (Rankin, Quinn, Shephard, & Duncanson, 2002). However, research conducted by *Toronto Star* reported that the department used racial profiling and reasoned that several differences across

01 A note on language

We will use the terms “African American” and “Black” interchangeably. We are aware that the two are not the same and that there is no agreement on their use, but in absence of better language we decided to go with what is commonly used.

racial groups were the result of discrimination against Blacks (Rankin, Quinn, Shephard, & Duncanson, 2002). Following the article, Melchers (2003) raised questions about the analysis that was conducted and pointed to the use of the baseline of the Black population of Toronto as problematic. In the U.S. there were similar concerns raised by MacDonald (2010) about the *Interim Report of the State Police Review Team Regarding Allegations of Racial Profiling* from then-attorney general Peter Verniero. Overall, we see that the matter of racial profiling is complex, and assumptions and analyses should be transparent to foster an environment of dialogue.

Racial bias is a pressing matter for both communities and their police forces with serious consequences on both sides. Studies reveal that unjustified accusations of racial bias against police leads to greater forced coercion, abuse, and holding a cynical view on their work (Trinkner, Goff, & Kerrison, 2019). These views are held by both Black and White officers. On the other hand, frequent stops without good justification yields frustration and mistrust of the police in the community. The negative views of officers in adolescents increases the likelihood of delinquency and decreases public confidence in the criminal justice system (Walters, 2019; Maryfield, 2018). This leads to less cooperation from the community and a decline in democratic citizenship, like voting (Tyler & Jackson, 2014). Decreased political engagement can further worsen conditions for the Black community as Baumgartner, Epp and Shoub (2018) found that detrimental disparities in traffic stops data were greatest in areas in North Carolina where the Black community had little political power and representation. All police departments must make institutional decisions that carry the potential to exacerbate this issue. They must decide when and where to target their patrolling efforts or may decide to target specific kinds of stops. If it is the case that these decisions place a disproportionate amount of policing efforts onto a Black community (or any group) then a racial bias will be reflected in the data. Baumgartner et al. (2018) posit that the ramifications of over policing minority communities through higher stop and search rates are underestimated, and

that the consequences greatly outweigh any potential benefits. Thus, more thorough and transparent research is needed to examine racial bias in traffic stops to understand the impacts of policing and inform the development of interventions.

This research study examines traffic stops data in the city of Charlotte collected in 2016-2017 and 2019-2020. After cleaning our data, 98% of the traffic stops involved a Black or White driver. As such, we decided to limit the scope of our analysis to those instances with either a Black or White driver. Baumgartner, Epp and Shoub (2018) theorize four causes of racial bias in traffic stops data: Differences in driving habits between racial groups, differences in how officers treat racial groups, “bad apple” officers skewing the data, or institutional practices. From their study, we conjecture that institutional factors are likely to have the largest and most detectable effect on racial bias. For this reason, we split officers into separate groups to detect institutional factors, such as outcomes based on years of service rather than the races of the officers. This study seeks to answer the research question: Is racial bias a factor in the disparities observed between Black and White drivers in the traffic stops in the City of Charlotte?

One of the earlier studies on traffic stops was done by Lamberth (1991). His research team recorded the information of 42,000 cars on the New Jersey Turnpike, along with police data about stops that were made. They found that both Black and White drivers had the same rates of speeding. However, Black drivers were stopped at a higher rate. Blacks made up 35% of the drivers who were stopped, even though they were 13.5% of those on the road. Further, the Black drivers were 73.2% of those who were stopped and arrested. In another study, this time in Maryland, Lamberth found similar results. Even though Black drivers constituted 17.5% of traffic violators, 72% of those stopped and searched were Black. Further, he also found that upon searches being conducted, there was a similar hit rate for finding drugs in vehicles driven by Black or White drivers. Gross and Barnes (2002) did another study in Maryland that spanned five years and

found that Black drivers were twice as likely to be stopped than White drivers, and five times as likely to be searched. In general, the concerns about racial bias in the policing around traffic stops prompted the Department of Justice to suggest states collect race and ethnicity data in traffic stops for analysis (Hernández-Murillo & Knowles, 2004). North Carolina was one of the first states to participate in the data collection.

Building on data that was collected by the state, Baumgartner, Epp and Shoub (2018) examined the 20 million traffic stops in North Carolina between 2002 and 2016. Looking more closely at the year 2010, when the Census data was available for comparison, they found that Black drivers had a 63% higher chance of being pulled over compared to White drivers. Given that Census data includes children below the legal driving age and senior citizens without a driving license, 63% would underestimate the rate. Further, based on driving habits, the researchers observed that Blacks drove 84 miles for every 100 miles by Whites. Adjusting for the driving behavior, the researchers found that the rates of traffic stops were 94% more likely for Black drivers when compared to Whites. They also found that Blacks were consistently over-policed across various agencies and demonstrated that this can increase overall crime rates yet decrease criminal conviction rates. Further, the researchers also used the data to debunk common theories that Black drivers broke traffic rules at a higher rate than White drivers, and that there are a few “bad apple” officers responsible for the disparities in the stops. Their analysis showed that there were large disparities between the treatment of Black and White drivers.

One issue raised in relation to traffic stops studies is that of the baseline comparison to determine disproportionality. Comparisons to aggregate city demographics have been raised by Melchers (2003) who argues that traffic stops measure incidence, yet are compared to population statistics, which measure prevalence, can cause errors. Repeat offenders would also skew the interpretation. Thus, Melchers cautions analysts to consider establishing careful baselines for

their comparisons. Using population statistics as a baseline typically means we assume that the incidence statistics we are measuring are happening at random, and thus should reflect population demographics. However, incidence statistics involving police interactions are far from random. Police forces intentionally deploy patrols to specific times and locations to coincide with crime rates, which is another issue of bias. Examining the prior studies of Baumgardner et al. (2018) and Harris (1999), and considering the concerns of Melchers (2003), we are confident that using population statistics as baselines for certain comparisons lead to conservative estimates for many disparities observed. Therefore, if racial groups are observed to have differing proportions of incidents in traffic stops data, it is not reasonable to claim racial bias is the cause without considering the nuances above. Because of the complexities surrounding baselines for comparison, we chose to only use baselines that could be derived from the dataset.

One way to determine racial bias given traffic stops data is through the outcome test. Proposed by Gary Becker, this test compares rates of searches that turn up contraband between groups. If searches of minority groups turn up contraband at lower rates than searches of White drivers, then it suggests that racial bias is at play, causing officers to search minorities with less reason (Simoiu, Davies, & Goel, 2017). To improve the accuracy of the outcome test, we can combine it with a benchmark test. The benchmark test considers the different likelihoods that groups will be searched. The combination of these tests would indicate racial bias if a group were more likely to be searched than others, but also turns up contraband at a similar or lower rate than others. We considered these tests in our analysis of searches. We used arrests and citations to proxy contraband and infer the legitimacy of searches since the data set that we worked with lacks this information.

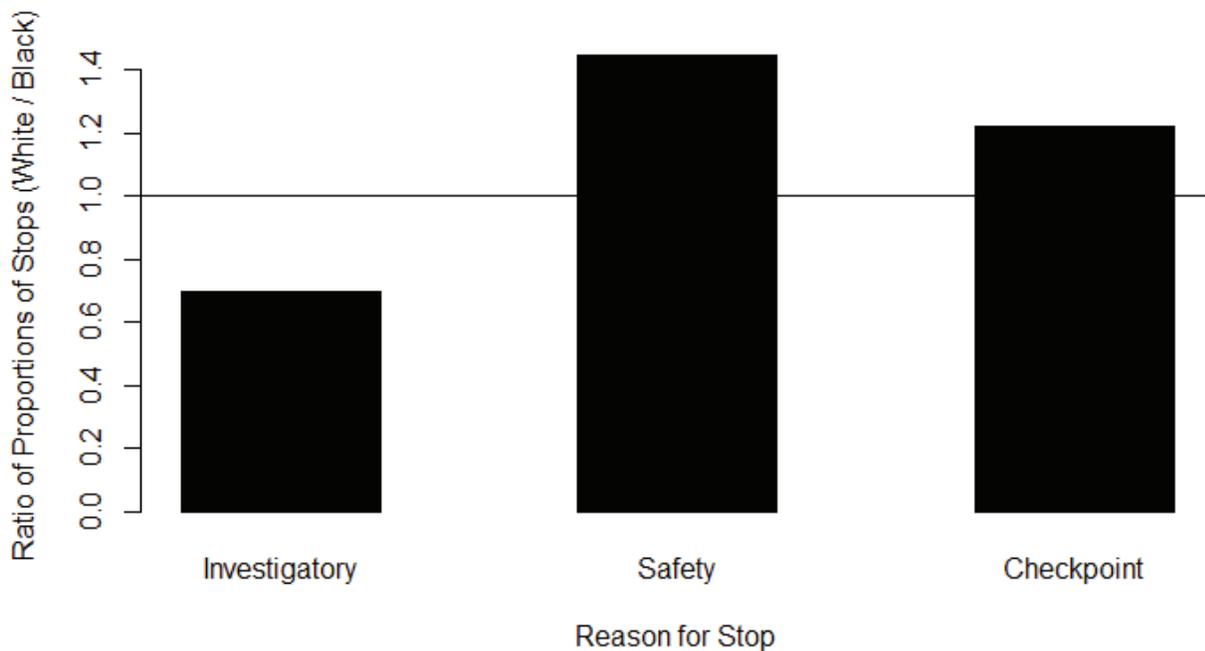
Materials & Methods

The script and data sets used for analysis are available at the following link: <https://github.com/carsongroulx/TafficStopsAnalysis>. Two data sets from The Charlotte Open Data Portal were combined for analysis in *R*. One from 2016-2017 contained 68,488 instances, and the other from 2019-2020 contained 158,917. Note that the 2018 data were not available. After combining the data sets, less than 5% of rows contained some missing value or had an unknown driver race, and such rows were removed. The instances of driver's race in this data set are 58% Black, 40% White, 2% > Asian, 1% > Native American, while officer's race are 73% White, 16% Black, 6% Asian/Pacific Islander, 4% Hispanic/Latino, 1% two or more races, 1% not specified, and < 1% American Indian/Alaska Native and Hawaiian/other Pacific Islander. Since Black and White drivers made up 98% of instances, we decided to focus on only those 213,475 instances for analysis.

Given our interest in possible bias against Black drivers, we used the numbers for Black drivers as baselines to visualize the data. Reasons for stops were grouped into the same three categories used by Baumgartner et al.'s (2018) study. Investigatory reasons included vehicle regulatory, vehicle equipment, seat belt, and investigation. Safety reasons included speeding, safe movement, stop light/sign, and driving while impaired. When considered in these groups, stops for the reason 'other' were left out. Out of the 125,323 instances for Black drivers, 0.59 (74,373) were for investigatory reasons, 0.40 (50,750) were for safety reasons, and < 0.01 (200) were for checkpoints. Out of the 84,044 instances for White drivers, 0.41 (34,691) were for investigatory reasons, 0.59 (49,189) were for safety reasons, and < 0.01 (164) were for checkpoints. Figure 1 shows the ratios of these proportions using those for Black drivers as the bases. For example, the category of investigatory is approximately 0.69 which is the ratio of 0.41 divided by 0.59.

Figure 1

Reasons for Stops Compared



Black drivers were stopped more for investigatory reasons, while White drivers were stopped more for safety reasons (Figure 1). Two-tailed, two proportion tests were conducted to determine if the proportions of stops for each reason were significantly different between Blacks and Whites. Each test was conducted with the null hypothesis that proportions were the same: $P_1 = P_2$, and the alternative hypothesis that proportions were not the same: $P_1 \neq P_2$. For example, for investigatory reasons we tested the null hypothesis: $P_1 (0.59) = P_2 (0.41)$ vs. the alternative hypothesis: $P_1 (0.59) \neq P_2 (0.41)$. We found that Black and White drivers were stopped at significantly different proportions for investigatory reasons and safety reasons, but not at checkpoints. Thus, we see that the observed differences in the proportions are likely not by chance. The results of these tests can be found in Table 1.

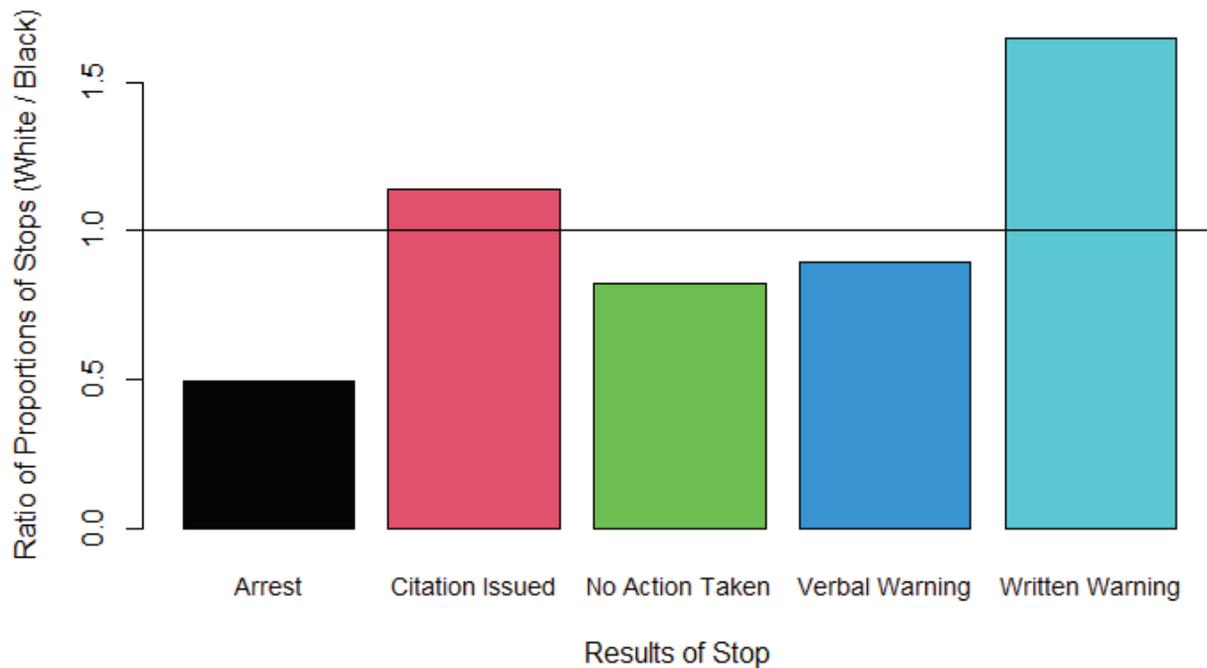
Table 1*Test Statistics from Two Proportion Tests for Reasons for Stops*

Variable	Chi-Square	df	p-value
Investigatory	6579.90	1	< .001
Safety	6556	1	< .001
Checkpoint	3.46	1	0.06283

Looking at the outcomes of the traffic stops, out of the 127,301 instances for Black drivers, 0.0289 (3,684) resulted in arrest, 0.3641 (46,351) resulted in citations, 0.0203 (2,590) resulted in no action taken, 0.5470 (69,628) resulted in verbal warnings, and 0.0397 (5,084) resulted in written warnings. Out of the 86,174 instances for White drivers, 0.0143 (1,230) resulted in arrest, 0.4142 (35,692) resulted in citations, 0.0168 (1,444) resulted in no action taken, 0.4895 (42,180) resulted in verbal warnings, and 0.0653 (5,628) resulted in written warnings. Figure 2 shows the ratios of these proportions using those for Black drivers as the bases. For example, the category of arrests is approximately 0.5 which is the ratio of 0.0143 divided by 0.0289.

Figure 2

Results of Stops Compared



Black drivers were arrested at twice as much (Figure 2). Black drivers were also more frequently given verbal warnings and let go without any action taken (Figure 2). White drivers were more frequently given citations and written warnings (Figure 2). Two-tailed, two proportion tests were conducted with a null hypothesis that proportions were the same: $P1 = P2$, and an alternative hypothesis that proportions were not the same: $P1 \neq P2$. For example, for arrests, we tested the null hypothesis: $P1 (0.0143) = P2 (0.0289)$ vs. the alternative hypothesis: $P1(0.0143) \neq P2 (0.0289)$ All results of a stop were found to occur at significantly different rates for Black and White drivers. The results of these tests can be found in Table 2.

Table 2

Test Statistics from Two Proportion Tests for Results of Stops

Variable	Chi-Square	df	p-value
Arrest	490.82	1	< .001
Citation Issued	544.46	1	< .001
No Action Taken	35.503	1	< .001
Verbal Warning	680.46	1	< .001
Written Warning	711.41	1	< .001

Figures 1 and 2 indicate that there were significant differences between the Black and White populations in both the reasons that they were stopped and the results of those stops. Next, we examine searches.

Figure 3.0

Proportions of Stops with a Search Conducted

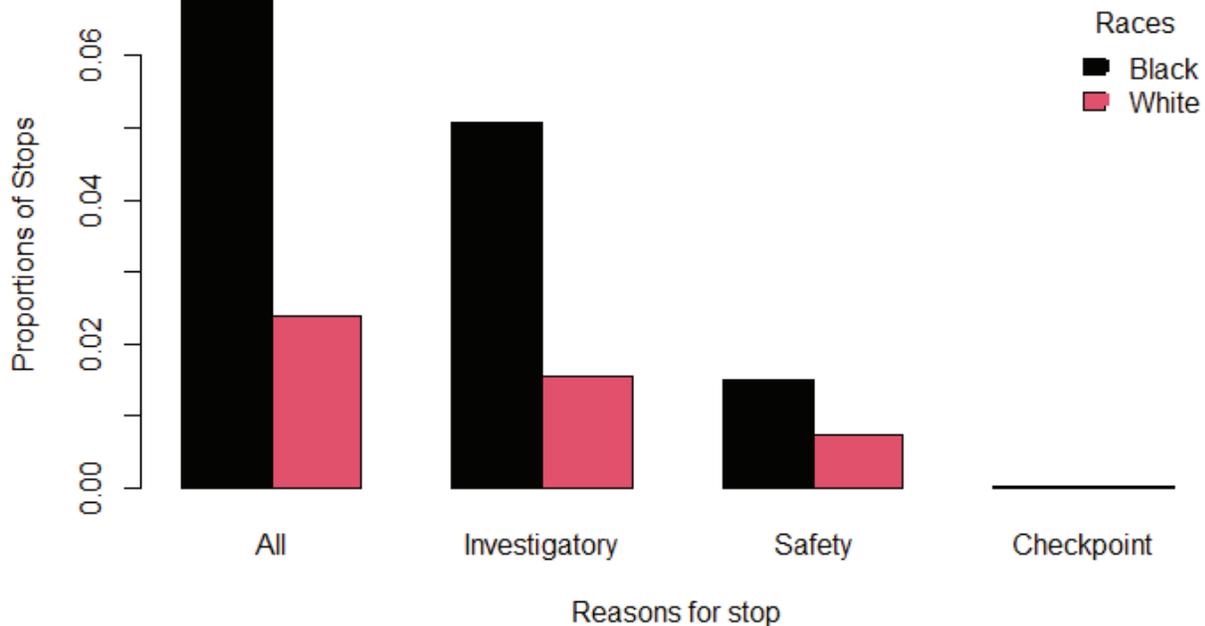


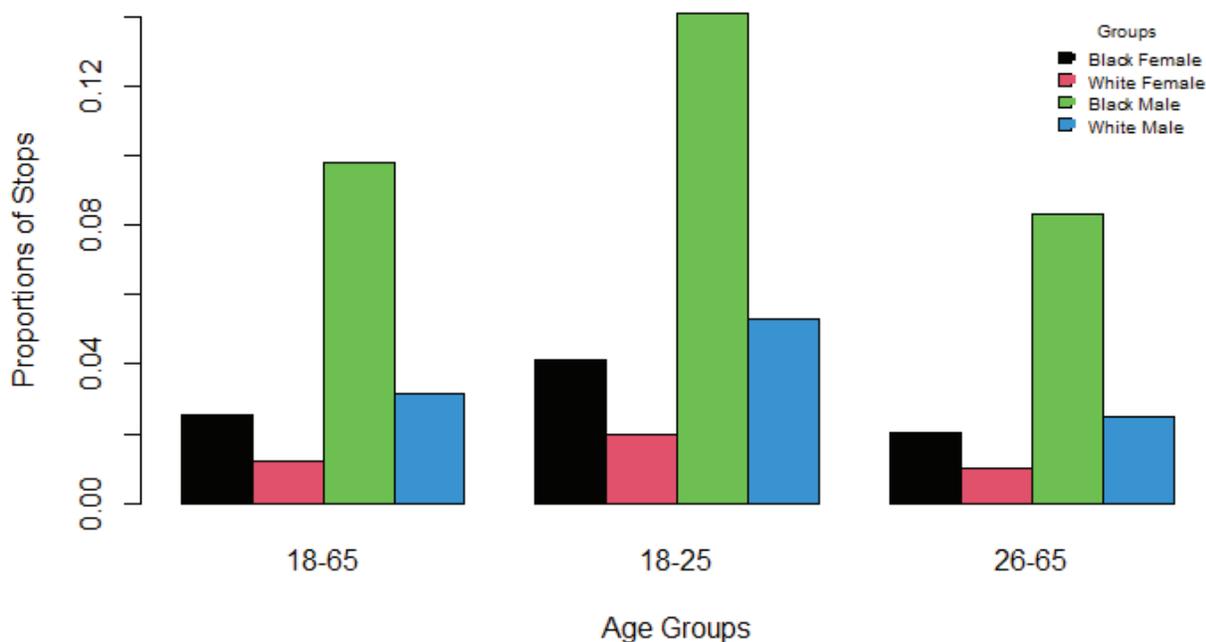
Figure 3.0 reports the search rates for Black and White drivers. Black drivers were searched three times more frequently than White drivers (Figure 3.0). Searches were conducted most disproportionately for investigatory stops (Figure 3.0). Only the checkpoint contained an equal ratio of searches conducted (Figure 3.0). A two-tailed, two proportion test was conducted with a null hypothesis that proportions were the same: $P_1 = P_2$, and an alternative hypothesis that proportions were not the same: $P_1 \neq P_2$. Results indicated that overall search rates were significantly different for Black and White drivers (*Chi-Square* = 2092, *df* = 1, *p*-value < .001).

Based on the prior research, we had reason to expect that there were discrepancies in search rates, not just among racial groups, but also sex and age groups. Baumgartner et al. (2018) reported that younger Black males were more likely to be stopped and searched based on officer suspicion. As such, we were interested in examining the experience of young Black males. To

investigate this, we grouped the drivers by race, sex, and age. Figure 3.1 highlights the proportions of searches conducted within groups broken into race, sex, and age groups 18-65, 18-25, and 26-65.

Figure 3.1

Proportions of Stops with a Search Conducted: Grouped by Age



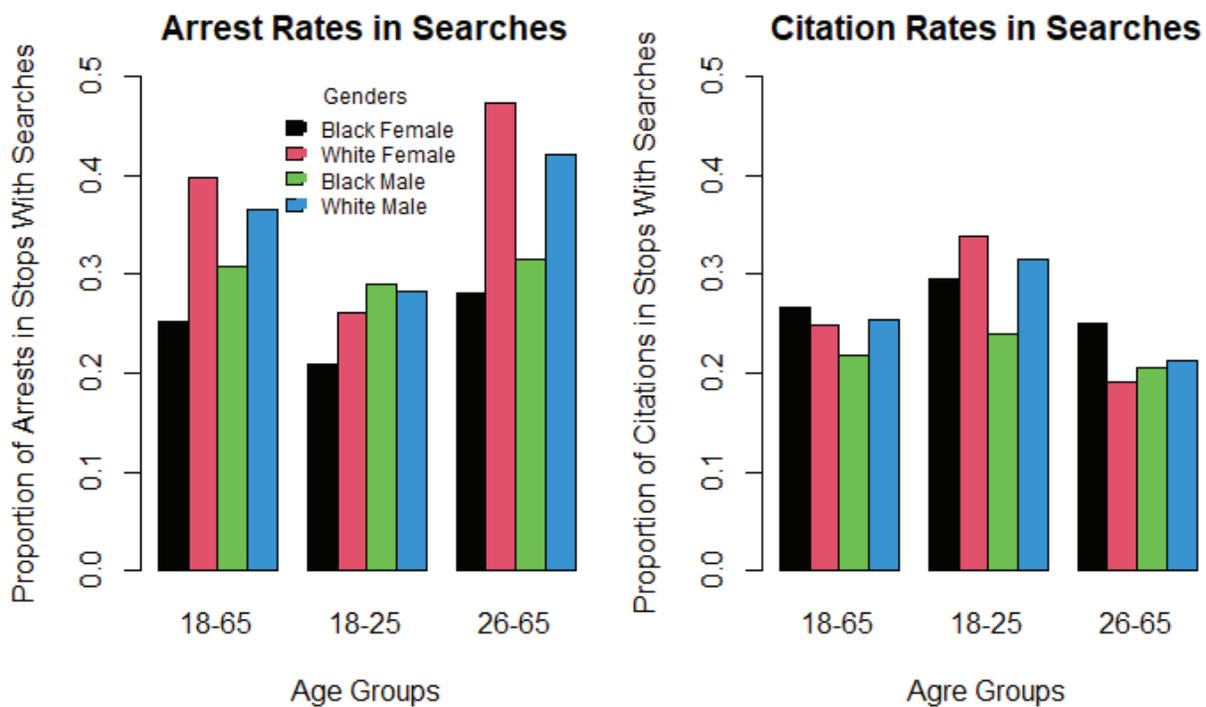
We see men were searched more frequently than women of the same race, Black drivers were searched more frequently than White drivers of the same gender, and younger drivers were searched more frequently than older drivers of the same race and gender (Figure 3.1). As expected, Black males aged 18-25 were searched three to eight times more often than any other group (Figure 3.1).

As explained before by the outcome and benchmark tests, higher search rates alone do not

indicate a racial bias if the searches appear warranted by higher consequence rates. To investigate if these higher search rates were justified, in Figure 3.2 we considered the rate of arrests and citations within the same groups but restricted to only stops where a search was conducted.

Figure 3.2

Arrest & Citation Rates in Stops with Searches



Examining overall rates, we see Black males received the fewest citations and Black drivers collectively received the fewest arrests (Figure 3.2). Most of these differences are not extremely large and may not be too alarming on their own. However, when combined with Figure 3.0 and Figure 3.1 we have a concern. Black drivers were searched more frequently, yet when searched Black drivers were also let off without consequence more frequently. We link these outcomes to the impact of two rulings *Terry vs Ohio* (1968) and *Whren vs U.S.* (1996) discussed later in the

conclusions. Together the rulings made it easier for unconscious bias to creep into the officers' decision making.

After 1999, traffic stops data was collected, and racial profiling was prominent in the news. Counties started training police officers to manage unconscious bias. We were interested if there was an impact on the searches based on the experience of the officers. We conjectured that with possible police training on unconscious bias, the racial disparities would begin to close.

Figure 4

Driver's Race Binned on Officers' Years of Service

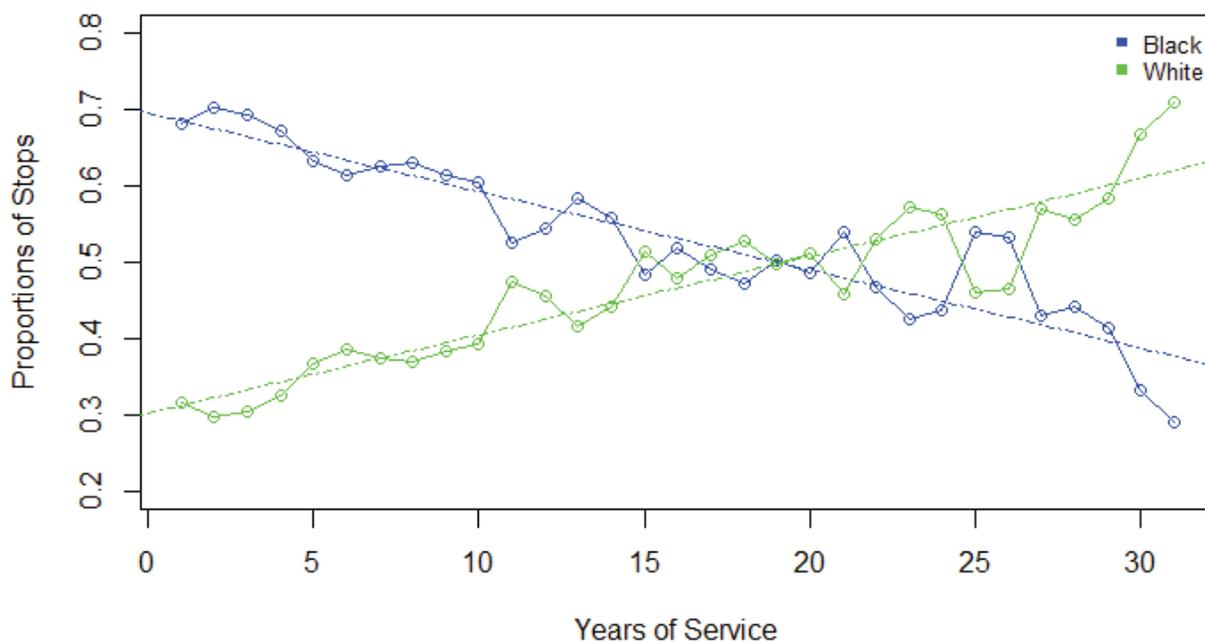


Figure 4 shows a clear trend in the proportion of drivers' race binned on the years of the officers' service. Officers with less than 15 years of service stopped a higher proportion of Black drivers compared to White drivers (Figure 4). These proportions remain about the same for of-

fficers between 15 to 26 years in the force (Figure 4). The pattern reverses for officers with more than 26 years of service (Figure 4). This data set included instances up to 39 years of service, but all bins beyond year 31 had far fewer instances, so they were removed. We believe that the police training could be a reason for the decrease in racial bias.

To further investigate the disparities in the stops based on the years of service of the officers, the analyses conducted for Figures 3.0-3.2 were replicated while considering stops made by different groups of officers. Group 1 consisted of officers with one or two years of experience, Group 2 with officers with 15-21 years of experience, and Group 3 with officers with 27 or more years of experience to capture the three trends of Figure 4, with as similar sample sizes as possible. The groups contained 34,169, 31,510, and 8,590 instances, respectively. All groups showed similar trends, but there were notable differences. Group 1 and 2 showed more equitable ratios for investigatory and safety stops of Black and White drivers. While Black drivers were still searched and arrested at higher rates, the ratio compared to White drivers was closer to equal than the overall average. However, Group 1 was far more likely to conduct a search, make an arrest, or give a citation. Group 2 seemed to target their searches more accurately since their searches resulted in an arrest or citation more frequently than did Group 1. Note that Group 3 made only 21 arrests and 23 searches total. Group 3 stopped Black drivers for investigatory reasons twice as often as White drivers, more so than the average rate. Overall, reasons for stops for Group 3 were more skewed than the averages. More disproportionate rates of stops for investigatory reasons combined with more outcomes of no action taken and verbal warnings for Black drivers could indicate, according to Baumgartner et al. (2018), a higher level of suspicion for the stop of Black drivers from Group 3, as opposed to probable cause, a stronger condition for making the stop. However, we would need more instances and more detailed data (e.g., whether contraband was found or not) to draw a stronger conclusion.

We were interested in better understanding what different factors interacted with the likelihood of a search. To investigate this, we turned to logistic regression. These models can consider many variables together to compare their influence on the likelihood of a specific outcome. Our model was trained to predict if a search was conducted from the race and sex of the driver and officer, the years of service of the officer, the age of the driver, and the reason for the stop. Officer races were recoded as White and non-White to improve the interpretability of the model. The data set was reduced to only stops for investigatory or safety reasons, and reasons for the stop were recoded as investigatory or safety. All predictor variables were statistically significant ($p < .01$). The predictors in order of most influential to least influential were as follows: driver sex, officer years of service, driver race, reason for stop, driver age, officer race, officer sex. The influence of these predictors was analyzed by considering residual deviation and a dominance matrix using the McFadden index. Note that the influence of driver sex and officer years of service was great enough such that both predictors completely dominated the influence of all following predictors (note that in later analysis we uncover that officers with one to three years of service made over a quarter of the stops recorded in the dataset, hence the strong influence of this predictor in our model). In contrast, driver race was only influential enough to dominate officer race and officer sex. These results tell us that the driver's race was not nearly the most important factor, but it still had a strong relationship with the likelihood of a search. The model indicated that if all else remained constant, changing from a White driver to a Black driver would increase the odds of a search by more than 130%. Similarly, changing from a female driver to a male driver would increase the odds of a search by more than 250%. In general, the likelihood of a search increased for the following groups compared to their counterparts: male drivers, drivers stopped by less experienced officers, Black drivers, drivers stopped for investigatory reasons, younger drivers, drivers stopped by White officers, drivers stopped by male officers. In Table 3 we see the odds ratio, degrees of freedom, change in residual deviation, and p -value for each predictor from the logistic regression

model. An odds ratio of one indicates that the likelihood of the search does not change based on a change for that predictor. A ratio of 1.5 indicates a change in that predictor would result in a search being 50% more likely, while a ratio of 0.5 would result in a search being 50% less likely.

Table 3

Logistic Regression Summary

Term	Odds Ratio	df	Change in Res. Dev.	p-value
Intercept	0.055	NA	NA	NA
Driver Race: Black	2.337	1	2227.09	< .001
Driver Sex: Male	3.583	1	3096.5	< .001
Driver Age	0.961	1	1718.94	< .001
Officer Race: White	1.586	1	170.53	< .001
Officer Sex: Male	1.419	1	19.26	< .001
Officer Years of Service	0.92	1	2360.26	< .001
Reason for Stop: Safety	0.493	1	1732.25	< .001

Discussion & Conclusions

In this study we sought to answer the following research question: Is racial bias a factor in the disparities observed between Black and White drivers in the traffic stops in the City of Charlotte? To answer the question we investigated, using *R*, 213,475 stops involving Black and White drivers in the years 2016-2017 and 2019-2020. The most convincing evidence to suggest there was a racial bias is reflected in the rate at which Black drivers (males aged 18-25 in particular)

were searched and released without consequence. As a collective, Black drivers were searched nearly three times the rate White drivers were, and Black males aged 18-25 were searched three to eight times the rate of any other group (Figures 3.0, 3.1). Reasoning from outcome and benchmark tests suggests we should see higher rates of offense or contraband from these groups to justify this increased search rate. Since we did not have information about offenses and contraband, we used arrests and citations as a proxy. Our analysis shows that Black drivers who were stopped were collectively arrested at twice the rate of White drivers but were searched at three times the rate of White drivers (Figures 2 & 3.0). When looking at citations, Black drivers who were stopped were cited at a lower rate than White drivers (0.88), however, they were searched at three times the rate of White drivers (Figures 2 & 3.0). Though the arrest rates could be used to support a higher search rate, the citation rates would not support the higher search rates. This analysis supports institutional biases as a major reason for the differences.

Restricting the stops to vehicles that were searched, we see that the arrest and citation rates were more similar across Black and White drivers. In-fact, Black drivers were collectively arrested the least, and Black males were cited the least (Figure 3.2). Black males aged 18-25 were searched and arrested most frequently (0.29), but the difference is marginal compared to White males (0.28) and White females (0.26). This supports the claim that ramifications of over policing minority communities through higher stop and search rates are underestimated, and that the consequences likely outweigh any potential benefits (Baumgartner et al., 2018). If it can be reasoned that officers are justified in targeting Black motorists for searches because of their higher arrest rates in all stops, then we should see higher rates of arrests and citations in searches. However, this was not the case, Black drivers were searched at three times the rate of White drivers, even though Black and White drivers had comparable rates of arrests and citations. The results from this study align with the results from the previous studies by Lambeth (1991), Gross and Barnes

(2002), and Baumgartner et al. (2018). All the studies point to bias in policing that leads to disproportionate impact on Black drivers.

To account for the patterns of disparities, we turn to institutional factors, specifically Court rulings that impacted the way policing was conducted. The literature points to two Supreme Court rulings - *Terry vs Ohio*, 392 U.S. 1 (1968) and *Whren vs United States*, 517 U.S. 806 (1996). *Terry vs Ohio* allowed officers to use “reasonable suspicion” rather than “probable cause” to conduct stops (even stop and frisk). Suspicion is a lower standard compared to probable cause. Further, *Whren vs United States* did not require the stops to be made equitably (e.g., stopping all speeders). The police could choose to stop any driver for any traffic violation, and then follow up on their suspicion (Baumgartner et al., 2018). If the suspicion was unfounded, the driver would be let go with lighter consequences, a pattern that we see in our analysis with Black drivers. These rulings together, give officers the flexibility to stop a driver on one of hundreds of minor violations and then conduct a search of the vehicle, driver, and passengers. The literature concludes, and we agree, that this flexibility allows unconscious bias to creep into the officers’ decision making.

There are some limitations to this study. The information available in the dataset constrains the analysis and interpretation. It does not mean that we cannot make inferences, however, a more comprehensive dataset could provide a more nuanced view about the impact of race in traffic stops. It is important to keep in mind that if this data set included additional variables (such as the reason for the search, contraband, or repeat offenders) then further analyses could be conducted to uncover deeper relationships or support new conclusions. For example, individual officer data could help us understand if some officers contribute to many Black drivers being stopped.

There is promise in training efforts and programs implemented by Charlotte-Mecklenburg Police Department. The department shows an awareness and concern over public relations and

disparities found in research. The department has multiple community engagement programs directed at fostering dialogue and interactions within the community. Programs like Cops & Barbers, Juvenile Diversion Program, Reach Out, Right Moves for Youth, and Academy of Safety & Protection allow for everything from open-ended discussions and academic success to survival training (City of Charlotte, n.d.). This allows for personal connections between the police and the community to be established, as well as community concerns to be directly expressed to officers and department leaders. In 2020 and 2021, the department implemented new training courses for implicit bias training and customer service-oriented interactions (Louis, 2020; Morris, 2021). Implicit bias training is directly targeted at resolving some of the disparities between racial groups reflected in crime and traffic data, while customer service-oriented training seeks to improve daily interactions officers have with civilians by implementing techniques used in customer service. In our own analysis we noted that officers with greater years of experience showed signs of better choosing when to conduct a search. Further, we showed that the ratio of Black to White stopped drivers decreased and inverted as years of experience increased (Figure 4). Improved training of officers combined with departments' willingness to listen and implement change are hopeful signs of resolve. Inferring bias from traffic stops will always remain complex, however, our Black communities, and society as a whole, need transparency to trust authority and foster democratic citizenship. Thus, there is a need for more data, more studies, and more open dialogue about these matters.

REFERENCES

Baumgartner, F. R., Epp, D. A., & Shoub, K. (2018). *Suspect citizens: What 20 million traffic stops tell us about policing and race*. New York: Cambridge University Press.

Capecchi, C. & Furber, M. (2016). Philandro Castile was pulled over 49 times in 13 years, often for minor infractions. Retrieved from <https://www.nytimes.com/2016/07/17/us/before-philandro-castiles-fatal-encounter-a-costly-trail-of-minor-traffic-stops.html>

“City of Charlotte.” City of Charlotte Government, <https://charlottenc.gov/CMPD/Safety/Pages/Community-Programs.aspx>.

Fettig, A. (2018, May 01). Report to the United Nations on racial disparities in the U.S. criminal justice system. Retrieved from <https://www.sentencingproject.org/publications/un-report-on-racial-disparities/>

Louis, Katrina. “Mecklenburg County Releases Implicit Bias Training for Justice System Workers.” Q City Metro, 26 June 2020, <https://qcitymetro.com/2020/06/25/mecklenburg-county-releases-implicit-bias-training-for-justice-system-workers/>

MacDonald, H. (2010). *Are cops racist?* ProQuest Ebook Central
<https://ebookcentral.proquest.com>

Maryfield, B. (2018). *Implicit racial bias*. Retrieved from
<https://www.jrsa.org/pubs/factsheets/jrsa-factsheet-implicit-racial-bias.pdf>

REFERENCES

- Melchers, R. (2003). Do Toronto police engage in racial profiling? Retrieved from https://www.yorku.ca/lfoster/2019-20/RESP%204052/lectures/Do%20Toronto%20Police%20Engage%20In%20Racial%20Profiling_Melcher.pdf
- Morris, Kendall. "CMPD Launches New Customer Experience TRAINING Inspired by Chick-Fil-A." Wenc.com, 24 June 2021, www.wenc.com/article/news/local/cmpd-customer-experience-chick-fil-a/275-7796ed8f-471f-4ab3-9c4d-b98fa88a6801
- Rankin, J., Quinn, J., Shephard, M., & Duncanson, S. (2002, October 19). Singled out. Retrieved from https://www.thestar.com/news/gta/known_topolice/2002/10/19/singled-out.html
- Simoiu, C., Davies, S., & Goel, S. (2017). The problem of infra-marginality in outcome tests for discrimination. *The Annals of Applied Statistics*, 11(3), 1193-1216.
- Toronto Police Services Board. (2003). Report of The Board/Service Race Relations Joint Working Group. Retrieved from <http://www.torontopolice.on.ca/publications/files/reports/jointworkinggroup.pdf>
- Trinkner, R., Kerrison, E. M., & Goff, P. A. (2019). The force of fear: Police stereotype threat, self-legitimacy, and support for excessive force. *Law and Human Behavior*, 43(5), 421-435. <http://dx.doi.org/10.1037/lhb0000339>
- Waddington, P., Stenson, K., & Don, D. (2004). In proportion: Race, and police stop and search. *British Journal of Criminology*, 44, 889-914.
- Walters, G. D. (2019). Predicting early adolescent offending with criminal victimization and delinquent peer associations by way of negative attitudes toward the police. *Law and*
- Verniero, P. (1999). Interim Report of The State Poilice Review Team Regarding Allegations of Ra cial Profiling. Retrieved from https://www.state.nj.us/lps/intm_419.pdf

THE STUDY OF COVID-19 WITHIN THE STATE OF NORTH CAROLINA IN THE UNITED STATES

Department of Mathematics and Statistics
Cesar Alzate and Xingjie Helen Li, Ph.D.

Abstract

Research on COVID-19 was done for North Carolina to assess local governmental policies, to measure COVID-19 growth rate, and to discover what predictors impact COVID-19 spread. Using a Time-Delayed SIR model, removal rates were calculated to compare how seven major metros from N.C. handled the pandemic. COVID-19 Data was collected from the Center for Systems Science and Engineering (CSSE) at Johns Hopkins, and the U.S. census was used for N.C. demographic data. MATLAB was used to perform multiple linear regression and solve the time-delayed Susceptible, Infected and Removed (SIR) model to evaluate local governmental policy by measuring four removal rates of each studied metro throughout the government control policies. Through the removal rate calculation, we found that upon lockdown restrictions being eased, locations near the coast suffered, despite doing well in removing infected COVID-19 persons. In the populous Charlotte-



Cesar Alzate

Cesar Alzate currently studies Computer Engineering at The University of North Carolina at Charlotte and is in his junior year. While he was completing his associate degree at Mitchell Community College, he tutored physics. He wants to work in the Aerospace Industry after completing graduate school.



FACULTY ADVISOR
Xingjie Helen Li, Ph.D.

Dr. Xingjie Helen Li graduated from University of Minnesota in 2012, did her postdoctoral at Brown University from 2012 to 2015 and joined UNC Charlotte in 2015. Her research lies in the area of applied and computational mathematics, focusing on multiscale modeling and structure-preserving schemes. She has built interdisciplinary collaborations with mathematicians, physicists and engineers in the following areas and received the NSF-DMS early career award in 2019.

Concord-Gastonia metro, COVID-19 growth rates were higher than other metros. Nevertheless, it had the highest removal rates meaning this metro did well in handling the pandemic. Next, using multiple linear regression, the most substantial correlating factor for COVID-19 transmission was a young age. The White and Black race populations were correlating factors with COVID-19 spread. Leading the age correlating predictor for the death rate in the largest metros was the 85-100 age group. In this same analysis, the 51-84 age group was found to be inversely correlated. Lastly, our education study indicates less education correlates with COVID-19 cases.

Keywords: COVID-19, time-delayed SIR model, compartmental model, multiple linear regression, government policy, removal rates

The Study of COVID-19 Within the State of North Carolina

On March 3, 2020, North Carolina reported its first confirmed case of COVID-19 in Wake County, North Carolina, US (*Dong et al., 2020*). Due to how COVID-19 has a high transmission rate and spreads through respiratory droplets, health care providers began recommending common measures taken to fight against the flu such as washing one's hands, avoiding touching one's face, and covering coughs and sneezes. Furthermore, Governor Roy Cooper proactively created a Task Force for COVID-19 whose actions (*North Carolina Identifies First Case of COVID-19, n.d.*) are meant to reduce the spread of COVID-19.

COVID-19 has proven to spread quickly and therefore, lockdowns were put in place; however, there are several issues with a global lockdown, such as the increase in depression, the loss of jobs, and the global COVID-19 recession (Fava, 2020). This study will explore the impact of government mandates and regulations affected by each major metro within North Carolina and various correlations of COVID-19 transmission such as race, age, and gender.

Materials & Methods

Data for SIR model and growth rate. In our compartmental (time-delayed SIR) model the seven metros studied were Charlotte-Concord-Gastonia, Raleigh-Durham-Chapel Hill, Greensboro-High Point, Asheville, Hickory-Lenoir-Morganton, Wilmington, and Jacksonville. Data on confirmed COVID-19 cases and deaths were collected from the COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University.

Growth Rate Estimate. Upon the onset of the COVID-19 pandemic outbreak, the number of total confirmed cases is growing exponentially. Due to the limitation of the testing, we can assume that.

$$N(t) = F(t)e^{kt}N(0) \quad (1)$$

Where $N(t)$ denotes the number of total confirmed cases at time t , $0 < F(t) \leq 1$ represents the capability of testing, k denotes the exponential growth rate, and $N(0)$ indicates the initial value.

Using the data in the format of $\log(N(t))$, we can see that the capability of testing $F(t)$ and growth rate k become independent, i.e., the lack of testing does not affect the fitting of growth rate. The reason is explained by equation 2. Suppose that:

$$\log(N(t)) = \log(F(t)) + k(t) * t \quad (2)$$

Consequently, since $\log(F(t))$ in equation two will always be relatively small, even on very conservative and extreme estimates for the capability of testing, it will not affect the slope of fitting, which is the growth rate $k(t)$. In addition, the growth rate $k(t)$ can be used to the assessment of reproducing number $R_0 \sim e^{k(t)t}$, the containment of this pandemic needs the growth rate $k(t)$ as small as possible. To understand the situations in North Carolina, we focus on seven major metro regions, they are Charlotte-Concord-Gastonia area, the Research Triangle, Asheville, Greensboro-Highpoint, Wilmington, Jacksonville, and Hickory. It was found that the number of new cases was on a natural decline, but government mandates further decreased the growth rates of cases.

Growth Rate Study. For each metro, we split their cases into four events and considered the incubation period of the virus. The average incubation period of COVID-19 is about seven days (*Qin et al., 2020*), so we used this number for incubation globally through our study when needed. We assume that Event 1 began on the date of the first case and ended seven days after March 17. If no cases were reported by March 17, 2020, then we used that as the starting date by filling the blanks as if having only one reported case until real cases began being reported. This could be done to so we could continue to take logarithm of the confirmed case as $\log(1) = 0$. It is

important to note that March 17 was chosen as event one because on that date Governor Roy Cooper announces Executive Order NO. 118, a stay-at-home order to go into effect March 27. During this period, schools closed in-person classes and restaurants were closed for dine-in. Event two encapsulates what happened after this initial stay-at-home order was eased. Event three represents the time period of Executive order NO. 131. Event four corresponds to Phase 1 of the N.C. state reopening plan, where businesses could open with restrictions.

Event 1: Date of the first COVID-19 case reported + incubation period (seven days) - March 17 + incubation period

Event 2: March 18 + incubation period - April 8 + incubation period

Event 3: April 9 + incubation period - May 7 + incubation period

Event 4: May 8 - July 29

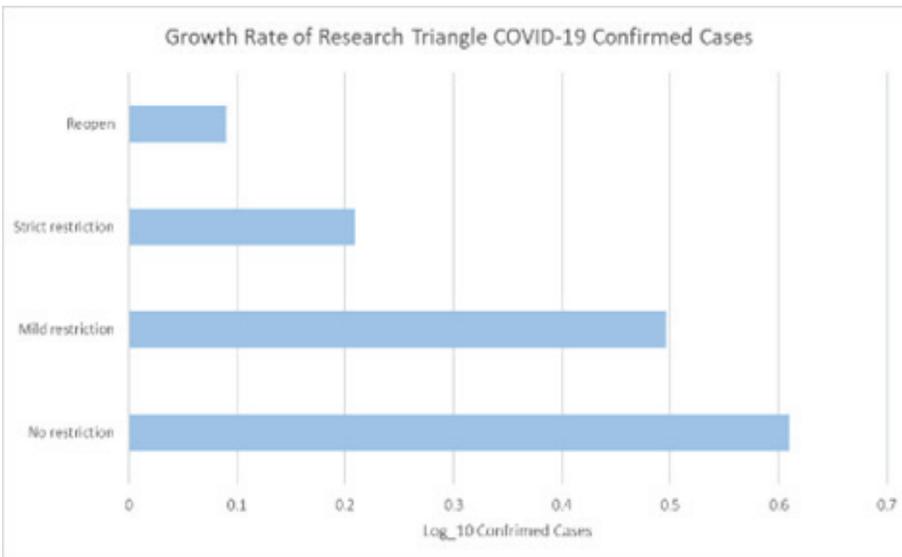
We then took the log of the cases for each event. These are presented below in Figure 1. We can see that right on the event shifts, we are having effects on growth rate. In combination with the SIR model, this part of the study allows seeing the complete picture of how successful government mandates are by analyzing both growth rate and removal rate together. Furthermore, all growth rates were weighted by renormalizing the population of each metro by dividing by the total population in said metro seen in equation 3.

$$\frac{\text{Actual Growth Rate} * \text{Population of County}}{\text{Total Population of Metro}} \quad (3)$$

Figure 1

COVID-19 Growth rates of a.) The Research Triangle, b.) Charlotte-Concord-Gastonia, and c.) Asheville

a.) Research Triangle COVID-19 Growth rate



Note. The growth rate, $k(t)$, of COVID-19 in the Research Triangle from equation 2.

Removal Rates Using the SIR Model. In this section, we consider a time-delayed SIR model for the spread of disease. Let t be the number of passing days since the disease occurs, and let

- $S(t)$ denote the number of susceptible individuals,
- $I(t)$ be the number of infected individuals and
- $R(t)$ be the number of removed individuals.

The system of time-delayed SIR model reads:

$$\frac{dS}{dt} = -rIS(t - T_1) \quad (4)$$

$$\frac{dI}{dt} = rIS(t - T_1) - aI(t - T_2) \quad (5)$$

$$\frac{dR}{dt} = \gamma I(t - T_2) \quad (6)$$

Where τ_1 is the average days of the incubation period, and τ_2 represents the average days of removal (either starting self-isolation or being hospitalized). We assume that $\tau_1 \geq \tau_2$ as when symptoms are nearly on set, that individual usually will be self-isolated. The parameter β is the average infection rate and γ is the average removal rate or removal rate. The removal rate is what we will figure out for each region and then test against our model. When we have a good removal rate to fit our model, we can then compare various metros to figure out what the government control methods were. The removal results are seen in Table 1, and their accuracy can be seen by looking at Figure 2 and seeing how well the pink line matches with the confirmed cases. Table 1 and Figure 2 are explained more in the following pages and the appendix.

The initial conditions are given as $S(0) = S_0$, $I(0) = I_0$ and $R(0) = 0$. The SIR model assumes that the total number of populations remains constant, so we have:

$$S(t) + I(t) + R(t) \equiv S(0) + I(0)$$

To implement the numerical simulation, we employ the MATLAB internal discrete differential equation solver **dde23** and fit the parameters based on real data. Our focus is to estimate the removal rate γ within each metro region, because we think γ is a better quantity than the case growth rate when assessing the local government policies.

Our study of seven metros generally followed the same pattern and flattened over time

as government mandates were put in place to control the growth of COVID-19. The use of this model was to evaluate the performance of government policy within each metro by estimating the piece-wise removal rates of each event period defined in the growth rate study.

Methods for Multiple Linear Regression. The areas chosen allowed an analysis of how differences such as age density, geographical properties, and total population played into the study. For the regression study, age and population data were gathered from the North Carolina Office of State Budget and Management (OSBM) and renormalized so we could adequately compare metros with different population sizes. All data was processed through vim script and then extracted and used in MATLAB. The `fitlm` function was used to perform the multiple linear regression. All COVID-19 data is retrieved from the date of each county's first COVID-19 case until July 6, 2020. In our education study, data was gathered from the U.S. census.

We used the following equation with b_1 through b_n representing the weights of the factors and x_1 and x_n represents a potential factor such as age. MATLAB will solve for our b 's or weights and the various results are given in the appendix.

$$y = b_0 + b_1 * x_1 + b_2 * x_2 + \dots + b_n * x_n \tag{7}$$

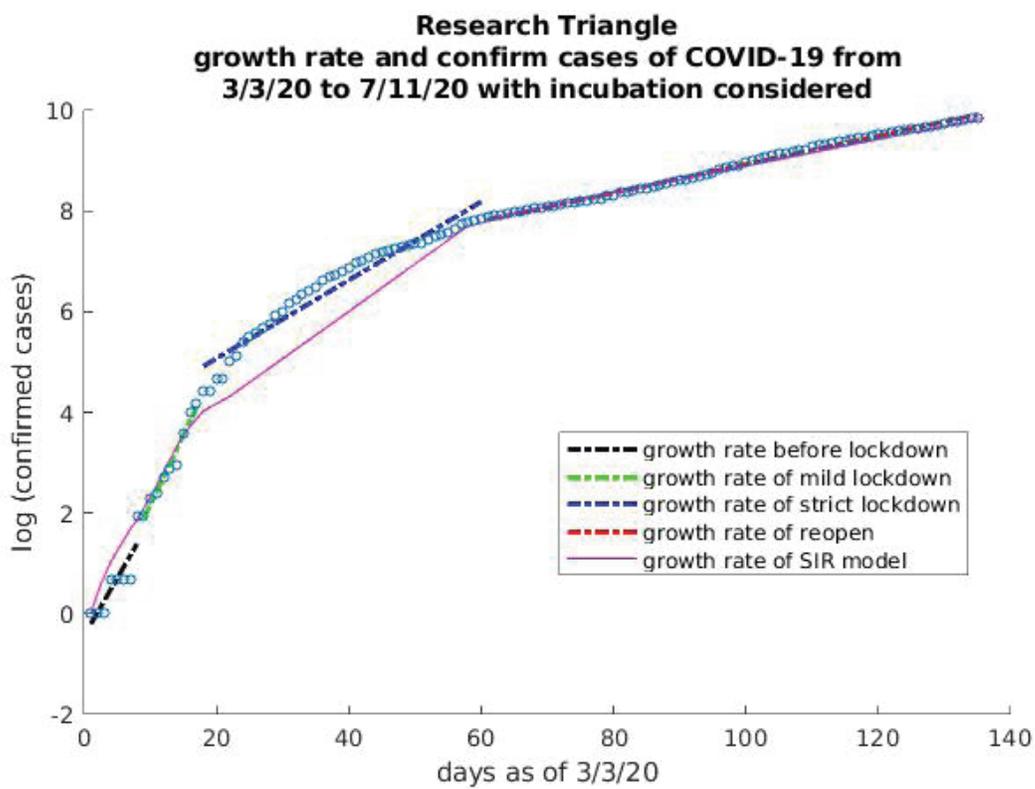
Results

Time-Delayed SIR Model & removal rates. By studying the removal rates calculated through our Time-Delayed SIR model, we can compare how government mandates affected each metro. The removal rate, γ in equation 6, is defined as the part of the infected population and cannot infect others. This can be reached by quarantine, dying, and even proper hygiene such as mask-wearing and hand washing. If government policy were effective, we would expect removal rates to increase upon the lockdown phase and decrease at the other phases. Also, by comparing

the different stages of reopening, removal rates can again be analyzed to note what is working and what is not. Without government intervention, one would expect the curve to become flatter when everyone eventually becomes infected. Still, there would be huge spikes near the first case, which would cause over-hospitalization. This is mainly because of the higher removal rate being close to 0 without intervention. The time-delayed SIR model is represented by the pink line, such as in Figure 2 and subsequent figures. Please see the appendix for all seven models.

Figure 2:

The Time-Delayed SIR Model Graphed with the Log of the Confirmed Cases for the Research Triangle Metro



Note. The SIR is modeled as the pink line here from solving the system of equations shown in equations 4,5, and 6. The actual number of cases every day are the dots. The dotted lines represent $k(t)$ calculated in equation 2.

As seen in Table 1 below, Charlotte-Concord-Gastonia had the highest removal rate despite its large population size and most prominent confirmed cases. We know that Charlotte has a large working-class of white-collar workers (*Kotkin, 2018*), and it is suggested that this metro adapted quickly to the pandemic. Logically, working from home was very feasible for many of these city jobs. Furthermore, most metros had high removal rates upon the initial lockdown compared to the pre-lockdown period, meaning that the initial lockdown, among other actions by the state, effectively reduced the growth rate of COVID-19. Additionally, the Research Triangle was less successful than Charlotte-Concord-Gastonia at removing infected people from the susceptible group. This is seen in Table 1 below, a higher removal rate means more COVID-19 infected persons were separated from the non-infected population

Table 1

Removal Rates of Seven NC Metros

Location	Pre-lockdown Removal Rate	Lockdown Removal Rate	Phase 1 Removal Rate	Reopen Removal Rate
Asheville	.0065	.008	.007	.012
Research Triangle	.0065	.001	.01	.013
Charlotte-Concord-Gastonia	.01	.005	.0135	.014
Wilmington	.0065	.001	.0145	.0015
Greensboro-High Point	.0065	.00095	.01	.015
Hickory	.01	.006	.004	.008
Jacksonville	.035	.01	.008	.012

Note. These values here is the piecewise calculated from the system of equations in 4,5, and 6.

In the future, by studying removal rates, one can provide data on how mask-wearing has affected COVID-19 transmission. For example, on June 26, 2020, face masks became required in public spaces statewide. By adding another event into this study, we can look at how this control measure affected the COVID-19 growth rate. Furthermore, it is difficult to measure how the lockdown affects people, so we do not suggest a severe lockdown is necessary. The metros not near the beach experience slower growth rates upon lockdown restrictions being eased. Also, besides the economic recession brought on by the pandemic, preliminary research shows that the pandemic increases depression and anxiety among people (*Twenge, 2020*).

Multiple Linear Regression. It was hypothesized that the younger population, those under 65 years of age, were the primary spreaders of the disease. Multiple Linear regression was used to test this. The data used came from a CSV data set provided by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (*Dong et al., 2020*) that tracked the confirmed cases by county in the USA in real-time. The `fitlm` function was used in MATLAB and our two variables for predicting cases were the age group of people under 65 and second, the group of people over 65. The results show that the age groups under 65 positively correlated with confirmed cases in Table 2 below. The resulting small p-value of .0002 indicates that we can reject the Null Hypothesis that age is not a correlating contributor to COVID-19 cases and we can say that a younger population correlates with more cases.

This does not mean that older people take better care of themselves but that the younger population has more contacts with infected people. A possible justification for this is that they often work or go to school. It is known that 65 is a typical retiring age (*Lumsdain, Robin, et al., 1995*). Also, we can see that by looking at our T-statistics in general, younger age groups were correlated to the growing number of COVID-19 cases and older people reduced the number of cases. This is confirmed by our test statistic because we produce an extremely high value for b_1

and a negative value for b2. It is important to note that both Charlotte-Concord-Gastonia and the combinations of all studied locations respectfully produced p-values of .046 and .0002. These low values show how little evidence there is against the claim that younger people correlate with more COVID-19 cases and that the older population correlates with fewer cases. Due to the number of counties, Jacksonville and Wilmington did not produce quantifiable results. When separating the data into male and female, our study concludes that just age is the correlating factor for COVID-19 transmission and not gender in any way. The separate gender results are seen in Table 3 and Table 4 in the appendix.

Table 2

Age Correlation Data for All Genders

Location	Number of Observations (Counties)	Error degrees of freedom	b1: 0-65 age range	b2: 65-100 age range	Test Statistic 1	Test Statistic 2	Coefficient of b1 is greater than Coefficient of b2
Asheville	5	3	.0024	.0058	.30	.20	False
Research Triangle	9	7	.01	.0096	2.11	.26	True
Charlotte-Concord-Gastonia	7	5	.019	-.04	2.64	-1.17	True
Greensboro-High Point	3	1	.02	-.05	.88	-.70	True
Hickory	4	2	-.002	.05	-.06	.3	False
Combined Areas	31	29	.01	-.01	4.27	-.94	True

Note. The results of Multiple Linear Regression when studying the correlation between gender and COVID-19 cases.

Similarly, the correlation between age and dying of COVID-19 was investigated in Table 5 below. For the Charlotte-Concord-Gastonia area, p-values for b3(51-84 age group) and b4(85-100) were .03. Also, although the 0-23 age group did not have a p-value of under 0.05; however, the table shows that this group contributed to the number of diseased cases. Therefore, we can conclude that the 51-84 age group are not at high risk of dying in this region. This study does not, however, consider the health of those in this age group. If someone has underlying health issues at this age, they would be put into a high-risk group based on other studies (*Cases, Data, and Surveillance, 2020*). Furthermore, the age group 85-100 were at a high risk of dying. For the combined regions and the Research Triangle, it was found that no age group was at particular risk.

Table 5

Age-Diseased Correlation Study

Location	b1:0-23 age group	b2:24-50 age group	b3:51-84 age group	b4: 85 – 100 age group	Test Statistic 1	Test Statistic 2	Test Statistic 3	Test Statistic 4
Combined Metro Areas	-0.0002	0.0006	-0.0001	0.004	-0.37	0.72	0.17	0.76
Charlotte-Concord-Gastonia	0.002	-0.001	-0.001	0.35	2.7	-1.7	-3.67	3.88
Research Triangle	-0.00008	-0.0006	0.001	0.002	-0.023	-0.19	0.74	0.17

Note. The results and parameters of the Multiple Linear Regression when looking at the correlation between the COVID-19 deceased population and age.

When considering race, we began by comparing how two separate races fared on the transmission of COVID-19 in Table 6. The two races were: Black and White. Other races were not included due to how small their percentage is in the North Carolinian population. We see that

both the combined Metro areas and Charlotte-Concord-Gastonia suggest a correlation among COVID-19 cases for both black and white people. We also see that our p-value for this conclusion, in these two areas, is .03, meaning both races have a correlation with COVID-19 cases. Therefore, we can reject the null hypothesis that race does not affect COVID-19 transmission. However, since both races did have positive correlation, we can justify that race is not an important factor for predicting COVID-19. There is, however, an issue. The whole picture of race and its correlation with COVID-19 cases is not complete until socioeconomic and education levels are considered. It should also be noted that there could be a connection from our earlier conclusion that masks helped control the spread of COVID-19.

Table 6

Data for Race Study

Location	b1: Black Popula- tion	b2: White Popula- tion	Test Sta- tistic 1	Test Sta- tistic 2	P value 1	P val- ue 2
Combined Metro Areas	.02	.01	3.5	4.8	.001	6.4e-5
Char- lotte-Con- cord-Gas- tonia	.05	.005	5.2	5.4	.04	.03
Research Triangle	.01	.01	1.3	2.6	.25	.06
Greens- boro-High Point	.01	.01	1.3	2.6	.25	.06

Note. The results and parameters of the Multiple Linear Regression when looking at the correlation between Race and COVID-19 cases.

By comparing the Charlotte-Concord-Gastonia area against the Research Triangle area in

Table 6 above, we can see that there is statistically significant evidence to support the claim that in Charlotte-Concord-Gastonia, both Black and White people correlate with confirmed cases. Socioeconomic status was not considered, so the complete picture is not yet fully understood. When studying race and its play in the transmission of COVID-19 it was essential to consider education as an alternative for socioeconomic status.

The correlation program considered three predictor variables: Percentage of Population without High School Graduation, Percent of Population with a High School Diploma, and Percentage of Population with a bachelor’s degree or higher. In Table 7, Our highest T-statistic was produced from the percentage of population without a High School diploma, and the lowest T-statistic was produced from the college education proportion of the population.

Table 7

Education Correlation with COVID-19 transmission

Location	b1: % of Population without High School Graduation	b2: % of Population with only High School Diploma	b3: % of Population with a Bachelor’s Degree or Higher	Test Statistic 1	Test Statistic 2	Test Statistic 3
Combined Metro Areas	0.032	0.009	0.005	0.99	1.66	0.95

Note. The results and parameters of the Multiple Linear Regression when looking at education and its correlation with COVID-19 cases.

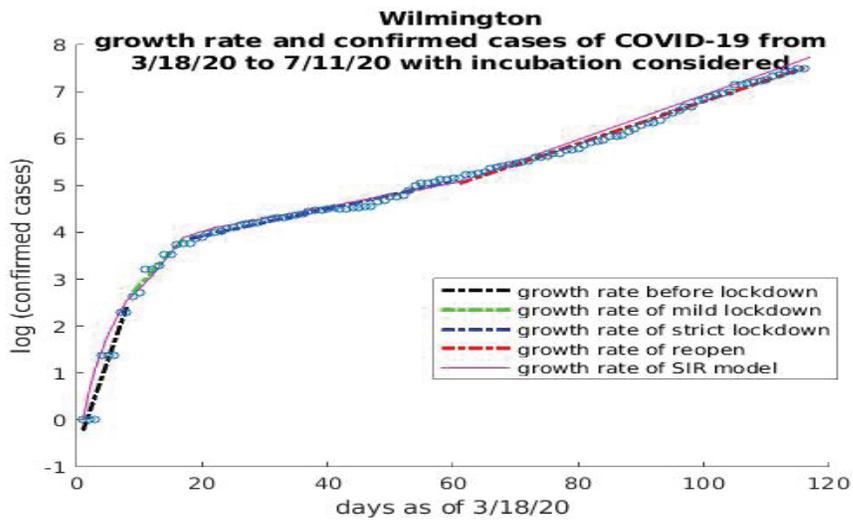
Discussion

By studying North Carolina metros, one could decide on government policy by metros instead of for the whole state. For example, the study adds conclusive evidence that something is not working correctly with the government policy in areas with beaches close by, as seen by the

low removal rates. It is suggested that these beach areas high in tourism take extra precautions for COVID-19 transmission. Wilmington had the most notable results when studying the removal rates. We see that post-lockdown cases soared. We also see that Wilmington somehow was able to lower its removal rate upon reopening. This might seem contradictory until the geographical properties of the area are considered. Wilmington is near the ocean, and tourism is vital for its economy. The data points to the conclusion that Wilmington did not do well to remove infected people due to the high tourism. The lockdown helped slow the growth rate, but the data suggests that this metro area needs to undergo further control measures such as more increased hygiene and fever tests for tourists. We can also draw a similar conclusion for Jacksonville as they have many beaches close by and equal results.

Figure 3:

The Time-Delayed SIR Model Graphed with the Log of the Confirmed Cases for the Wilmington Metro



Note. The SIR is modeled as the pink line here. The actual number of cases everyday are the dots. The dotted lines represent $k(t)$ calculated in equation 2.

Additional events can also be studied. By studying removal rates, one can provide data on how, for example, mask-wearing has affected COVID-19 transmission. For instance, on June 26, 2020, face masks became required in public spaces statewide. By adding another event into this study, we can look at how this control measure affected COVID-19 growth rate. Furthermore, it is difficult to measure how the lockdown affects people, so we do not suggest a severe lockdown is necessary. The metros not near the beach experience slower growth rates upon lockdown restrictions being eased by looking at our growth rates. Also, besides the economic recession brought on by the pandemic, preliminary research shows that the pandemic increases depression and anxiety among people (*Twenge, 2020*).

Lastly, on June 26, masks became mandated when going outside and being near people. The study done here stops checking cases just ten days after this; however, masks were still commonly worn. Furthermore, due to restrictions of the data date ranges, it is not studied here how the mask government regulation affected COVID-19 growth rate and removal rate. Finally, the results of our age study in combination with the education study show that younger people can be used as a predictor for COVID-19 transmission.

REFERENCES

- Cases, Data, and Surveillance. (2020, February 11). Centers for Disease Control and Prevention. from <https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/assessing-risk-factors.html>
- Dong, E., Du, H., & Gardner, L. (2020). An interactive web-based dashboard to track COVID-19 in real time. *The Lancet Infectious Diseases*, 20(5), 533–534. [https://doi.org/10.1016/s1473-3099\(20\)30120-1](https://doi.org/10.1016/s1473-3099(20)30120-1)
- Lumsdaine, Robin L. and Stock, James H. and Wise, David A., Why are Retirement Rates so High at Age 65? (July 1995). NBER Working Paper No. w5190, from SSRN: <https://ssrn.com/abstract=225253>
- Massachusetts General Hospital. (n.d.). Depression on the Rise During COVID-19. Retrieved April 4, 2020, from <https://www.massgeneral.org/news/coronavirus/depression-on-rise-during-covid-19>
- North Carolina Identifies First Case of COVID-19. (n.d.). NCDHHS. Retrieved January 3, 2020, from <https://www.ncdhhs.gov/news/press-releases/north-carolina-identifies-first-case-covid-19>
- Twenge, J. M., & Joiner, T. E. (2020). U.S. Census Bureau-assessed prevalence of anxiety and depressive symptoms in 2019 and during the 2020 COVID-19 pandemic. *Depression and Anxiety*, 37(10), 954-956. doi:10.1002/da.23077
- Qin, J., You, C., Lin, Q., Hu, T., Yu, S., & Zhou, X. H. (2020). Estimation of incubation period distribution of COVID-19 using disease onset forward time: A novel cross-sectional and forward follow-up study. *Science Advances*, 6(33), eabc1202. from <https://doi.org/10.1126/sciadv.abc1202>

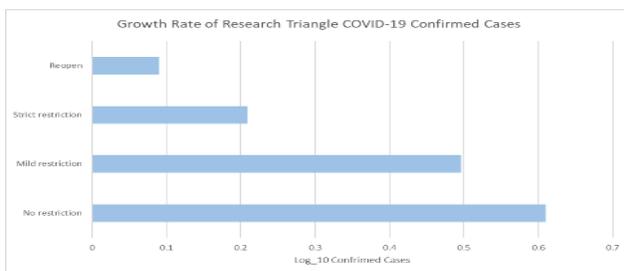
APPENDIX A

The following figure shows the growth rate $k(t)$ of COVID-19 split into four major events.

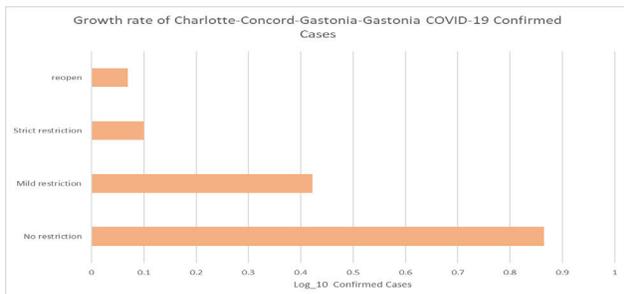
Figure A1

COVID-19 Growth rates of a.) The Research Triangle, b.) Charlotte-Concord-Gastonia, and c.) Asheville

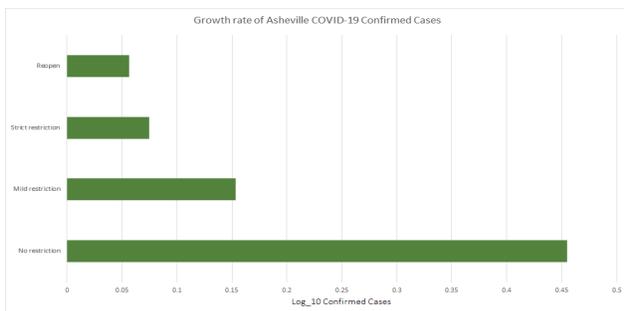
a.) Research Triangle COVID-19 Growth rate



b.) Charlotte-Concord-Gastonia COVID-19 Growth rate



c.) Asheville COVID-19 Growth Rate

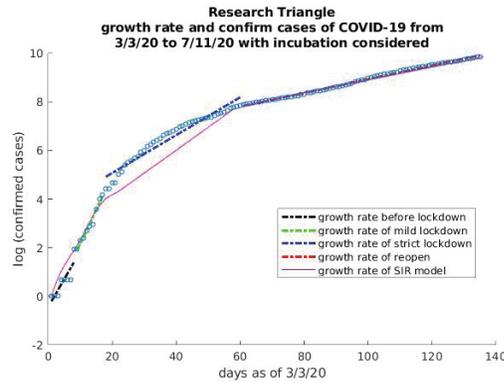


Note. The growth rate $k(t)$, of COVID-19 in three metros calculated in equation 2.

The following graphs show the SIR model with the log of the confirmed cases. The removal rate being chosen correctly allows the pink line to properly simulate the real data. The dot points are a scatter plot of the real data.

Figure A2:

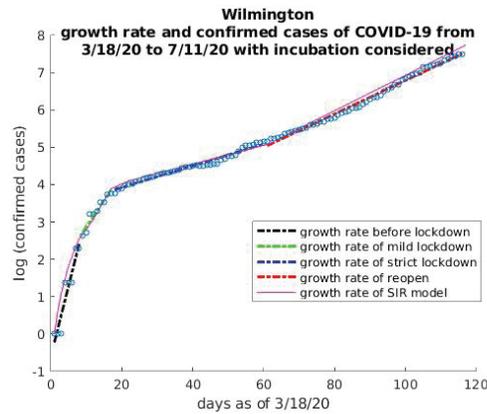
The Time-Delayed SIR Model Graphed with the Log of the Confirmed Cases for the Research Triangle Metro



Note. The SIR is modeled as the pink line here from solving the system of equations below in equations 4,5 and 6. The actual number of cases everyday are the dots. The dotted lines represent $k(t)$ calculated in equation 2.

Figure A3:

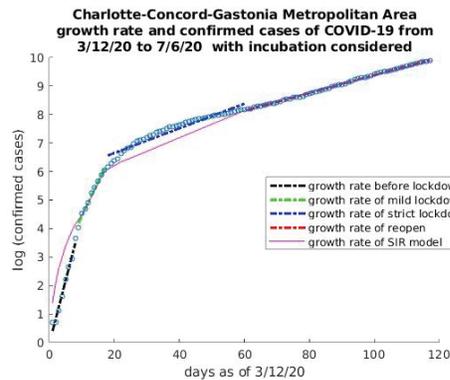
The Time-Delayed SIR Model Graphed with the Log of the Confirmed Cases for the Wilmington Metro



Note. The SIR is modeled as the pink line here. The actual number of cases everyday are the dots. The dotted lines represent $k(t)$ calculated in equation 2.

Figure A4:

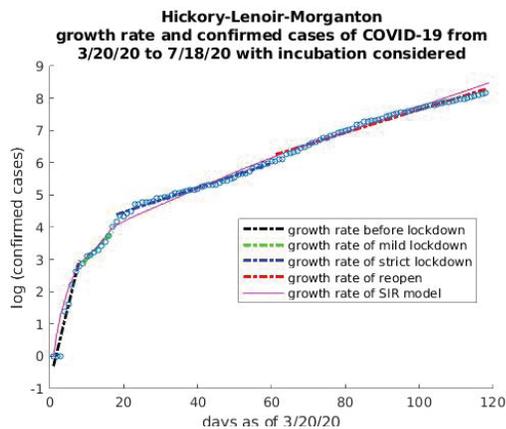
The Time-Delayed SIR Model Graphed with the Log of the Confirmed Cases for the Charlotte-Concord-Gastonia Metro



Note. The SIR is modeled as the pink line here. The actual number of cases everyday are the dots. The dotted lines represent $k(t)$ calculated in equation 2.

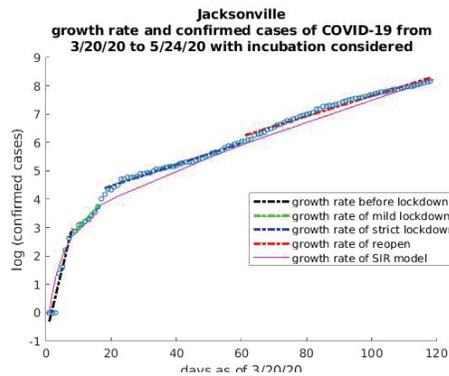
Figure A5:

The Time-Delayed SIR Model Graphed with the Log of the Confirmed Cases for Hickory-Lenoir-Morganton Metro



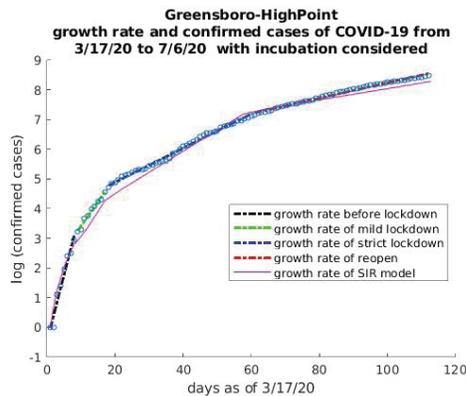
Note. The SIR is modeled as the pink line here. The actual number of cases everyday are the dots. The dotted lines represent $k(t)$ calculated in equation 2.

Figure A6:
The Time-Delayed SIR Model Graphed with the Log of the Confirmed Cases for Jacksonville Metro



Note. The SIR is modeled as the pink line here. The actual number of cases everyday are the dots. The dotted lines represent $k(t)$ calculated in equation 2.

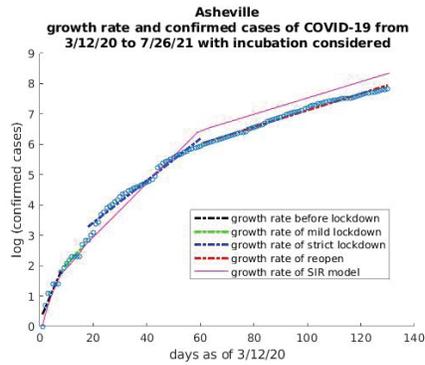
Figure A7:
The Time-Delayed SIR Model Graphed with the Log of the Confirmed Cases for Greensboro-Highpoint Metro



Note. The SIR is modeled as the pink line here. The actual number of cases everyday are the dots. The dotted lines represent $k(t)$ calculated in equation 2.

Figure A8:

The Time-Delayed SIR Model Graphed with the Log of the Confirmed Cases for the Asheville Metro



Note. The SIR is modeled as the pink line here. The actual number of cases everyday are the dots. The dotted lines represent $k(t)$ calculated in equation 2.

APPENDIX B

Table B1

Removal Rates of Seven NC Metros

Location	Pre-lockdown Removal Rate	Lockdown Removal Rate	Phase 1 Removal Rate	Reopen Removal Rate
Asheville	.0065	.008	.007	.012
Research Triangle	.0065	.001	.01	.013
Charlotte-Concord-Gastonia	.01	.005	.0135	.014
Wilmington	.0065	.001	.0145	.0015
Greensboro-High Point	.0065	.00095	.01	.015
Hickory	.01	.006	.004	.008
Jacksonville	.035	.01	.008	.012

Note. These values here is the piecewise calculated from the system of equations in 4,5, and 6.

Table B2*Age Correlation Data for All Genders*

Location	Number of Observations (Counties)	Error degrees of freedom	b1: 0-65 age range	b2: 65-100 age range	Test Statistic 1	Test Statistic 2	Coefficient of b1 is greater than Coefficient of b2
Asheville	5	3	.0024	.0058	.30	.20	False
Research Triangle	9	7	.01	.0096	2.11	.26	True
Charlotte-Concord-Gastonia	7	5	.019	-.04	2.64	-1.17	True
Greensboro-High Point	3	1	.02	-.05	.88	-.70	True
Hickory	4	2	-.002	.05	-.06	.3	False
Combined Areas	31	29	.01	-.01	4.27	-.94	True

Note. The results of Multiple Linear Regression when studying the correlation between gender and COVID-19 cases.

Table B3*Age Correlation Data for Males*

Location	Number of Observations (Counties)	Error degrees of freedom	b1: 0-65 age range	b2: 65-100 age range	Test Statistic 1	Test Statistic 2	Co-effi-
Asheville	5	3	0.005	0.01	3.02	-1.38	
Research Triangle	9	7	0.02	0.023	1.68	0.46	
Charlotte-Concord-Gastonia	7	5	0.03	-0.07	2.23	-0.88	True
Greensboro-High Point	3	1	-0.016	0.1	-5.77	7.2	
Combined Areas	31	29	0.024	-0.016	4	-0.7	True

Note. The results and parameters of the Multiple Linear Regression for studying the correlation between the male gender and COVID-19 cases.

Table B4*Age Correlation Data for Females*

Location	Number of Observations (Counties)	Error degrees of freedom	b1: 0-65 age range	b2: 65-100 age range	Test Statistic 1	Test Statistic 2	Coefficient of b1 is greater than Coefficient of b2
Asheville	5	3	0.0024	0.0058	0.23	0.2	False
Research Triangle	9	7	0.01	0.059	0.34	0.027	True
Charlotte-Concord-Gastonia	7	5	0.034	-0.067	2.23	-0.89	True
Greensboro-High Point	3	1	-0.18	0.087	-3.5	4.3	False
Hickory	4	2	n/a	n/a	n/a	n/a	n/a
Combined Areas	31	29	0.026	-0.028	4.49	-1.05	True

Note. The results and parameters of the Multiple Linear Regression for studying the correlation between the female gender and COVID-19 cases.

Table B5*Age-Diseased Correlation Study*

Location	b1:0-23 age group	b2:24-50 age group	b3:51-84 age group	b4: 85 – 100 age group	Test Statistic 1	Test Statistic 2	Test Statistic 3	Test Statistic 4
Combined Metro Areas	-0.0002	0.0006	-0.0001	0.004	-0.37	0.72	0.17	0.76
Charlotte-Concord-Gastonia	0.002	-0.001	-0.001	0.35	2.7	-1.7	-3.67	3.88
Research Triangle	-0.00008	-0.0006	0.001	0.002	-0.023	-0.19	0.74	0.17

Note. The results and parameters of the Multiple Linear Regression when looking at the correlation between the COVID-19 deceased population and age.

Table B6*Data for Race Study*

Location	b1: Black Popula- tion	b2: White Popula- tion	Test Sta- tistic 1	Test Sta- tistic 2	P value 1	P val- ue 2
Combined Metro Areas	.02	.01	3.5	4.8	.001	6.4e-5
Char- lotte-Con- cord-Gas- tonia	.05	.005	5.2	5.4	.04	.03
Research Triangle	.01	.01	1.3	2.6	.25	.06
Greens- boro-High Point	.01	.01	1.3	2.6	.25	.06

Note. The results and parameters of the Multiple Linear Regression when looking at the correlation between Race and COVID-19 cases.

Table B7

Education Correlation with COVID-19 transmission

Location	b1: % of Population without High School Graduation	b2: % of Population with only High School Diploma	b3: % of Population with a Bachelor's Degree or Higher	Test Statistic 1	Test Statistic 2	Test Statistic 3
Combined Metro Areas	0.032	0.009	0.005	0.99	1.66	0.95

Note. The results and parameters of the Multiple Linear Regression when looking at education and its correlation with COVID-19 cases.

CRISIS FOR THE UNIVERSITY STUDENT: CHANGING STUDENT HOUSING AND GROWING COST BURDEN

Geography and Earth Sciences Department
Connor Wood And J. Claire Schuch, Ph.D.

Abstract

College cost burden and student debt are among the most pressing discussions in contemporary US society. This conversation has largely been focused on changes in tuition and fees. While this is important, over 60% of the college cost at four-year public institutions is housing. This substantial burden has already forced 35% of four-year college students to be housing insecure and 7% to be homeless (Baker-Smith et al., 2020). In order to address this, it is essential we understand the factors driving housing costs and its impacts on students. This paper assists in that goal by investigating changes in on- and off-campus housing costs at the University of North Carolina at Charlotte in recent years. Using tuition, fees, and on- and off-campus housing data from UNC Charlotte, we demonstrate that student housing cost increased by 6% on-campus and 20% off-campus between 2017 and 2019. We also collected survey data from 99 students. According to those results, 59% of students currently feel cost burdened by their housing cost and 88% would feel burdened if their rent increased. Students believed



Connor Wood

Connor is a UNC Charlotte undergraduate student studying Geography. In his studies, he has become interested in the connections of economic policy on our spatial world. This interest was solidified during his work as a Summer Research Assistant where this project began. As a student who experienced housing insecurity, student housing affordability became one of his passions and made him a TEDxUNCCharlotte Speaker on the topic. Outside of Connor's academics, he has been involved across campus in various departments holding many executive positions. After graduation, he wants to pursue a Master's of Public Policy and work at the intersection of research and policy development.



FACULTY ADVISOR
J. Claire Schuch, Ph.D.

Dr. Claire Schuch holds a Ph.D. in Geography and Urban Regional Analysis and worked as a National Science Foundation postdoctoral research fellow 2018-2020 in the Geography and Earth Sciences Department. She has conducted a range of interdisciplinary, mixed-methods, community-based studies, covering topics such as Latino civic engagement, minority and female entrepreneurship, immigrant inclusion, postpartum depression, unintended pregnancy, affordable housing, school-to-work transitions, and domestic violence.

being part of a growing university and city attributed to increasing off-campus rents.

Keywords: housing, surveys, students, higher education, mixed-methods

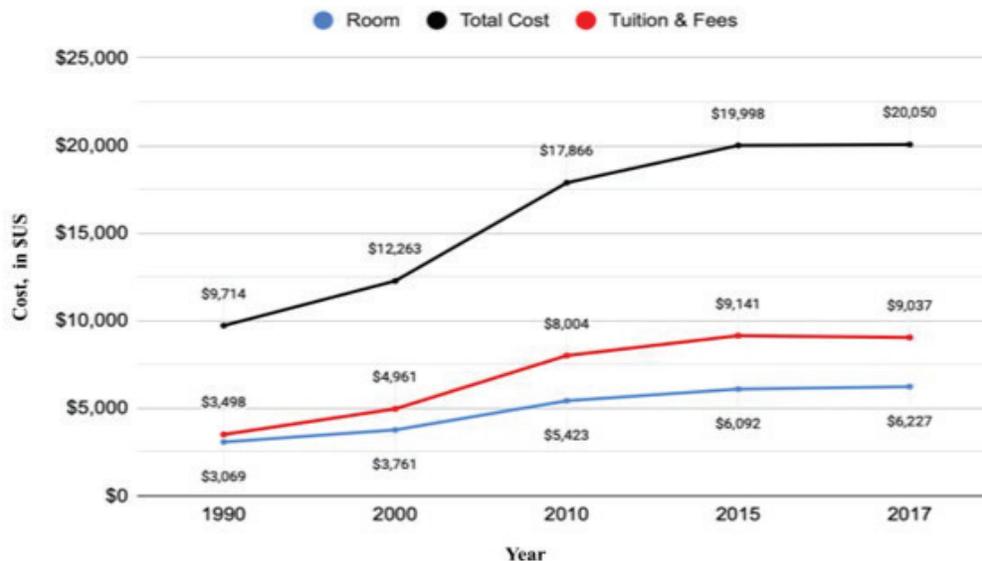
The annual cost of higher education at a four-year public institution has doubled in the last three decades from \$9,714 in 1990 to \$20,050 in 2017 (Figure 1). Still, university enrollment has increased by 27% since 2000 (Snyder et al., 2019). While more people are accessing higher education, students' ability to afford a college education has deteriorated, leaving the nation with a collective student debt of \$1.4 trillion and an estimated 70% of college graduates carry student loan debt averaging \$38,000 per person (Fay, n.d.). On a societal level, this has created a generation of young adults burdened by debt, which impacts their purchasing power and the entire economy. As a result, how to make college affordable and decrease student debt is a common state and federal political discussion. This paper contributes to our understanding of the factors driving housing costs and its impacts on students by investigating changes in on- and off-campus housing costs at the University of North Carolina at Charlotte in recent years.

Literature Review

The college affordability discussion has largely revolved around increasing tuition and fees; however, these are not the only factors. Student housing accounts for over 60% of the four-year public college cost. Four-year public institution tuition and fees increased by 82% since 2000, from \$4,961 to \$9,037 in 2017. During that time, on-campus housing cost increased, on average by 66%, from \$3,761 to \$6,227 (Figure 1). However, student housing is still left out of the discussion and changes in off-campus student housing costs are largely unknown.

Figure 1

Four-Year Public Postsecondary Institution Costs in Constant 2017 US Dollars, 1990-2017



Source: Snyder et al. (2019)

While housing is largely left out of the popular discussion and the literature, some studies have examined student housing trends in the United States and other countries. For example, Van Der Werf (1990) wrote about the emerging privatization of student housing and potential loss of financial control. Others have written about shifting student preferences from traditional style to suites (Ghani & Suleiman, 2016; Khozaei et al., 2014; La Roche et al., 2010). Ong and colleagues (2013) discovered relationships between the number of students living on-campus and the off-campus market, driving factors in this connection were the cost of off-campus rent, complex security and campus housing stock including availability, style, and price. Still, the studies have failed to connect back to the student cost burden. Students are also largely left out of housing affordability discussions and policies. Therefore, this research sets out to understand what is happening with student housing costs and bring its potential changes and implications into the larger

discussion around affordability for college and housing. In order to do this, this paper asks:

1. To what extent has on- and off-campus housing costs changed for college students?
2. What factors are driving these changes in the perspective of college students?
3. What are the implications of rising housing costs for students and college affordability?

Methods

Case Study

We answer our research questions using the University of North Carolina at Charlotte (UNC Charlotte) as a case study. UNC Charlotte is a large public urban research institution and one of the 15 postsecondary institutions of the UNC System. It is the only system institution serving the City of Charlotte, the 16th largest city in the United States, and its surrounding metropolitan area. Both the City of Charlotte and UNC Charlotte have seen substantial growth in the past two decades (US Census). UNC Charlotte enrollment has grown from 17,241 in 2000 to 29,710 in 2018 (Figure 4). Approximately 6,000 students live on campus and over 10,000 live immediately around campus. With transfer students accounting for half of new students each year and the university enrolling and graduating more low-income students than any other UNC system institution, UNC Charlotte has a diverse student body that is often left out of student housing discussions (UNC Charlotte Admissions, 2020).

Data Collection

Primary and secondary data were collected between May and July 2019. All materials and study procedures were approved by the UNC Charlotte Institutional Review Board (IRB). Secondary data were largely derived from UNC Charlotte and UNC System sources. We obtained enrollment data from Fall 1988 to Spring 2019 from the Historical Factbook by the UNC Char-

lotte Office of Institutional Research (n.d). Tuition and fees data were pulled from the website of UNC Charlotte Niner Central and the Office of Bursar. This data was only available from 2009 onwards due to a record retention standard of 10 years and only publicly published from 2016 onwards. On-campus housing data was pulled from the UNC Charlotte Housing and Residence Life website (n.d.). Housing rates were only publicly available from 2015-2016 onward. This data was compiled into excel sheets and analyzed using descriptive statistics to find the average and percent change over time.

For off-campus housing, we used data from individual leasing complexes offering academic year leases that start in August and run until the following July. These complexes are designed and marketed directly to students and owned largely by national companies. Following a general model of large-scale multi-unit housing offering individual leases for a furnished single bedroom/bathroom and a shared common space with a kitchen and an all-inclusive rent, these complexes have risen in popularity and frequency since 2000 (Ghani & Suleiman, 2016.) There are 12 of these privately-owned complexes operating around the university, largely built in the last decade, with the newest opening in Fall 2018 (Table 1). To find the rent price for each complex, we consulted with the respective leasing offices and websites. The apartments complexes only had on hand one or two years of rental rates. This specific housing is representative of current student housing market trends at UNC Charlotte and nationally, and most comparable to on-campus housing.

Table 1*Off-Campus Student Housing Leasing Offices*

Name of Complex	Leasing Website
49 North	https://www.forty9north.com
The Edge	https://www.americancampus.com/student-apartments/nc/charlotte/the-edge
University Walk	https://www.americancampus.com/student-apartments/nc/charlotte/university-walk
University Village	https://www.universityvillagecharlotte.com
The Flats at Mallard Creek	https://theflatsatmallardcreek.com/#amenities
The Flats at Campus Pointe	https://theflatsatcampuspointe.com
Arcadia	https://www.arcadiauncc.com
Aspen	https://myaspenheights.com/our-locations/charlotte/
Millennium One	https://mlapartments.com
Bldv98	http://blvd98.com
University Crossings	https://www.americancampus.com/student-apartments/nc/charlotte/university-crossings-charlotte#specials
Haven 49	https://haven49charlotte.com
Campus Walk	http://unccrentals.com/campus_walk.php
Colville Townhomes	http://unccrentals.com/colville_townhouse.php
University Terrace	http://unccrentals.com/university_terrace.php
University Terrace North	http://unccrentals.com/university_terrace_north.php

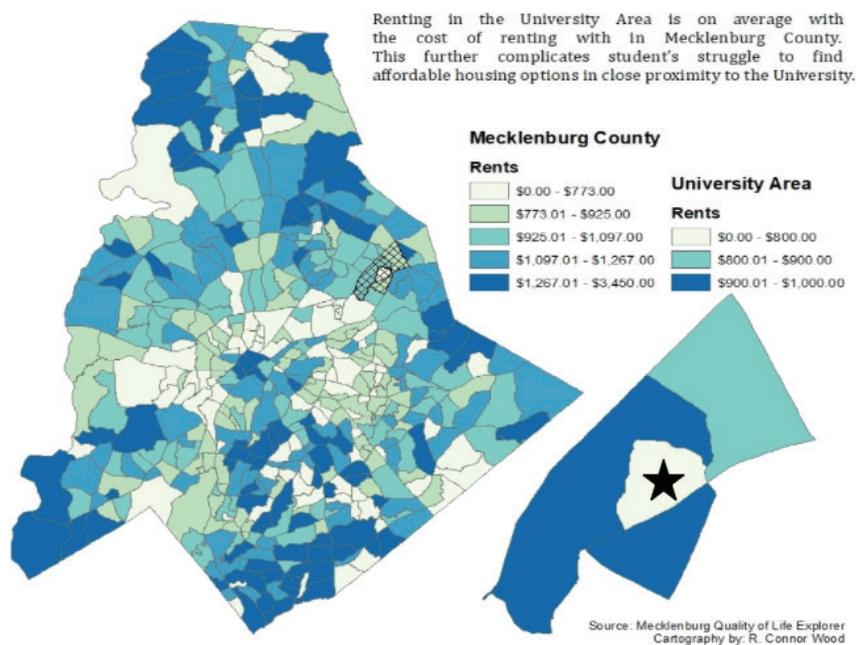
Note: 2019-2020 Academic Year rental rates were found on the complexes' websites.

To take into account UNC Charlotte's surrounding area, known as University City, and Mecklenburg County as a whole, we used Quality of Life Data, an online public tool that includes numerous variables at the Neighborhood Profile Area (NPA) level (Charlotte-Mecklenburg Quality of Life Explorer, n.d.). To delineate between Mecklenburg County and specifically the University Area, we selected NPAs that contained at least one of our selected 12 individual leasing student complexes. Using the Explorer and ArcMap, we analyzed the spatial variation in the distribution of values for selected variables like rental costs (Figure 2).

Figure 2

Rental Costs in Mecklenburg County vs University NPAs, 2017

Mecklenburg County vs University Area Rental Costs



Note: The star represents UNC Charlotte's Campus

Source: Charlotte-Mecklenburg Quality of Life Explorer, Rental Costs 2017. Map edited by authors.

Online Survey

To understand the student perspective on their cost burden, an online survey was conducted over Summer 2019 through a Google Form. Eligibility criteria included being a current or recent former UNC Charlotte student and living or have recently lived in one of the off-campus, individual leasing student housing complexes. In an attempt to obtain a representative sample, participants were recruited in a variety of ways, including through social media, email, student organization listservs, and word-of-mouth. Students were asked several questions about their college status (first-generation, transfer status, aid-receiving), their current and past living arrange-

ments and monthly rent. Students were also asked for their thoughts on changes occurring in the University Area and what was driving these changes, as well as their feelings related to housing costs and student cost burden (for a full list of survey questions, see Appendix). The responses collected were stored in an excel sheet.

In total, 89 undergraduates and 10 graduate students responded to the online survey, 39 of whom were first-generation college students (representative of the whole student body). Nine were transfer students, which is an underrepresentation of the student body as a whole (Table 2). Seventy-seven out of the 99 received some form of financial aid (representative of the whole student body); 90% of first-generation students did and all transfer students did. We cannot speak to gender, age or race/ethnicity because we did not ask those demographics.

Table 2

Survey Sample Demographics Compared to Overall UNC Charlotte Student Demographics

Variable	Sample (N=99)	UNC Charlotte (N=29500)
First-generation	39%	37%*
Aid-receiving	78%	75%*
Transfer	10%	43%**

*Source: UNC System, UNC Charlotte page (2020)

**Source: UNC Charlotte Office for Institutional Research (2020)

Data Analysis

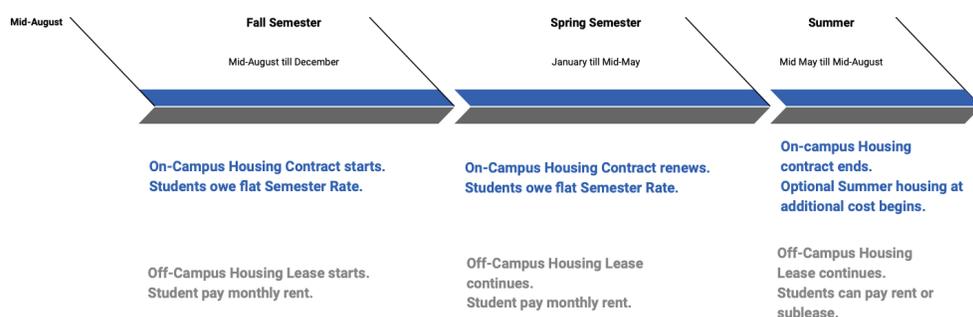
Current and former housing arrangements were analyzed in the subsequent method to calculate the monthly rent rate. First, all rent rates received were organized by year, then complex, then by number of bedrooms in the unit. Secondly, an average rent was calculated for each type of unit in the complex. These rents were compared to other complexes then an average rent rate for each style of unit in the off-campus market was calculated. Lastly, these rents were averaged to

give mean rent for the off-campus market.

To compare on- and off-campus costs, a few assumptions had to be made due to the differences between the two. The academic year runs from Mid-August to Mid-May, which totals nine months and is divided into two semesters. For students living on-campus, they pay a single rate at the beginning of each semester and are only allowed to reside on campus over the academic year. For students staying off-campus, their 12-month leases start in mid-August to the end of July with monthly rent due at the beginning of each month. Therefore, these residents pay ten months for the academic year and two summer months. On-campus students seeking summer housing must find another option and for off-campus students they must continue to pay or sublease their unit (Figure 3). We specifically looked at individual leasing complexes that included furnished apartments with utilities included in rent due to their prevalence around UNC Charlotte and increasing popularity across the country. Students who choose to live in traditional unfurnished apartments and in rental homes have different costs that are harder to compare directly to on-campus housing.

Figure 3

Student Housing Lease Lengths in Comparison to Academic Year



Note: On-Campus refers to residence halls, off-campus refers to student housing complexes.

While there are differences in the two markets, comparing individual leasing complex-

es allows for more accuracy in our findings. To make the most accurate direct comparison, we accounted for differences in types of housing offered by the two. On-campus student housing offers a variety of styles including traditional double rooms, suites, and one- and four-bedroom apartments, while off-campus only offers apartments and townhomes. To make the most accurate comparison, we compared the cost of one- and four-bedroom apartments. To do so we converted the cost into a monthly rent, a semester rate, and yearly cost. Semester rates were divided by five to provide the on-campus monthly rent cost. Monthly rents were multiplied by five to provide their semester rate. To provide the total price for the 10-month academic year, we doubled the semester rate.

Results

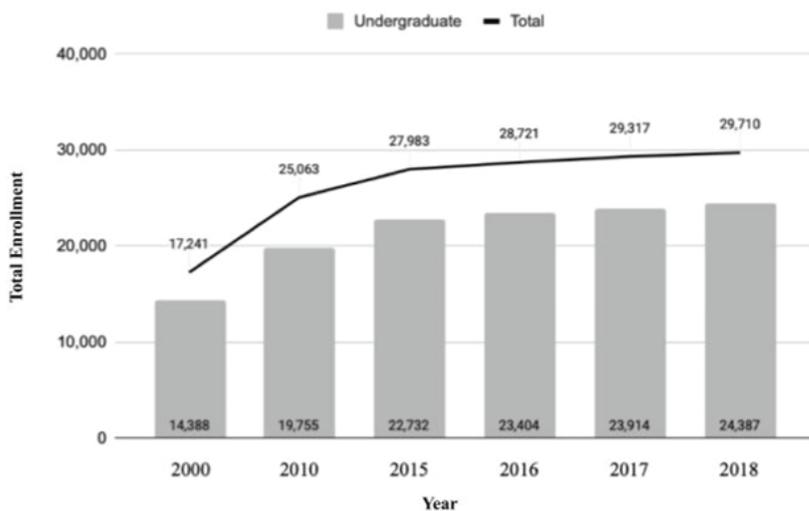
This section shows our findings, organized by research question. First, we use the secondary quantitative data to demonstrate how on- and off-campus housing costs changed for college students. Second, we draw on primary survey data to explore what factors are driving these changes in the perspective of college students. In the final section, we build on these findings to discuss our third question, i.e. the implications of rising housing costs for students and college affordability.

Campus and Local Changes

UNC Charlotte enrollment has increased by 72% in the past two decades, from 17,241 in 2000 to 29,701 in 2018. For undergraduates specifically, enrollment was 19,755 in 2010 and 24,381 in 2018 (Figure 4). Meanwhile, in-state undergraduate tuition and fees per semester increased from \$2,404 in 2010 to \$3,548 in 2019 (Table 3). In other words, in-state tuition and fees increased by 47% while total enrollment only increased by 6%.

Figure 4

UNC Charlotte Fall Enrollment 2000-2018



Source: UNC Charlotte Office of Institution Research, Factbook (2018)

Table 3

Undergraduate Tuition and Fees Rates at UNC Charlotte, 2010-2020

+

Academic Year	Per Semester	
	In-State	Out-Of-State
2010-2011	\$2,404	\$7,709
2015-2016	\$3,266	\$9,852
2016-2017	\$3,382	\$9,967
2017-2018	\$3,497	\$10,214
2018-2019	\$3,522	\$10,239
2019-2020	\$3,548	\$10,265

□

Source: UNC Charlotte Niner Central, Tuition and Fees (2019)

We found tremendous changes in the University Area as well as significant differences

between this area and Mecklenburg County as a whole. The selected University NPAs saw a 92% population increase, compared to a 58% increase for the County overall (Table 4). Low average resident age, household income, and single-family units and ownership speak to a traditional postsecondary student population. While the University Area differs greatly from the rest of the County due to the high number of students, 2017 rental costs only differed by 17% difference, averaging \$1,097 in the County and \$915 in the University Area (Table 4, Figure 2).

Table 4

Select Population and Housing Variables for Mecklenburg County and the University Area

Select Population and Housing Variables for Mecklenburg County and the University Area

Variables	All Mecklenburg County NPAs		University NPAs	
	Average	Percent Change	Average	Percent Change
Population Density 2000	3.4	From 2000-2018: 44%	5.5	From 2000-2018: 95.5%
Population Density 2018	5.1		10.8	
Population 2000	1505	From 2000-2018: 57.7%	2471	From 2000-2018: 92.3%
Population 2018	2373		4752	
Resident Age 2016	37		22	
Household Income 2016	\$66,629		\$29,393	
Housing Density 2011	2.0	From 2011-2018: 8.7%	1.2	From 2011-2018: 25.3%
Housing Density 2018	2.1		2.5	
Single Family Housing 2011	64.5%	From 2011-2018: -2.3%	9.3%	From 2011-2018: 10.8%
Single Family Housing 2018	62.9%		10.3%	
Home Ownerships 2016	57%		15.3%	
Rental Costs 2016	\$1,097		\$915	

Source: Charlotte Mecklenburg Quality of Life Explorer

Housing Cost Changes

We find that both on- and off-campus housing costs have risen in recent years. For on-campus housing specifically, semester rates have increased on average by nearly 16%, from \$3,947 in 2015-2016 to \$4,565 in 2019-2020. Double traditional rooms saw the largest price increase at nearly 20%. Three-bedroom suites saw the smallest price increase at 9% and no

on-campus option saw a price decrease (Table 5). Calculating a monthly rent for comparison we can see that rent for a one bedroom is \$1,071 and \$960 for four Bedrooms with two shared bathrooms. Overall, the average on-campus housing yearly cost increased from \$7,894 in 2015-2016 to \$9,130 in 2019-2020 (Table 6).

Table 5

UNC Charlotte On-campus Housing Rates per Semester and Percent Changes, 2015-2019

	Single	Double	1B Suite	2B Suite	3B Suite	4B Suite	1B apt	4B Apt	Average
'15-'16	\$3,837	\$2,955	\$4,135	\$4,075	\$4,090	\$3,930	\$4,690	\$4,138	\$3,947
'16-'17	\$4,008	\$3,087	\$4,378	\$4,300	\$4,248	\$4,077	\$4,830	\$4,389	\$4,135
'17-'18	\$4,170	\$3,212	\$4,553	\$4,472	\$4,416	\$4,220	\$5,025	\$4,504	\$4,293
'18-'19	\$4,316	\$3,369	\$4,713	\$4,628	\$4,570	\$4,436	\$5,200	\$4,661	\$4,451
'19-'20	\$4,462	\$3,532	\$4,855	\$4,766	\$4,458	\$4,568	\$5,355	\$4,801	\$4,565
% increase	16.3%	19.5%	17.4%	17.0%	9.0%	16.2%	14.2%	16.0%	15.7%

Source: UNC Charlotte Housing & Residence Life website

Table 6

UNC Charlotte On-Campus Rate per Month, Semester, and Yearly Cost, 2015-2019

	Monthly Rent			Semester Rate			Academic Year Cost		
	1B Apt	4B Apt	Average	1B Apt	4B Apt	Average	1B Apt	4B Apt	Average
'15-'16	\$938	\$828	\$789	\$4,690	\$4,138	\$3,947	\$9,380	\$8,276	\$7,894
'16-'17	\$966	\$878	\$827	\$4,830	\$4,389	\$4,135	\$9,660	\$8,778	\$8,270
'17-'18	\$1,005	\$901	\$859	\$5,025	\$4,504	\$4,293	\$10,050	\$9,008	\$8,586
'18-'19	\$1,040	\$932	\$890	\$5,200	\$4,661	\$4,451	\$10,400	\$9,322	\$8,902
'19-'20	\$1,071	\$960	\$913	\$5,355	\$4,801	\$4,565	\$10,710	\$9,602	\$9,130

Note: 1B = 1 Bedroom, Apt = Apartment, 4B = 4 Bedroom

For off-campus rents, we used the data collected by the student survey and leasing offices. We received responses for each of the 16 complexes listed in the survey; 12 were individual leasing complexes, and four offered individual and traditional leasing. We also received 12 entries for unlisted complexes. We received a total of one response for 2015-2016, four for 2016-2017,

19 for 2017-2018, and 99 responses for 2018-2019. Due to limited responses for 2015-2016 and 2016-2017, we chose not to compare these values due to the inability to evaluate their validity. For 2017-2018, we did not receive one- or two-bedroom rents. For each year, the most reported bedroom students lived in was a four-bedroom unit. We find that for each year prices increased for each style of unit, except for three bedrooms. Four-bedroom apartments varied the most in price, with an average of \$350 difference between the minimum and maximum rents (Table 7).

Table 7

University Area Off-Campus Monthly Rents, 2017-2020

Year	# of Bedrooms	Average	# of Complexes	Minimum	Maximum
2017-2018	1	-	-	-	-
	2	-	-	-	-
	3	\$462	2	\$375	\$549
	4	\$561	10	\$335	\$700
	5	\$813	2	\$665	\$960
2018-2019	1	\$896	3	\$776	\$999
	2	\$741	4	\$700	\$781
	3	\$623	6	\$450	\$701
	4	\$584	12	\$365	\$699
	5	\$529	1	\$529	\$529
2019-2020	1	\$1,071	6	\$928	\$1,180
	2	\$743	7	\$669	\$809
	3	\$599	7	\$435	\$732
	4	\$603	13	\$375	\$709
	5	\$642	2	\$609	\$674

Note: Average was found by each individual unit type for that respective year.

To compare directly to on-campus, we pulled one- and four-bedroom rents from Table 6 and then averaged all rents reported for an individual year. The average off-campus rent paid by students increased from \$612 in 2017-2018 to \$732 in 2019-2020, an average increase of 20%. In

the same time frame, four-bedroom apartments increased by 7.5% from \$561 to \$603 (Table 8).

Table 8

UNC Charlotte Off-campus Month, Semester, and Yearly Cost, 2017-2019

Year	Monthly Rent			Semester Rate			Yearly Cost		
	1B Apt	4B Apt	Average	1B Apt	4B Apt	Average	1B Apt	4B Apt	Average
'17-'18	-	\$561	\$612	-	\$2,805	\$3,060	-	\$5,610	\$6,120
'18-'19	\$896	\$584	\$675	\$4,480	\$2,920	\$3,375	\$8,960	\$5,840	\$6,750
'19-'20	\$1,071	\$603	\$732	\$5,355	\$3,015	\$3,660	\$10,710	\$6,030	\$7,320

Note: 1B = 1 Bedroom, Apt = Apartment, 4B = 4 Bedroom

Due to the larger availability of four-bedroom apartments than one-bedrooms in the on- and off-campus housing stock, we directly compare them to the on-campus equivalent in Table 9. While both prices have increased since 2017-2018, there is on average a \$1,500 saving to live off-campus for a semester. Strikingly, we find that in 2019-2020 a student saved on average \$3,572 living off-campus for the academic year when comparing tuition, fees, and housing (Table 9). Student survey respondents also felt that college cost and the cost burden have both grown.

Table 9

Cost to Attend and Live in a Four-Bedroom Apartment at UNC Charlotte, 2017-2019

Year	Per semester			Total Cost for the Academic Year	
	On-Campus	Off-Campus	Tuition & Fees	On-Campus	Off-Campus
'17-'18	\$4,138	\$2,805	\$3,497	\$15,270	\$12,604
'18-'19	\$4,504	\$2,920	\$3,522	\$16,052	\$12,884
'19-'20	\$4,801	\$3,015	\$3,548	\$16,698	\$13,126

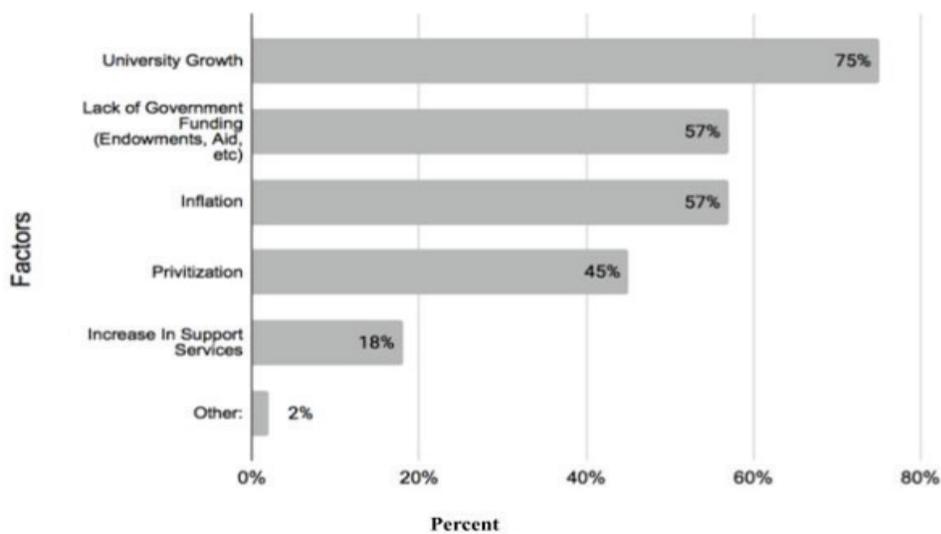
Note: Yearly cost only includes Fall and Springs semesters, not the optional summer term

Factors Driving Housing Cost Changes

Of the students surveyed, 96% believed that higher education's cost burden had increased. Of those respondents, 76% believed that university growth was the cause while 58% believed that inflation and lack of government funding/aid was the cause (Figure 5). In reference to off-campus rents, 92% of students believed that rents had increased in the University Area. Over 60% of students believed that enrollment growth, construction of new complexes, and rising rents in Charlotte were increasing the off-campus rents (Figure 6).

Figure 5

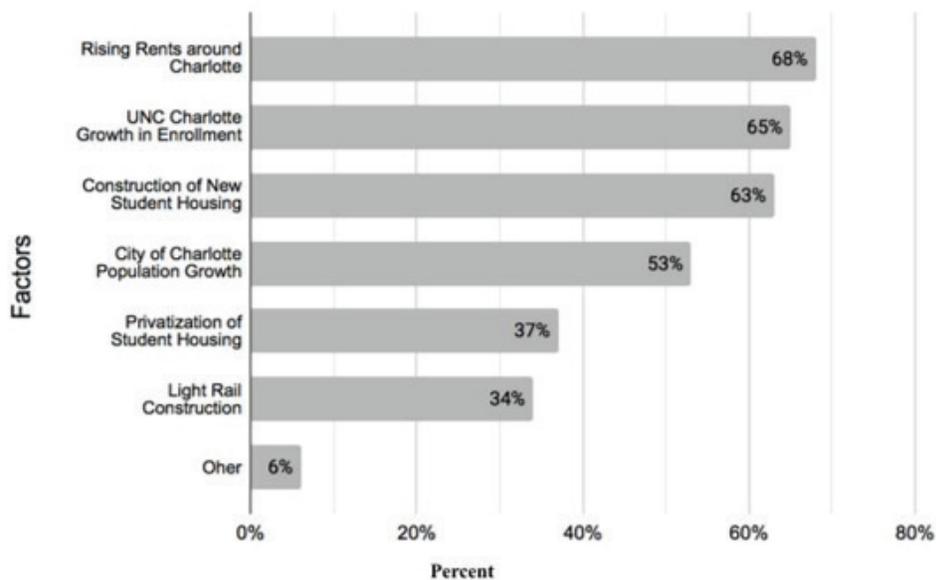
Factors Increasing Higher Education's Cost Burden



Note: Students were asked to “select all that apply” for relevant factors.

Figure 6

Factors Driving Changes in Off-Campus Housing Rents

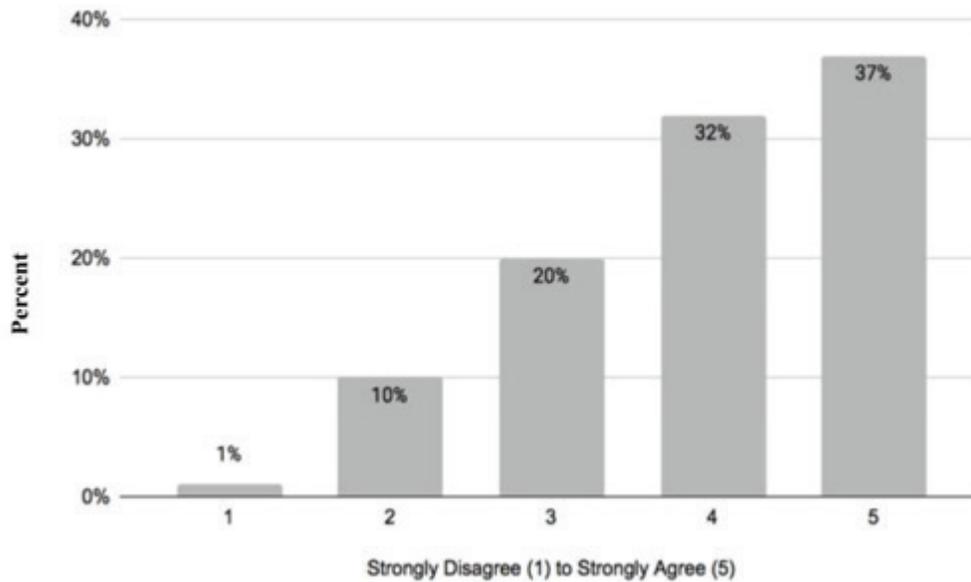


Note: “Light Rail Construction” refers to the expansion of LYNX Blue Line from downtown Charlotte to the University.

Nearly 70% of students either agreed or strongly agreed that off-campus student housing was contributing to the cost burden of students. Only 12% of students disagreed or strongly disagreed that off-campus housing was impacting the cost burden (Figure 7). At the time of the survey, 59% of students felt current cost burden by their off-campus rents. When asked if they would feel a cost burden if their rents increased, 88% of students said yes.

Figure 7

Off-Campus Cost are Increasing Cost Burden of Students

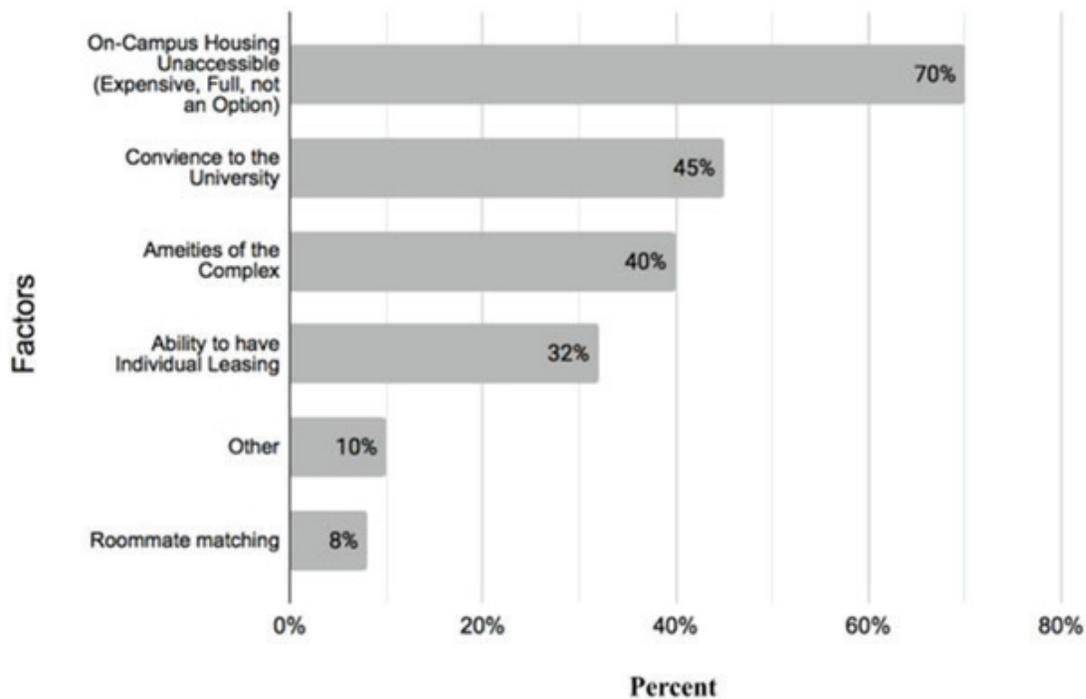


Note: Students were asked to choose only one response.

A majority of students who chose to live off-campus chose to do so due to the cost-burden of on-campus living. Of the respondents, 45% and 40% respectively chose to live off-campus for convenience to the university and amenities of the complex (Figure 8).

Figure 8

Factors Determining Student Selection of Complex



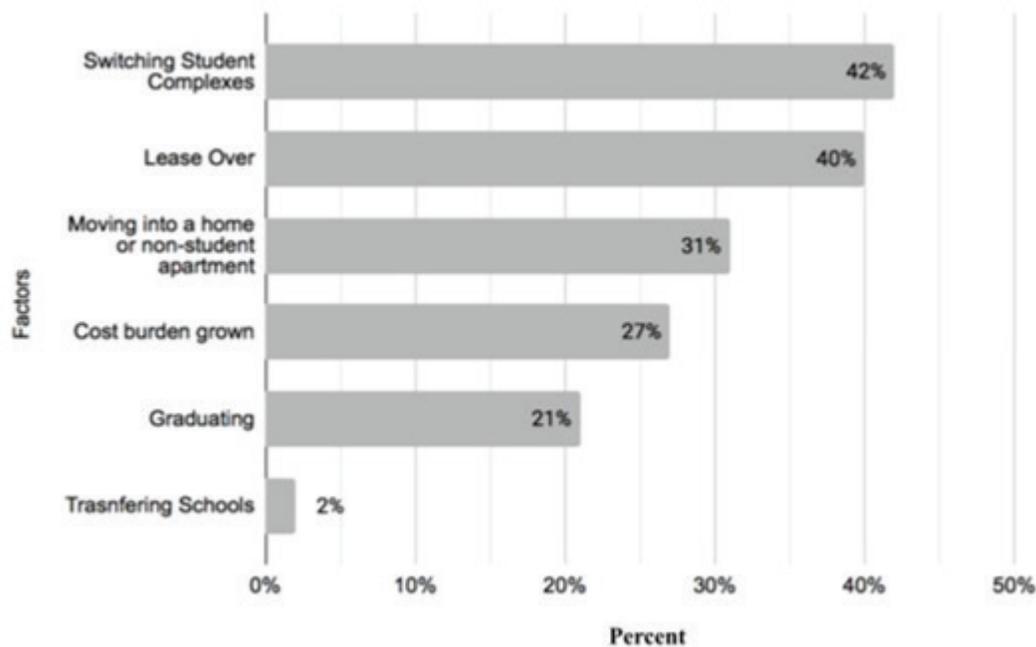
Note: Individual Leasing refers to each bedroom in a unit receiving its own lease.

Half of students responded that they were moving after July 2019 when their lease ended. While students oftentimes select off-campus housing to save money, the most common reasons for moving once they are living off-campus is their lease ending and relocating to another off-campus housing complex. Others (27%) listed increased rent as a reason for moving and 31% of respondents were moving to a rental home or non-student apartments (Figure 9). Students' written responses confirmed that, while off-campus housing is costly to them, it is still cheaper and more accessible than living on-campus. Some students were concerned about off-campus safety and security, which is in line with other studies (La Roche et al., 2010; Ong et al., 2013).

Students were also concerned with the generalization that all college students receive financial support from parents, arguing that that is not always the case.

Figure 9

Factors Leading to Students Moving



Note: Non-student apartments were not compared due to time constraints and different factors that make them less directly comparable to on-campus residence halls.

Discussion and Conclusions

In summary, we find that on-campus and off-campus housing costs have changed drastically in recent years. On average, on-campus rates increased by 16% since 2015. Since 2017 alone, on-campus living increased by 6% and off-campus rents increased by 20%. Even with this recent increase in the off-campus market, it is still cheaper to live off-campus for the academic year. We also find that UNC Charlotte’s on-campus housing prices per academic year were 25% higher than the national average reported by the Digest of Education in 2017-2018, off-cam-

pus prices was 7% lower (Synder et al., 2019). While students typically save money by living off-campus, 59% of students say they are currently cost burdened by their rent. This cost burden and the changes in off-campus rents impact where and how long students stay in their residence. Ninety percent of our survey sample expressed that a future rent increase would make them feel cost burdened. As such, results support the point that student housing needs to be included in college affordability discussions.

Students attribute the increasing cost of higher education largely to university growth, as well as lack of government funding, inflation and housing privatization. Top factors believed to drive changes in off-campus rents, according to students, were general rising rents around Charlotte, UNC Charlotte enrollment growth, the construction of new student housing and Charlotte population growth. In other words, being part of a city where housing costs are increasing, impacts the University Area, and both university growth and city growth were believed to be attributing to increased rents.

While it does seem to be more cost effective for students to live off-campus, it is not as straight-forward as it seems. On-campus housing is for the 10-month academic year, while off-campus housing is a 12-month lease running from August to July. This differing timespan causes an opportunity cost related to summer housing. Another challenge of comparing on- and off-campus housing is that there are certain amenities such as internet and cable factored into the rent. Meanwhile, off-campus housing may have other amenities, such as a pool or a gym. While this difference is hard to compare, students' total cost for the 12-month lease on average is less than the cost to live on-campus for an entire academic-year, which influences their perceptions of housing costs and how they make decisions on where to live.

A limitation of this paper is that we only looked at one university. That said, we anticipate findings to be reflective of those of similar institutions. Furthermore, in an effort to overcome this

limitation and provide more knowledge on the subject, this project is currently being expanded to look at all 15 postsecondary institutions in the UNC System. Other limitations include potential margin of error in the housing data collected, and the convenience sample of the survey data. Though our student sample was relatively small, it was largely representative of the larger student body and the student responses largely agreed with one another, suggesting a reliability of the results. While on-campus housing was readily available, off-campus rents are not tracked anywhere to our knowledge and leasing offices only had largely only one year available. Therefore, we use the student survey responses to calculate off-campus rents in previous years. Additional recommendations include a comprehensive analysis of all price points available in the student housing market including on-campus rates, student apartments, and privately-owned rental homes. Due to the ever-changing conditions that students experience in their educational trajectories, a longitudinal study is also needed to understand changes in cost burden over time, including post-graduation.

In conclusion, we find that the on- and off-campus housing costs at UNC Charlotte have increased in recent years. A majority of our student sample expressed that they currently feel cost burdened by their housing costs, and 90% shared they would feel cost burdened if their rent were to further increase. While the UNC System (2019) unveiled its college affordability “NC Promise” plan, reducing tuition to \$500/semester at three institutions, it only focuses on tuition. While tuition and fees are a factor in college costs, they are not the only one and for many two- and four-year public institutions, housing is the largest cost factor. Therefore, it is essential that we continue to explore and discuss what is happening in student housing, not just at an institutional level (e.g. within UNC Charlotte) but also as part of the broader national discussion about college affordability. Further examination should also be given to solutions on reducing or curbing housing cost for college students. Students should be involved in that conversation since they are

directly affected. Our ongoing research explores who else should be involved in those discussions given that a variety of public and private stakeholders are involved with setting the prices for both on- and off-campus housing.

REFERENCES

- Baker-Smith, C., Coca V., Goldrick-Rab S., Looker E., Richardson B., & Williams T. (2020). #Real College 2020: Five Years of Evidence on Campus Basic Needs Insecurity. The Hope Center. https://hope4college.com/wp-content/uploads/2020/02/2019_RealCollege_Survey_Report.pdf
- Charlotte-Mecklenburg Quality of Life Explorer (n.d.) Rental Costs, 2017. <https://mcmmap.org/qol/#40/>. Original data source: U.S. Census Bureau. American Community Survey 2013-2017, 5-Year Estimates: Table B25063.
- Chemtob D. & Off G. (2019) Charlotte jumps in rankings of largest U.S. cities, surpassing Indianapolis. *The Charlotte Observer*. <https://www.charlotteobserver.com/news/business/biz-columns-blogs/development/article230790609.html>
- Fay, B. (n.d.) Students and Debt. <https://www.debt.org/students/>
- Ghani, Z. A., & Suleiman, N. (2016). Theoretical underpinning for understanding student housing. *Journal of Environment and Earth Science*, 6(1), 163- 176. <https://iiste.org/Journals/index.php/JEES/article/view/28409/29152>
- Khozaei, F., Hassan, A. S., Al Kodmany, K., & Aarab, Y. (2014). Examination of student housing preferences, their similarities and differences. *Facilities*, 32(11), 709-722. <https://doi.org/10.1108/F-08-2012-0061>
- La Roche, C. R., Flanigan, M. A., & Copeland Jr, P. K. (2010). Student housing: Trends, preferences and needs. *Contemporary Issues in Education Research (CIER)*, 3(10), 45-50. <https://doi.org/10.19030/cier.v3i10.238>
- Ong, S. E., Petrova, M., & Spieler, A. (2013). Demand for university student housing: An empirical analysis. *Journal of Housing Research*, 22(2), 141-164. <https://doi.org/10.1080/10835547.2013.12092073>
- Snyder, T.D., de Brey, C., & Dillow, S.A. (2019) Digest of Education 2018. *National Center for Education Statistics*. <https://nces.ed.gov/programs/digest/d18/index.asp>
- UNC Charlotte Niner Central (n.d.) Tuition and Fees. <https://ninercentral.uncc.edu/billing-payments-refunds/tuition-and-fees>

REFERENCES

UNC Charlotte Office of Institutional Research (n.d.). Fact Book. <https://ir.uncc.edu/fact-book>

UNC System Office (2019). Affordable Education. <https://affordableeducation.org>

UNC System Office. (n.d.). InfoCenter. <https://www.northcarolina.edu/infocenter>

UNC System Office (n.d.) Strategic Planning. University of North Carolina at Charlotte Five-Year Goals and Associated Interim Benchmarks.

<https://www.northcarolina.edu/Strategic-Planning/UNC-Charlotte>

UNC Charlotte Office of Undergraduate Admissions. (n.d.). University Profile.

<https://admissions.uncc.edu/about-unc-charlotte/university-profile>

UNC Charlotte Housing and Residence Life Department (n.d.). Rates.

<https://housing.uncc.edu/apply/rates>

Van Der Werf, M. (1999). Colleges Turn to Private Companies to Build and Run Student

Housing. *Chronicle of Higher Education*, 45(40), 37-39. <https://eric.ed.gov/?id=EJ588039>

Appendix

Degree Pursuit

- Undergraduate
- Graduate

Are you a first generation college student?

- Yes
- No

Are you a transfer student?

- Yes
- No

Do you receive financial aid?

- Yes
- No

Have off-campus student housing rents in the University area increased?

- Yes
- No

If yes, what do you think is contributing to this increase? (Check all that apply)

- UNC Charlotte Growth in Enrollment
- City of Charlotte Population Growth
- Light Rail Construction
- Rising Rents around Charlotte
- Construction of new student housing complexes with "better" amenities
- Privatization of Student Housing
- Other: _____

Are off-campus student housing cost attributing to the cost burden of students?

- 1 2 3 4 5
- Strongly Disagree Strongly Agree

Do you feel cost burdened by your current rent price?

- Yes
- No

Would you feel cost burdened if you rent price increased?

- Yes
- No

Why did you choose to live in off-campus student housing? (Check all that apply)

- On-Campus Housing unaccessible (expensive, full, not an option)
- Convenience to the University
- Ability to have Individual Leasing
- Roommate Matching
- Amenities of the complex
- Other: _____

Are you planning on moving this year?

- Yes
- No

If yes, why? (Check all that apply)

- Cost Burden grown
- Graduating
- Lease Over
- Switching Student Complexes
- Moving into a house or non-student apartment complex
- Other: _____

Do you think the cost burden of higher education has increased?

- Yes
- No

If yes, why? (Check all that apply)

- University Growth
- Increase in Support Staff and Services
- Lack of Government Funding (Endowments, Aid, etc.)
- Inflation
- Privatization of Higher Education
- Other: _____

Note: Survey questions used in this study.

PRACTICE WHAT THEY PREACH?: HOW PRE-SERVICE TEACHERS' SELF-EFFICACY IN CULTURALLY RELEVANT TEACHING PRACTICES ALIGNS WITH THEIR PERCEPTIONS OF DIVERSITY

Department of Education

Faith Frayman, Cindy M. Gilson, Ph.D., Tehia Starker Glass, Ph.D., and Erin FitzPatrick, Ph.D.

Abstract

In this qualitative content analysis, we addressed the following research questions: (a) How do pre-service teachers perceive their self-efficacy in creating and enacting culturally relevant curriculum and a culturally inclusive classroom environment? (b) How do pre-service teachers' perceptions of race and diversity align with their perceptions of self-efficacy to engage culturally relevant teaching practices? Both participants indicated the importance of the teacher education institution in influencing their self-efficacy in teaching culturally responsive curriculum. Results indicate that participants saw value in building rapport, embracing diversity, and sharing life experiences.

Keywords: self-efficacy, pre-service teachers, teacher preparation, culturally responsive teaching



Faith Frayman

Faith Frayman is a senior in the College of Education studying Special and Elementary Education. She has minors in both Children's Literacy and Early Childhood Studies. Faith is a Levine Scholar and an Honors Education candidate. After graduating, Faith will be teaching English as a second language with a corporation called Whales English. Her service passions include working with organizations such as Freedom School Partners, Tan Kap Vini, and Wine to Water.



FACULTY ADVISOR
Cindy M. Gilson, Ph.D.

Dr. Cindy M. Gilson is an Associate Professor in the Special Education and Child Development Department. Dr. Gilson is the Coordinator of the Graduate Certificate in AIG program. Her research interests focus on gifted education, differentiated curriculum and instruction to enhance student learning and potential, classroom discourse, teacher listening orientations, STEM high schools, and professional development.

Race Related Teaching Practices

Minoritized students consistently underperform within educational spheres due to an obstacle course of societal, economic, and racial barriers not present for their White counterparts (Hung et al., 2020; Wang et al., 2015). One of these barriers is the lack of diverse cultures and races represented within many classroom environments. Students who feel their culture is supported within the classroom are more likely to take ownership of their learning and feel more connected to educators who make them feel valued (Fuglei, 2014; Walness & Crawford, 2016). Thus teachers must create inclusive classrooms where diverse students feel valued and why the current study was necessary. Next, we present important educational theories that helped to frame this study and were used to analyze the data.

In this work, delineating the difference between race and culture is crucial. For this study, race can be defined as the way in which society groups people based upon shared physical, geographic, historical, and cultural aspects. Race is the “physical differences that groups and cultures consider socially significant” (APA, 2020, p. 142). Alternatively, culture is the characteristics and knowledge developed through a combination of history, tradition, heritage, languages, ancestry, practices, and beliefs that create a unique, shared experience (APA, 2020).



FACULTY ADVISOR

Tehia Starker Glass, Ph.D.

Dr. Tehia Starker Glass is an Associate professor of Elementary Education and Educational Psychology in the department of Reading and Elementary Education at the University of North Carolina at Charlotte. Her research interests include preparing preservice and inservice teachers' culturally responsive teaching self-efficacy, examining motivational factors that influence teachers' behavior towards culturally diverse students, culturally responsive classroom management, the impact of teacher education at historically Black colleges and universities (HBCUs), and instructional design.

Culturally Responsive Teaching, Race-related Teaching Practices, and Multiculturalism

The importance for classroom cultural responsiveness is growing as educators develop their understanding of the impact of cultural relevance. This shift has spurred new practices and theories surrounding Culturally Responsive Teaching (CRT) and Race-Related Teaching Practices (RRTP). CRT is a conceptual framework that positions the recognition of students' cultural backgrounds, interests, and experiences within the classroom as crucial to students' performance (Ladson-Billings, 1994). CRT is teaching that "seeks to empower students educationally and to expand their capabilities in other spheres" by incorporating their cultures within the classroom (Fuglei, 2014, para. 2). CRT requires teachers to make a concerted effort to know their students as people (Fuglei, 2014). It also requires teachers to take the role of facilitator of, not keeper of, knowledge. Furthermore, Fuglei (2014) explained the importance of showing students that their culture and traditions matter and teaching them how to exist within a space that requires "code-switching," the ability to adapt one's language and behavior to the White-centered situation. CRT is supported in educational research literature and connects to RRTP. RRTP includes ways teachers should best "address race so young children can develop their own positive racial identity, build relationships across races, and recognize and stand up to race-related injustices" (Walness & Crawford, 2016, p.1448). CRT can be used to address race and identity effectively in classrooms (e.g. allowing students to talk about issues of race within classroom discussions; Walness & Crawford, 2016). Both CRT and RRTPs are important because when educators explicitly and purposefully address



FACULTY ADVISOR

Erin Fitzpatrick, Ph.D.

Dr. Erin FitzPatrick is an Assistant Professor in the Department of Special Education and Child Development at the University of North Carolina at Charlotte. She teaches graduate and undergraduate literacy courses. Her research interests include elementary writing and practice-based professional development.

race and culture, it benefits all students, not just students of color, because White students grow in their understanding of the historical impact of racialization (e.g., Fuglei, 2014).

Similarly, multiculturalism is grounded in embracing how varying cultures contribute to diversity. “Teachers need in-depth knowledge about ethnic cultures and experiences to integrate ethnic content, experiences, and points of view into the curriculum” (Banks, 1989, p. 245). Multiculturalism “argues for the recognition of group differences and offers a positive view of cultural maintenance” (Ng Tseung-Wong & Verkuyten, 2015, p. 680). As an ideology, multiculturalism is the foundation of CRT. Recognizing cultural differences and viewing them in an affirming light is key to CRT. The three core tenets of CRT are: a) student learning and achievement, b) the affirmation of students’ cultural competence, and c) the facilitation of a critical consciousness which encourages students’ understanding of and critiques against major institutions (Ladson-Billings, 1994).

The Lag in Application

One reason for the disconnect between the development of culturally relevant theories and the application of these theories in public school classrooms is the growing cultural divide between teachers and their students (Lambeth & Smith, 2016). While the public-school body increases in diversity, the teaching population has not kept pace. In 2015, the National Center for Education Statistics reported that 80% of teachers were White, middle-class, monolingual women. Thus teachers are finding themselves increasingly underprepared to teach students whose cultural experiences differ vastly from their own (Lambeth & Smith, 2016). Many pre-service teachers lack cultural awareness and feel unequipped to productively approach issues of race, especially with students of color (Dedeoglu & Lamme, 2011; Lambeth & Smith, 2016). Teachers often fail to recognize their biases, which influences their views of culturally and/or racially diverse students and can result in labeling students as having “deficits” based off of unidentified

biases (Fuglei, 2014; Lambeth & Smith, 2016). As a result, both students and teachers suffer a break in relationships creating an unwelcoming environment not conducive to learning (Jong et al., 2014).

Pre-Service Teachers' Self-Efficacy

Due to the factors highlighted above, teacher preparation programs must consider intentional methods to improve pre-service teachers' self-efficacy (Tschannen-Moran et al., 1998) in CRT (Siwatu et al., 2011). Recommended best practices include providing pre-service teachers with multiple opportunities to (a) engage with authentic CRT practices, (b) teach diverse students during field experiences, and (c) observe CRT in action (Siwatu et al., 2011). Additionally, researchers have shown that teachers' self-perceptions can impact student-teacher relationships (Jong et al., 2014). According to Jong et al. (2014), "teachers with higher self-efficacy offer their students more support and positive reinforcement than teachers with lower self-efficacy" (p. 297). Therefore, research on pre-service teachers' self-efficacy for implementing CRT is worthwhile.

The Role of Educator Preparation Programs

Educator preparation programs (EPPs) are a main source of new teachers into the profession. Within EPPs, many of the teacher educators are White, middle class, and monolingualistic as well. Thus, we cannot be surprised if EPPs have difficulty preparing teacher candidates to be culturally responsive, if they themselves are not, and also have not wrestled with race for themselves (Evans-Winters & Hoff, 2011) or practiced how to teach about race in classroom contexts (Kay, 2018). Due to numerous institutional, state, and professional policies, the focus becomes compliance versus preparing teachers to be culturally responsive in their classrooms (Philip, Souto-Manning et al., 2019). The tension that exists for teacher education to balance mandates and equity has yet to be resolved, and unfortunately, both teacher candidates and classroom students

lose when they are not exploring race and racism within their classrooms.

Limitations of the Background Literature

Within the research synthesized, a common limitation was the limited scope of the study samples. Many researchers only examined the gap between White and Black students (e.g., Hung et al., 2020). This is not an accurate representation of the larger student population as other students of color (e.g., Latinx, Indigenous, or Asian groups) are becoming increasingly prevalent. For the few studies that addressed multiple groups, the demographics were still limited as they focused on one academic group (e.g., students studying STEM one university; Chemers et. al, 2011). One implication for research would be addressing performance gaps between non-Black students and their White counterparts, as well as gaps between different student groups of color. Another major limitation in the literature was that studies often focused solely on the way White teachers perceived culture and race. More research is needed on the way teachers' of color perceptions impact how they respond to cultural diversity in classrooms (Jong et. al, 2014; Lambeth & Smith, 2016).

The Present Study

The current study addressed the preparedness of pre-service teachers to educate students from cultures different than their own. Specifically, the study focused on the way pre-service teachers' perceptions of race, diversity, and culture impacted their views of CRT and RRTP in their classroom. Understanding pre-service teachers' perceptions is important because how teachers view culture and diversity could have an impact their curricular practices (Fuglei, 2014; Lambeth & Smith, 2016). Teachers' preparedness, perceptions, and self-beliefs have direct impact on the learning environment, relationships with students, and academic achievement of students of color in particular (Jong et al., 2014; Lambeth & Smith, 2016). Therefore, additional research on

pre-service teachers' self-efficacy is necessary and could lead to important implications for EPPs and related education policies.

Research Questions

This study addressed the following research questions: (a) How do pre-service teachers perceive their self-efficacy in creating and enacting culturally relevant curriculum and a culturally inclusive classroom environment? (b) How do pre-service teachers' perceptions of race and diversity align with their perceptions of self-efficacy to engage culturally relevant teaching practices? The authors chose the frameworks of CRT, RRTPs, and multiculturalism as these frameworks center on the convergence of race, culture, and diversity within the classroom and how those concepts impact both students and teachers.

Method

Two participants were recruited from the graduating class of an EPP at an urban university in the Southeastern US. Maria (all names are pseudonyms), age 22, was a Latina female with strong cultural ties to her heritage. She framed her family's socioeconomic status as lower middle class. She graduated with a teaching degree but is currently employed as a nanny. John, age 23, a White cisgendered man from a slightly upper middle class socioeconomic status, does not indicate any cultural ties to his personal heritage.

Data Sources

This study used two modified surveys administered through Google Forms and an interview.

Pre-service Teacher Questionnaire. The first author administered a modified version of the

Pre-Service Teacher Questionnaire (Lambeth & Smith, 2016) which questions pre-service teach-

ers' cultural background, perceptions, and experiences. The survey included ten open-ended questions, modified for clarity and length.

The demographic information and Teacher Questionnaire (Lambeth & Smith, 2016) were necessary to compare how pre-service teachers' demographics and cultural backgrounds aligned with their self-efficacy to teach in diverse classrooms (see Appendix A). According to the authors of the survey, the major threats to the survey's validity were that the research was conducted by university professors within their own courses, but they sought to maintain validity by not tying survey results to grades increasing the likelihood students were comfortable expressing their opinions.

Teaching Beliefs and Mindset Survey. The CRT Self-Efficacy section of the Teaching Beliefs and Mindset Survey (Siwatu, 2007) assessed pre-service teachers' self-efficacy in CRT. The first author adapted Siwatu's (2007) quantitative survey to be a qualitative, open-ended survey. Though there were 26 questions in total, only eight questions – those that related to CRT – were modified to be used in the interviews. These questions assessed pre-service teachers' perception of their ability to teach diverse students and create a culturally responsive classroom (see Appendix B). Reliability for each section of the survey exceeded .90 as estimated by Cronbach's alpha. Siwatu (2007) indicated some inflation in reliability because the original instrument had many questions.

Interview. Both participants completed a 10- to 15-minute interview during which they were asked modified questions from both surveys. Interviews were conducted via Zoom platform with cameras off to maintain confidentiality.

Research Design

This qualitative content analysis evaluated data collected from surveys and interviews administered by the first author. A qualitative content analysis is appropriate for analyzing this data as it allows a thematic approach to assessing pre-service teachers' perceptions (Hsieh & Shannon, 2005).

Procedures

To complete this study, participant consent was obtained via Google Forms. Then, each participant was given access to the Google Form surveys. Survey responses were collected and compiled into an Excel sheet. The first author read through survey responses and determined areas of further exploration. She then chose questions for the interviews. After this was completed, consent was obtained again for the individual interviews which were conducted via Zoom. To protect participant privacy, only audio was recorded from each interview. Cameras were kept off. The first author transcribed the recordings. Transcript data were analyzed to determine codes, categories, and themes.

Data Analysis

Data were analyzed using a qualitative content analysis. As such, data analysis was done through thematic coding. Content analysis uses a directed approach involving two parts (Hsieh & Shannon, 2005). First, the first author developed initial codes based off predetermined theories and guidance from research findings prior to data collection – deductive coding. These initial codes were (a) importance of diversity and inclusion, (b) importance relationship building with students, (c) impact of surrounding influences on perceptions, and (d) impact of race on bias. The first author began analysis by reading through data and analyzing them against the deductive

codes. Then she assessed the data responses again, sorting them into the initial codes, and adding more coding as necessary.

Following initial coding, data were reread for any outstanding, consistent themes, and inductive codes were developed. Data were then sorted to include the inductive codes as well as the deductive codes. All coded data as well as themes and categories were then organized into a codebook (see Appendix C). First, data were sorted into codes (Relationship Building, Communication, Inclusivity, Identity, Addressing Bias, Academic, Local, and Global). These codes were chosen by finding the most commonly repeated motifs within the participants' words. From there, codes were sorted into categories based on commonalities amongst codes. These categories were Rapport, Diversity, and Life Experiences.

Trustworthiness/Positionality

Trustworthiness was ensured through three main methods: researcher's position, reflexivity, and adequate engagement in data collection (Merriam & Tisdell, 2016). I am a Black woman in my twenties with politically liberal, progressive views regarding race and diversity. My identity and beliefs impact my understanding of this topic. Besides identity-related biases, I also had expectations for the kind of data to garner from the study. I worked to guard against confirmation bias in two primary ways. First, I engaged in careful reflection of potential biases to my perception of data by keeping a bias journal throughout the process and by consulting with my advisor. Second, I spent ample time collecting data to ensure a multitude of potential responses. Finally, I had the third author check the codebook, coded data, categories, and themes to ensure findings were credible and reliable.

Results

Three inductive themes were uncovered—rapport, diversity, and life experiences. These

three themes are broken into additional subheadings for the main categories.

Rapport

Repeated patterns surrounding the importance of building rapport with students and families emerged. Rapport in this case can be defined as efforts towards interaction and meaningful communication with students and families. Each category for this theme is described in turn.

Relationship Building. As John indicated, “knowing one’s students and spending time with them [is] the key to success.” This concept appeared repeatedly in both participants responses. They discussed the importance of building a relationship with students to better understand their culture.

Communication. When asked to reflect on the way they internalized relationships and experiences, both participants indicated that communicating with others was the best approach. Both also stated that experiences with people of other cultures helped them be more perceptive to race and culture. John indicated that “talking with [others] is the best way for [him] to internalize and better understand where they are coming from.” This was also true when the participants were asked about their confidence in communicating with parents. While only Maria indicated confidence in this ability, both emphasized the importance of attempting to communicate with parents. They collectively cited the ability to use apps, translators, or other resources to attempt to communicate with parents of differing languages. Maria as a Spanish speaker indicated more confidence in her ability to communicate with parents, particularly parents who speak another language.

Diversity

Repeatedly, topics of race, culture, language, gender identity, ethnicity, and other concepts of identity diversity came up in both written and verbal responses. Moreover, the participants discussed the importance of multiculturalism and globalism.

Identity. Identity is at the core of any discussion about race, culture, and diversity. This was true when examining the difference in responses of the two participants when asked how confident they were in incorporating their students' cultures.

Maria, a lower middle-class Latina, clearly relied heavily on her experiences living in a culture outside of the dominant one. Maria said,

I often like to teach in Spanish and English. I think if anything, the only time I ever get pushback is possibly from my students because I have questions like “why are you teaching also in Spanish,” you know. And I actually kind of like remind them like, “hey,” you know, “we have other students here who speak more than one language in our classroom and at the same time, aren't we so blessed that we get to learn new languages?” And . . . in my morning meetings, I'll have the students say hello in the many different languages they know. So, students get to share in different languages. And I also try to teach lessons that are globally aware. Like I had also just taught a lesson on. . . South Africa, on the Xhosa people. So that was really something that got the kids motivated to learn more about different cultures.”

In contrast, John, a White, upper middle-class male, indicated relying on relationship building to incorporate students' cultures and experiences. John said,

“I do work especially at the beginning of the year. . . I make a lot of effort to make sure I understand who they are and not to treat like cultural—culture is not I don't know what the adjective from monolith is...[pauses] it's not all one, like it's multifaceted. So I think that just comes with a lot of relationship building and kind of understanding of the subtle differences that each student brings.”

Inclusivity. Inclusivity is a category that came up repeatedly when talking about multiculturalism.

Both participants cited inclusion as central to the definition of multiculturalism. Maria argued that multiculturalism is “not only the tolerance, but the inclusion of different ideas, morals, religions, social classes, races, ethnicities, languages, and I would even argue abilities and genders.”

Addressing Bias. The final category that came up under the theme of diversity was addressing bias, specifically related to assessment. Both participants discussed the importance of ensuring that tests assess students’ learning and not their background knowledge. Maria also talked about the necessity of “consistently consider[ing] bias and schema when interacting with texts.” John did not address the importance of analyzing texts within his interview.

Life Experiences

The impact of life experiences on the answers of the participants was clear. Both credited their global and cultural awareness to key personal experiences that expanded their perspective. These experiences can be divided into the category of academic, local, and global.

Academic. Both participants stated that their experiences within their university’s College of Education greatly influenced their perspective on culture and race, and also their self-efficacy or confidence in being a culturally responsive teacher. Maria stated that “studying in our programs, you know, they tried to talk to you about other cultures.” John added that the “professors that [he] had that taught about systemic racism and the different approaches that you can take and kind of working on decentering the dominant culture” contributed to his preparation in being a culturally responsive teacher.

Local. John said that “high school was more diverse and [he] was able to experience far more cultures and people.” He shared that this contributed to his self-efficacy in being a more culturally responsive teacher. Maria did not see her local schools as a major influence on her cultural awareness and therefore did not speak to this topic. However, another influence for both participants

was performing clinicals and student teaching in Title I schools.

Global. One set of codes that arose specifically for Maria was the impact of study abroad on her perspective on teaching diverse students. She said, “My study abroad experiences really did open my outlook to other countries and the importance of globalism.” John did not have these experiences.

Discussion

The findings of this study support the literature suggesting that the factors contributing to self-efficacy of teachers in teaching culturally responsive curriculum to diverse groups of students are multifaceted (Fulgei, 2014; Lambeth & Smith, 2016).

The first research question addressed how pre-service teachers perceive their self-efficacy in creating and enacting culturally relevant curriculum and a culturally inclusive classroom environment. These participants portrayed high self-efficacy and confidence in teaching culturally responsive curriculum. Both participants reported high self-efficacy linked to relationship building – which data confirm is the easiest part of CRT to implement. The participants indicated more confidence as teachers of culturally diverse students when they felt they had a relationship with their students; this correlation is supported by literature. In fact, teachers with higher self-efficacy offer more to their students allowing for a better building of relationships (De Jong et al., 2014). Building a stronger relationship can allow for a more conducive classroom environment as well. We did not uncover an explicit answer to the impact on curriculum, though Maria did indicate that analyzing curriculum for bias is important.

The second research question addressed how pre-service teachers’ perceptions of race and diversity align with their perceptions of self-efficacy to engage CRT practices. We found that engaging with CRT is linked to perceptions of race. The racial identity of the participants did in-

fluence the way they perceived CRT. John consistently viewed CRT as an important way to show “windows” into other cultures whereas Maria viewed it as a way to celebrate cultures within her classroom. As John comes from a White-centered, dominant culture, his response still indicates an oppressive power and level of cultural voyeurism. Ladson-Billings’ work on CRT reiterates the importance of not just viewing other cultures, but truly celebrating them. She cites that “culturally relevant pedagogy must provide a way for students to maintain their cultural integrity while succeeding academically” (1995, 476).

Both participants cited efforts to approach bias within their classroom. Furthermore, John relied on relationship building to incorporate students’ cultures and experiences while Maria relied on her personal cultural experience to relate to students. Both participants also spoke about the importance of multiculturalism in the classroom. The importance of multiculturalism is supported by other researchers as well. For example, Dedeoglu and Lamme (2011) said that, “by educating preservice teachers about multiculturalism, teacher education programs prepare them to become advocates for the many culturally diverse students in our schools” (p. 470).

Limitations

One limitation to the study was number of participants. Data collection for this study coincided with a global pandemic, and most people had competing priorities. The first author made numerous attempts to recruit participants and converted the study design from the initial plan (with IRB approval) based on low participation. Both participants also primarily taught (e.g., student teaching, clinical experiences) in Title I schools with high percentages of minoritized students. These experiences influenced the biases these participants held. Results may have been different if their student teaching experiences had occurred in different settings with a percentage of minoritized students reflected in their hometowns or in predominantly White settings. To address this, future research should include participants from differing backgrounds who complete

their student teaching in more varied settings. Also, data were self-reported, and personal perceptions and biases may have impacted their answers.

Conclusion

This research may inform how teachers are prepared to address diverse students. Both participants indicated the importance of the teacher education institution in influencing their self-efficacy in teaching culturally responsive curriculum. This research addresses a deficit in current literature as it specifically attempts to address the connection between self-efficacy and culturally responsive curriculum.

REFERENCES

- American Psychological Association. (2020). *Publication manual of the American Psychological Association* (7th ed.). American Psychological Association.
- Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Clinical and Social Psychology*, pg. 359–373.
- Banks, J.A. (1989) Approaches to multicultural curriculum reform. *Trotter Review* (4)3.
- Chemers, M., Zurbriggen, E., Syed, M., Goza, B., & Bearman, S. (2011). The role of efficacy an identity in science career commitment among underrepresented minority students. *Journal of Social Issues*, 67(3), 469–491. <https://doi.org/10.1111/j.1540-4560.2011.01710.x>
- Dedeoglu, H., & Lamme, L. (2011). Selected demographics, attitudes, and beliefs about diversity of preservice teachers. *Education and Urban Society*, 43(4), 468–485. <https://doi.org/10.1177/0013124510380718>
- De Jong, R., Mainhard, T., Tartwijk, J., Veldman, I., Verloop, N., & Wubbels, T. (2014). How pre-service teachers' personality traits, self-efficacy, and discipline strategies contribute to the teacher–student relationship. *British Journal of Educational Psychology*, 84(2), 294–310. <https://doi.org/10.1111/bjep.12025>
- Evans-Winters, V. E., & Twyman Hoff, P. (2011). The aesthetics of white racism in pre-service teacher education: a critical race theory perspective. *Race, Ethnicity and Education*, 14(4), 461–479. <https://doi.org/10.1080/13613324.2010.548376>
- Fuglei, M. (2014). Culturally responsive teaching: Empowering students through respect. <https://resilienteducator.com/classroom-resources/culturally-responsive-teaching-empower-students-through-respect/>
- Hsieh, H., & Shannon, S. (2005). Three Approaches to Qualitative Content Analysis.

REFERENCES

Qualitative Health Research, 15(9), 1277–1288. <https://doi.org/10.1177/1049732305276687>

Hung, M., Smith, W., Voss, M., Franklin, J., Gu, Y., & Bounsanga, J. (2020). Exploring student achievement gaps in school districts across the united states. *Education and Urban Society*, 52(2), 175–193. <https://doi.org/10.1177/0013124519833442>

Kay, M. R. (2018). *Not Light, but Fire: How to Lead Meaningful Race Conversations in the Classroom*. Stenhouse Publishers.

Ladson-Billings, G. (1994). *The dreamkeepers*. San Francisco: Jossey-Bass Publishing Co.

Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. *American Educational Research Journal* (32). 465-491.

Lambeth, D., & Smith, A. (2016). Pre-service teachers' perceptions of culturally responsive teacher preparation. *The Journal of Negro Education*, 85(1), 46–58. <https://doi.org/10.7709/jnegroeducation.85.1.0046>

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative Research: A Guide to Design and Implementation* (4th ed.).

National Center for Education Statistics. (2018). *Characteristics of public schools*. https://nces.ed.gov/programs/coe/indicator_clr.asp

Ng Tseung-Wong, C., & Verkuijten, M. (2015). Multiculturalism, Mauritian Style : Cultural Diversity, Belonging, and a Secular State. *The American Behavioral Scientist* (Beverly Hills), 59(6), 679–701. <https://doi.org/10.1177/0002764214566498>

Philip, T. M., Souto-Manning, M., Anderson, L., Horn, I., J. Carter Andrews, D., Stillman, J., & Varghese, M. (2019). Making Justice Peripheral by Constructing Practice as “Core”: How

REFERENCES

- the Increasing Prominence of Core Practices Challenges Teacher Education. *Journal of Teacher Education*, 70(3), 251–264. <https://doi.org/10.1177/0022487118798324>
- Sharan B. Merriam, & Elizabeth J. Tisdell. (2015). *Qualitative research: a guide to design and implementation* (4th ed). Wiley.
- Siwatu, K. (2007). Preservice teachers' culturally responsive teaching self-efficacy and outcome expectancy beliefs. *Teaching and Teacher Education*, 23(7), 1086–1101. <https://doi.org/10.1016/j.tate.2006.07.011>
- Siwatu, K. O., Frazier, P., Osaghae, O. J., & Starker, T. (2011). From maybe I can to yes I can: Developing pre-service and in-service teachers' self-efficacy to teach African American students. *The Journal of Negro Education*, 80(3), 209–438. <https://www.jstor.org/stable/41341129>
- Spencer, S., Logel, C., & Davies, P. (2017). Stereotype threat. *Annual Review of Psychology*, 67(1), 415–437. <https://doi.org/10.1146/annurev-psych-073115-103235>
- Steele, C. M., & Aronson, J. (1995). Stereotype threat and intellectual test performance of African Americans. *Journal of Personality and Social Psychology*, 69(5), 797-811.
- Tschannen-Moran, M., & Woolfolk Hoy, A. W. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. *Teaching and Teacher Education*, 23, 944-956. <https://doi.org/10.1016/j.tate.2006.05.003>
- Walness, S. B., & Crawford, P. A. (2016). Reading your way to a culturally responsive classroom. *NAEYC: Young Children*, 71(2). <https://www.naeyc.org/resources/pubs/yc/may2016/culturally-responsive-classroom>
- Wang, C., Algozzine, B., & Porfeli, E. (2015). An exploration of community capital, student composition of schools, and achievement gaps. *Multicultural Learning and Teaching*,

APPENDIX A

Pre-Service Teacher Questionnaire (Modified from Lambeth & Smith, 2016)

1. Describe your background in terms of class, socioeconomic status, racial identity, culture, or religion.
2. Please provide a detailed explanation of how you were raised, including the size of your family, type of home you lived in, and authority figures.
3. Describe the demographics of your high school and elementary school. For example, was it culturally/socioeconomically diverse?
4. Define multiculturalism to the best of your understanding.
5. Is student teaching or clinical experiences what you expected them to be? If so, why? If not, how has it differed?
6. Explain what your teaching experiences have been like so far. What kind of schools (Title I, private, charter, public, demographic make-up, etc.) have you observed or taught in?
7. Do you feel that you are a multiculturally responsive teacher? If so, who/what prepared you to be a multiculturally responsive teacher? If not, why?
8. Has your definition of multiculturalism changed based on your experiences as a student teacher?
9. Consider the context in which you live, work and socially interact with people. How do you reflect upon and internalize intercultural relationships and experiences?
10. Do your everyday life experiences create opportunities to challenge stereotypes and explore unfamiliar cultures? Yes or no?

APPENDIX B

Culturally Responsive Teaching Self-Efficacy section of the Teaching Beliefs and Mindset

Survey (Modified from Siwatu, 2007)

1. Do you feel confident in your ability to implement strategies to minimize the effects of the mismatch between your students' home culture and the school culture? If yes, what are some ways you see yourself doing this?
2. Do you feel confident in your ability to develop fair assessment strategies for all students? What are some challenges that could impact your ability to do so?
3. Do you feel that you could and should obtain information about your students' background? Why or why not?
4. Do you feel that you could successfully and authentically incorporate your potential students' cultural backgrounds into your classroom environment? Please expand on your answer.
5. Could you identify ways that standardized tests could be biased based on a students' cultural background?
6. How confident are you in your ability to include parents that speak different languages or come from different backgrounds in your classroom involvement?
7. Do you think it is important to analyze curriculum materials for messages that include negative stereotypes or biases? If not, why? If so, how confident are you in your ability to do this?
8. How confident are you in your ability to create authentic relationships with students from other cultural or linguistic backgrounds? Please expand on your answer

APPENDIX C

Codebook

Rapport: efforts towards interaction and meaningful communication with students and families	
<i>Relationship building</i>	<i>Communication</i>
Building a relationship with them regardless of their culture	couple of different apps that I can use to like, communicate some
it comes from creating those bonds and relationships in the classroom	have not been really given a lot of information about how to get interpreters and translators and that kind of thing
I am a strong relationship builder	I reflect best through talking to people
I quickly learned that knowing ones students and spending time with them would be the key to my success	important for the parents to see that I have the desire to communicate with them about their student and that I am willing to look for the alternatives
important to create relationships with my students	talking with them is the best way for me to internalize and better understand where they are coming from
kind of understanding of the subtle differences that each student brings	try to use technology that allows us to communicate
like to be able to assimilate, and intercultural relationships make that more challenging	
make sure that I got to know my students	
they realize you don't know them and so they don't wish to learn from someone that doesn't respect them	

APPENDIX C

through the relationships that I choose to spend my time on		
I made it a priority to learn about my students needs and cultures		
having friends from different cultures		
shows off how I think amazing they are and how unique they are		
Diversity-topics of race, culture, language, gender identity, ethnicity, and other concepts of identity		
<i>Inclusivity</i>	<i>Identity</i>	<i>Addressing Bias</i>
teach things from lenses of more than just the dominant culture	Upper middle class family, but consider myself middle-class	there's so much just entrenched that unless you have been—you have learned or been exposed or been made to get out of your comfort zone that you don't realize is cultural and not like knowledge-based
taking your appreciation of many different cultures that are lived out on a daily basis and bringing them all together in a way that appreciates them and	White	I can more objectively look and make changes to what I do with curriculum
take a very clear and public stance that bilingualism is an asset	lower middle class economic status	consistently consider bias and schema when interacting with texts
promotes providing Windows and Mirrors, or reflections of self and windows into other cultures	Female	be sure that assessments are based on the skill itself and reflects the understanding of the student

APPENDIX C

Multiculturalism- is not only the tolerance but the inclusion of different ideas, morals, religions, social classes, races, ethnicities, languages, and I would even argue abilities and genders	Male	I work to make sure that I am not assessing someone's background knowledge
Multiculturalism is a doctrine that promotes diversity	Latina, Puerto Rican and Honduran	
I often try to do it [incorporate students' cultural background], but it often feels trivial and tacked on	identify rather under my ethnicity as a Hispanic	
I need to be aware of important dates, concepts and social norms that may be different from my own	being Latino, it's easier for me to connect with my students that are Hispanic or Latino	
I do a good job of trying to teach and speak in a way that is initially inclusive, but also is uplifting to cultures that are not the dominant culture		
help students understand things, either to approach it from their own culture like mirrors, or have other people use windows and try and show them the perspective of other cultures		

APPENDIX C

Life Experiences-key experiences within their lives of global and cultural awareness that expanded their perspective		
<i>Academic</i>	<i>Local</i>	<i>Global</i>
almost exclusively observed public schools	I would have more opportunity to come in contact with different communities in Charlotte if there wasn't Covid	applying for the Peace Corps to be a teacher abroad
attended a predominantly White (65-80%), predominantly well-off public schools		because of a pandemic
I've always been in classrooms that have a large ESL population, so mostly Latino and African-American students		drew on my experiences of having studied abroad
definitely studying in our programs, you know, they tried to talk to you about other cultures		
elementary and middle school experiences weren't diverse at all		
focused mostly on Title I schools		
High school was more diverse and I was able to experience far more cultures and people of different socioeconomic statuses, but I felt like that was not even that big of diversity		

APPENDIX C

<p>I have done <u>clinical</u>s at Title 1 schools only in the United States where the demographics are a majority of Black, Latino, immigrant, and or refugee students due to one of my minors being Teaching English as a Second Language</p>		
---	--	--

BEYOND THE KNOWLEDGE ECONOMY: SOCIAL CIRCUS AS AN INTERSECTIONAL AVENUE TO GLOBAL AESTHETICS AND UNIVERSAL ETHICS

Department of Dance

Krysta Rogden and Gretchen Alterowitz, M.F.A.

Abstract

While the Western world is a post-colonial society that attempts to guarantee an equal opportunity for success to all, objectives to uphold inclusion efforts in the primary education system often undermine the complexities of cultural histories and oppressions among individuals. The linear narrative of success and spiritual fulfillment, or the value we assign to our lives, in this society is one that often places economic surplus over the holistic development of the individual and of humanity. In disregarding cultural histories and the value of individual fulfillment, the Western world discredits the creative and communal potential of holistic art education in favor of capital capable subjects and class objectives. In this work, I advocate for a reevaluation of success and spiritual fulfillment in the Western world as well as the public education system. To move away from our knowledge economy, I propose one solution that includes social circus education as an artistic avenue for developing spiritual fulfillment on the local, person level, as well as compassion on the global, humanity level. I utilize the work of dance scholar, Sherry Shapiro, who also calls for a reevaluation of the Western



Krysta Rogden

Krysta Rogden is a recent graduate of the University of North Carolina at Charlotte where she received a Bachelor of Arts in Dance Performance, Choreography, and Theory as well as a Minor in Theatre Arts. Her career focus is community engagement through circus education within the city of Charlotte. She is a member of Nouveau Sud Circus Project, a Charlotte-native performing company specializing in circus arts. As an active campus participant, she is a co-founder of Queen City Circus, a performance group within the College of Arts + Architecture that frequently performs and volunteers at events on campus. As an active community participant, she has volunteered with Charlotte Cirque and Dance Center assisting with performances, costume creation, and educational outreach. She has also spent time as a summer camp educator where she taught classes in dance and circus arts.



FACULTY ADVISOR
Gretchen Alterowitz, M.F.A.

Gretchen Alterowitz (Associate Professor, Department of Dance) is an artist scholar whose research focuses on feminist, queer, and democratic dancemaking and performance. Her writing is published in *Dance Chronicle*, *Conversations Across the Field of Dance Studies*, *Journal of Dance Education*, and the forthcoming *Oxford Handbook on Contemporary Ballet*. She has presented her choreography at festivals across the US and the Grachtenfestival in Amsterdam.

human value system. I also expand on research theorist, Anna Carastathis, and her situational approach to oppression, provisional intersectionality, to foster meaningful art education.

Keywords: social circus, art education, intersectionality, neoliberalism, and ethics

Introduction

In the Global West, we are living in a globalized, neoliberal economy that scrutinizes individual activity and relationships based on economic potential and exchange. Through globalization, a nuanced twentieth century phenomenon, current themes such as economy, culture, climate, and tradition are now a part of a global forum as humans continue to define themselves, their traditions, and their relations to others. Globalization is ubiquitous as cultures and their histories are enmeshed and disseminated through modern institutions such as mass media and transnational capitalism. These institutions, which have been introduced and mandated by political hegemonic powers such as the United States and the European Union, circulate information through a cultural hierarchy, perpetuating the narrative of “us” and “them.” I echo previous work (Carastathis, 2016; Depaepe, 2012; Shapiro, 2008; Walter, 2014) when I write that while globalization recognizes diversity, the neoliberal view is a recolonizing, post-colonial view that praises competition and writes off economic inequalities as cultural or personal faults.

One way that the post-colonial, neoliberal view is disseminated globally is through the determinant concept of intersectionality. Research theorist Anna Carastathis defines intersectionality as a provisional theory. First prominent in scholarly discourse in the 1980s and 1990s along with globalization and stemming from late nineteenth century Black feminism, intersectionality pinpoints “multiply oppressed” identities among individual intersecting groups such as race, class, gender, and religious beliefs (Carastathis, 2016, p. 9). As a provisional approach, Carastathis (2016, p. 4) states intersectionality is meant “to get us to think about how we think...to grapple with and overcome our entrenched perceptual-cognitive habits of essentialism...and segregation.” However, as I will discuss, the current equalizing of culture through mass media, and the disregard for historical oppressions in the Western narrative of human potential renders intersectionality as a false determinant to discrimination. Throughout this paper, I refer to the ahistorical,

inclusive objectives as determinant intersectionality.

There are various powers in play regarding such determinant societal systems that underscore why success tends to favor economic capital instead of the holistic development of humanity. Education historian Marc Depaepe reminds us that Western society historically grounded education and societal prosperity in religion, which was a tool of behavioral control. As societies advanced through industrial and scientific innovations, and the clergy was no longer in charge of policy, nations placed societal prosperity solely on the “market of a child,” or potential in the industrialized economy (Depaepe, 2012, p. 135). Because education, including art education, is organized by government delegated ordinance in line with neoliberal ideology, the success of the human is determined by their ability to function within a knowledge economy.

In this work, where I refute determinant intersectionality and the knowledge economy, I agree with dance scholar, Sherry Shapiro, who calls on art educators to realize their power in fostering “global aesthetics and universal ethics.” These concepts are ultimately ways to “constitute a universal relationship [with self and others] in which the body becomes the concrete place... of human compassion” (Shapiro, 2008, p. 254). I also agree with Shapiro when she states that our neoliberal society has little to no recognition of colonial oppression and moves us towards a universal standard of inclusion (2008, p. 264). Spiritual fulfillment in this formulation, or the various values humans subscribe to which we give meaning and orientation to our lives, is based on the idea of the American dream and economic success rather than holistic fulfillment and world prosperity.

As a dancer and circus practitioner who has participated in the United States’s public-school system, I am attempting to rethink neoliberal value systems and answer the call for education reforms through social circus. As I will discuss both through my own experience as a member of the Nouveau Sud Circus Project, based in Charlotte, North Carolina, social circus is a

practice that utilizes circus arts in a creative ensemble environment to foster individual expression and cultural exchange. Separate from spectacle, circus is the practice of various art and movement forms that reveal an underlying sense of community, exploration, risk, and creativity. As a discipline practiced globally, circus is one way to intersect individual desires and cultures with art education.

Globally, I am calling for a reevaluation of the Western value system which places spiritual fulfillment on a spectrum of economic potential. On the local level, this reevaluation leads to a reform of the neoliberal public education system that currently perpetuates this knowledge economy. I also advocate for the realization of intersectionality as a provisional approach, rather than determinant, to foster global aesthetics and universal ethics, and I introduce social circus education as one discipline to nurture such aesthetics and ethics. I will demonstrate this concept by first, defining social circus in terms of provisional intersectionality (Bessone, 2017; Carastathis, 2016). I will then define the global aesthetic and universal ethics in terms of Shapiro (2008). Finally, I will refute the current Western human value system and knowledge economy, utilizing social circus as both a methodology for attaining spiritual fulfillment and an educative vessel for a global aesthetic and universal ethics (Kalin & Barney, 2018; Loring, 2017; Shapiro, 2008; Walter, 2014).

Provisional Intersectionality and the Social Circus

Social circus is one avenue in the Western world to educate future generations on how to view their bodies and their personal, local histories amidst a globalized world. It also teaches individuals how to situate themselves compassionately in relation to identities different from their own. I refrain from discussing circus within the performative arts for its circulation of “feelings of content” (Bessone, 2017, p. 656), or lack of critical questioning amidst the audience-performer relationship that may perpetuate fixed, neoliberal views of identities. The “feelings of content” arise when Western audiences view cross-cultural performances of hegemonic corporations, such

as Cirque du Soleil. These performances often display minoritarian bodies as token examples of success within the globalized world without acknowledging the historical oppression of such cultures in Western civilization (Bessone, 2017). I do foresee further research on the benefits of social circus performances within the local, community sector; however, this work focuses on circus in educational environments.

Stated above and here in my own terms, provisional intersectionality is a research approach involving syncretic awareness of human value, culture, and history to pinpoint overlapping systematic oppressions. This definition aligns with scholars such as social researcher, Ilaria Bessone, director of Nouveau Sud Circus Project, Carlos Alexis Cruz, and Shapiro who also advocate for Carastathis's (2016, p. 6) "reimagining of our identities and alignments." I appreciate Carastathis's work for refuting neoliberal definitions of intersectionality; these definitions, which include determinant intersectionality, removed the Black feminist roots of the term in favor of the universal inclusion theory. As it is currently used in education, social circus is also a victim of neoliberal globalization as seen in the removal of its culturally cultivated roots.

While there are some who utilize social circus as "an umbrella term for the use of circus arts in any caring, supportive or therapeutic setting" (as cited in Cadwell, 2018, p. 22), I agree with Bessone (2017, p. 652), when she underscores these definitions of social circus as "reinforcing reductionist views of 'the other' and unequal power relations." Cirque du Soleil takes the "responsibility" application a step further with their definition that claims "social circus" refers to "projects offering circus activities...to various at-risk groups living in precarious personal and social situations" (as cited in Bessone 2017, p. 653). Instead, utilizing my own experience as a circus practitioner and drawing from the work of Bessone (2017) and Cruz (2020), I have compiled a definition of social circus that states: Social circus is the process of expressing and exchanging individual struggles, histories, traditions, and transformations through physical movement, ensem-

ble engagement, and creative processes.

As a creative mover whose interests began with the historically rigid, European-based movement form of ballet, I was pleasantly surprised after my initial encounters with circus arts. I trained with performers three times my age and from across the globe specializing in their own indigenous practices. They willingly shared their skills and cultural connections with others. These practices include the intersections of martial arts, music, and dance, to acrobatics both on the ground and within aerial apparatuses. Some of these artists have backgrounds in disciplines such as dance or competitive gymnastics. Other practitioners come from no formal training at all and fostered their practice through personal exploration. When I was a student in circus class, the place you come from, the access you have to formal training, the type of body you were born with, and the practice you choose to focus on was irrelevant to the circus community. I was a ballet dancer experiencing break-dancing and acrobatics for the first time while building the strength to train on trapeze. The idea motivating circus practice is to use our bodies as creative vessels to unveil the extraordinary physical and connective possibilities within humans.

The Global Aesthetic and Universal Ethics

My research utilizes a global aesthetic and universal ethics because these two ideas allow us to recognize cultural specificity while also empathetically relating to others, an important concept we can nurture through social circus. Instead of the hegemonic “responsibility” that perpetuates one society above another, I advocate for social circus as a means to a global aesthetic and universal ethics that are conceptualized within the local societies themselves. Art as a product of culture and in the form of conscious movement — such as dance or social circus — conceptualizes ontic (physical, bodily) experiences within the ontological (the spiritual) realm to create connections between local, personal sensibilities, and global, outer contexts. While economic stability is arguably a necessary function for survival, the knowledge economy undermines both ontic and

ontological human value connections for excessive capital competition.

In the physical realm, utilizing a global aesthetic in education can remove the hierarchical stance that places White bodies and art forms above those of other cultures, and therefore ensure true cultural inclusion in classrooms. For example, when I was a dance student, I often heard the saying that ballet technique was the foundation for all dance; this creates a hierarchy of global movement genres in which ballet is considered the apex of dance for its “regal European aesthetic.” Western society has deemed ballet as a “high-art,” and the discipline is often held, globally, at a higher stature than other indigenous diasporas from continents such as Africa or South America (Shapiro, 2008, p. 255).

While Shapiro speaks primarily of dance movement, as I have discussed, colonial institutions are also present within circus performance and education. To correct this hierarchical stance, we must utilize global aesthetics in the Western world to think of human encounters “in a way that makes a global leap without an appropriation of others’ experiences, assuming a hierarchical stance... Finding ways that accept the particular and at the same time transcend the differences” (Shapiro, 2008, p. 254). As mentioned, I have trained with individuals who come from no circus background, or those who come from a background of a different global diaspora. We constantly exchange experiences to both learn new skills and share our own. In my own experience, when we work in an educational environment free of hierarchy, the outcome is a positive exchange of personal and global cultures.

In the ontological realm of self, to align the values of right and wrong on a universal scale is to compassionately recognize the shared experiences and suffering of all humans, and to do unto others as you would to yourself; we recognize a person’s sacred otherness, or their own ontological sense of self. To acknowledge universal ethics is to base the “rightness of an action,” as it affects the lives and histories of those it is directed toward, in “the other’s values, beliefs, princi-

ples, and aesthetic and religious sensibilities” (Shapiro, 2008, p. 261). Globally, universal ethics exposes human fears of threats to the very existence of our species — climate change, transnational pandemics, and the possibility of nuclear warfare, to name a few. On the local or personal level, the suffering body, one that experiences famine, plague, oppression, discrimination, projection, appropriation, and physical grief, “transcends the particularity of human existence and becomes a potent means of generating a sense of shared humanity” (Shapiro, 2008, p. 263). Similar to the way provisional intersectionality and a global aesthetic might help us “reimagine our identities and our alignments in coalitional terms” according to Carastathis (2016, p. 6), Shapiro’s call for universal ethics will ensure that the Western world does not lose touch with such shared coalitional experience.

The Knowledge Economy

In this section, I attempt to underscore how the Western knowledge economy teaches us that spiritual fulfillment, which was previously grounded in religious devotion, can be obtained through economic success. This is not to say spiritual fulfillment cannot occur in Western religion currently; I merely suggest that in our individual-centered society, educational goals often undermine spiritual fulfillment itself. I introduce independent scholar C.S. Walter (2014) for her examination of spiritual fulfillment within Western culture. She expands on Depaepe (2012) to conclude that not only was there a time where the organized religion of Christianity governed the Western world, there was a time when art in the form of unspoken theatricals or social dancing was understood as part of spiritual devotion. Walter states, in regards to Western religion, “when dancing as a group the notion of the body or economic difference was not something that was defined; the group meant more, and in worship and celebratory expression...” (2014, p. 95). There is an emphasis on the social aspect of movement art forms in pre-Renaissance era.

However, the scientific advancements of the Renaissance era caused a shift towards a

more cognitive, rather than intuitive, understanding of the universe. Neo-Darwinism and the theory of evolution began to debunk divine spirituality, and the artistic rituals attached to such spirituality. Nuanced scientific theories devalued the spiritual practice of art and assigned it to individual, nation-state expression, or folk art (Walter, 2014). I agree with Walter (2014, p. 97) in saying that delving deeper into scientific theory and technologic advancements gathers factual evidence about the operation of the world, and the expression of culture in the ontic realm; however, scientific reasoning does not explain ontological existential desires, fears, and questions pertaining to a person's sacred otherness.

The business of fulfillment in a free-market society, such as the United States, provides hope and a continuous labor supply for a class-justified circumstance of resource and wealth distribution (Walter, 2014). What this societal compliance means is that individuals are educated to believe that fulfillment is equal to material wealth and this "success" in modern post-colonial times is obtainable by all. In academia, we satisfy the knowledge capital by granting institutions with elevated exam scores or graduation rates higher amounts of funding; however, those scores and rates often undercut student potential for genuine knowledge absorption in favor of competitive or reward-based education.

As mentioned previously, critical analysis of determinant intersectionality shows how even art education is capitalized in post-colonial institutions. For example, I present education researchers Nadine M. Kalin and Daniel T. Barney (2018) who underscore the way art education functions in a "culture of compliance" through strict National Art Education Association (NAEA) guidelines that hold presenters to a presupposed relevancy, clarity, and appropriateness, or inoffensiveness (Kalin & Barney, 2018, p. 69). Art educators' subjectivity is replaced by simplistic objectives for consumers (learners), and student achievement is based on test scores determining ability to understand such state-mandated course, class, or grade level objectives. This should

sound familiar to those in educational settings where learning objectives are clearly spelled out in advance with clear takeaways in knowledge absorption. Educators are held by standards of what is already known, limiting challenging intellect, and learners are subject to what is already deemed economically viable. The knowledge economy, then, reduces art and scholarship to a “marketplace of ideas” to teach spiritual fulfillment as capital potential and therefore removes the creative, explorative, and questioning nature of art and humanity (Kalin & Barney, 2018, p. 68).

The objective consumption of knowledge, material, and social status for societal compliance in a world ruled by cognitive ability is not a destination to spiritual fulfillment, but an instant gratification. As religious spirituality was replaced by objectivity in a Western world, this objectivity also replaced the importance of spiritual activities such as acting, dancing, and singing in favor of excessive capital consumption of goods, experiences, and achievements. These consumptions, which satisfy a human desire to feel connected to a local societal system, will not satisfy the human desire for spiritual fulfillment. As the Western world discredits the creative and spiritually empathetic capabilities of humanity in favor of self-esteem and economic potential, we are perpetuating “the violent historical enmeshing...systems of capital, white supremacy, and empire” (Carastathis, 2016). This government-organized way of living, disseminated through classrooms, highlights the reason the Western world sees an increase in employees questioning why they trade their time on Earth for production (Walter, 2014, p. 16). We are ultimately left disconnected, unfulfilled, and unhappy. We can correct the disconnection through holistic legislation and education based on provisional intersectionality.

Social Circus as an Avenue to Spiritual Fulfillment and Global Compassion

An ontic and ontological evaluation of social circus allows us to see the discipline as a meaningful encounter that is one destination to both local, individual fulfillment, and global, human compassion. In my own dance training, I was emotionally drained from hearing how my

body shape did not fit the performer body mold, or that my interest in art was not economically viable. When I began practicing circus, my distress faded. My objective changed from becoming a professional performer to inspiring others using the enthusiasm and possibility of circus. Social circus holds the capacity of “unveiling meaning in new forms of attachment to the world and thus a renewed attention to the vitality of life” (as cited in Bessone, 2017, p. 656). The “new forms of attachment” arise from both ontic, creative community adaptations, and ontological, spiritual human connections.

In ontic terms, the expression of circus within a local culture is the connection of group improvement/sustainability through physical self-achievement and bodily interactions. Social researcher Philip A. Loring situates the circus as a model for a sustainable socio-ecological system that is both adaptable and persistent; the persistence of which is not whether predefined structures remain, but whether stakeholders continue to recognize, respect, and feel a sense of belonging to the system (Loring, 2017). His work is based on circus in the widely documented European Union; however, circus researcher P.R. Nisha (2014) verifies this argument within South Asia. Through field research and personal accounts with Indian circus artists, Nisha notes how even though the circus community is built in a specific location and a point in time, the artists constantly explore, adapt, and engage creatively with moments of life, and the Indian circus archive is constructed by the memorabilia of the community itself (Nisha, 2014).

While Loring (2012) introduces creative movement toward sustainability as an emotional feeling of belonging, creative adaptation is also a physical necessity for survival. Loring (2012) and Nisha’s (2014) work highlights the “creative principle of adjustment” that movement analyst Margaret H’Doubler introduces through cellular biology. H’Doubler (1998) observed that single living cells within bodies change and adapt to respond to their situations and environments, such as when injuries occur, and blood cells respond instantaneously. She states that “life’s cre-

ative principle of adjustment...is an inherent biological principle before it is an art principle” (H’Doubler, 1998, p. xxix). As an inherent biological act of sustainability, creativity is a means of experiencing the shared human quality of adapting as well as globally adapting with others. To discredit the explorative nature of creative movement in education is to discredit the life objective of sustainability.

Ontologically, social circus aligns with Shapiro (2008) and Walter’s (2014) emphasis on conscious movement with spirituality in a group environment. At the Nouveau Sud Circus Project, there is a transformative energy amidst the space. I never felt as if I were an outsider because it is the physical and creative variations among the members that enhance the circus dynamic. There are moments when we individually become educators, learners, and spectators. I may work separately with one or two members on a specific practice such as aerial hoop, or act with the ensemble to develop a group acrobatic skill. In either situation, there is a prospect of danger and impossibility that is reduced by an aura of trust, compassion, and community. Through perseverance and investment in communication, the impossible becomes possible, something learnt and achieved (Bessone, 2017, p. 656). We are invested in the safety, success, and stories of ourselves and each other’s bodies. Bessone provides an example through her own social circus research. Regarding one study in Quebec she states that:

circus provides opportunities for new physical and emotional experiences, and different perspectives on one’s own and others’ bodies, promoting group cohesion through the rather ‘simple’ agenda of ‘performing a circus trick successfully’. This...contributes to an immediate sense of satisfaction, self-achievement, and group improvement... (2017, p. 657)

Social circus is then an example of utilizing a global aesthetic to work toward universal ethics; we find a similar humanity in working toward the common goal of group success. Humans are praised for our cultural differences and using the provisional approach to difference that is inherent in social circus we illuminate the desire for movement away from suffering that we are other-

wise taught to limit through capital consumption.

Conclusion

We can imagine what our world might become when we challenge the current neoliberal perceptions of national capabilities and transnational consciousness through shared desires for movement away from suffering. I have argued that if the Western world pairs ontic, embodied suffering with ontological desire, and links the body with intellect, we have the potential to realize a sacred otherness within humanity. In attempting to define social circus as one possible avenue to overcome the challenge of neoliberal perceptions, I have also connected the nuanced research theory of provisional intersectionality with social circus to argue how we can produce education centered around a “global aesthetic with universal ethics as the goal” (Shapiro, 2008).

In this work, I have positioned social circus as one possible intervention to the existing primary education system. Currently, this research requires adequate field testing in public institutions, and I foresee additional research on the politics of the possible intersectional encounters within social circus. In education, working to understand humans in relation to shared experience—what the body feels—within the rational world might direct us toward the still-radical idea that “all humans share the same inalienable rights” (Shapiro, 2008). By educating and empowering generations through social circus as a creative discipline, we can destabilize colonial aesthetics and institutes, return creative agency to the individual, and illuminate shared desires for spiritual fulfillment, relationship, and communication.

REFERENCES

Bessone, I. (2017) Social Circus as an Organised Cultural Encounter Embodied Knowledge, Trust and Creativity at Play, *Journal of Intercultural Studies*, 38:6, 651-664.

Cadwell, S. (2018) Falling together: an examination of trust-building in youth and social circus training, *Theatre, Dance and Performance Training*, 9:1, 19-35.

Carastathis, A. (2016). *Intersectionality: Origins, Contestations, Horizons*. Lincoln; London: University of Nebraska Press.

Cruz, C. A. (2020). *Our Mission*. Retrieved from The Nouveau Sud Circus Project.

Depaepe, M. (2012). *Between Educationalization and Appropriation: Selected Writings on the History of Modern Educational Systems*. Minderbroedersstraat, Leuven (Belgium): Leuven University Press.

H'Doubler, M. (1998). *Dance: A creative art experience*. Madison, WI: University of Wisconsin Press. (Orig. pub. 1940).

Kalin, N., & Barney, T. (2018). Commentary: Art (Education) of Governmentality. *Visual Arts Research*, 44(2), 67-77.

Loring, P. (2007). The Most Resilient Show on Earth: The Circus as a Model for Viewing Identity, Change, and Chaos. *Ecology and Society*, 12(1).

Nisha, P. (2014). A Tightrope Walk: Chronicle of a Circus Trade Union. *Social Scientist*, 42(3/4), 91-103.

Shapiro, S. (2008). *Dance in a World of Change: A Vision for Global Aesthetics and Universal Ethics*. In *Dance in a world of change: reflections on globalization and cultural difference*. Champaign, Ill: Human Kinetics.

Walter, C. (2014). *Dance, Consumerism, and Spirituality*. Palgrave Macmillan.

CAMBRIDGE WOMEN AND THE PROFESSIONAL WORLD: NAVIGATING GENDER CONSERVATISM IN THE LATE VICTORIAN ERA

Department of History
Olivia Dobbs and Amanda Pipkin Ph.D.

Abstract

During the late nineteenth century, British women received better education, especially at the university level. In particular, the University of Cambridge opened two women's colleges, Girton College in 1869 and Newnham College in 1871. The establishment of higher educational institutions greatly contrasted the traditions of the Victorian gender norms, which dictated that women should be feminine, nurturing, and supportive towards their husband and family. Due to this persistence of tradition, these conservative notions of gender influenced Cambridge women throughout their academic and professional lives. Although women may have been limited by gender conservatism in their careers, it is important to note that these limitations did not make their accomplishments less impressive. Furthermore, their strategic navigation of traditional gender roles aided them in successfully establishing their professional presence in their respective fields. Women



Olivia Dobbs

Olivia Dobbs is currently a senior at the University of North Carolina at Charlotte. Her majors are History and Japanese with a minor in mathematics. Having been chosen to participate in the Early Entry program for the History M.A. with a concentration in Public History, she wishes to continue her research on women's history in the 19th and 20th centuries and hopes to further integrate her Japanese skills in her career. She expects to pursue a Ph.D. later in her career. She is currently awaiting publication for her biographical entry on Philippa Fawcett in The Palgrave Encyclopedia for Victorian Women's Writing. The entry details the impressive life of Fawcett, the first woman in Cambridge history to earn higher than a man on the mathematics tripos, and her dedication to education throughout her career in civil service.



FACULTY ADVISOR Amanda Pipkin, Ph.D.

Dr. Amanda Pipkin is Associate Professor of History at the University of North Carolina at Charlotte. She received a bachelor's degree from Wake Forest University, an M.A. at the University of Leiden, and a Ph.D. from Rutgers University, the State University of New Jersey. Her book, *Rape in the Republic, 1609-1725: Formulating Dutch Identity* (Brill, 2013), reveals the significance of sex and gender in the construction of Dutch identity during the period of the Revolt of the Netherlands and beyond by examining depictions of rape in pamphlets, plays, poems, and advice manuals. She co-edited with Sarah Moran *Women and Gender in the Early Modern Low Countries, 1500-1750* (Brill, 2019), an interdisciplinary volume available in Open Access that reveals vital interconnections among women across the modern political divide of The Netherlands and Belgium. She has also published articles on seventeenth-century Dutch culture in the *Journal of Early Modern History* and in *Tijdschrift voor Geschiedenis*. Her new book-length project, *Dissenting Daughters: Reformed Women in the Dutch Republic, 1572-1725*, highlights women's contributions to the spread of the Reformed faith across Europe by detailing their teachings, efforts to convert unbelievers, organization of informal church services, participation in international debate, and encouragement of their fellow Calvinists abroad.

such as Jane Ellen Harrison, Charlotte Angas Scott, Marion Greenwood Bidder, and Philippa Fawcett used various tactics to establish themselves as academics and help inspire other women in the process. Though exceptional in their upbringing and talents, other Cambridge women commonly practiced their methods of navigating gender conservatism and other social dilemmas. By skillfully conforming to certain gender norms, these women helped revolutionize women's professional opportunities from within and ushered in the next generation of female academics.

Keywords: feminism, gender, nineteenth century, twentieth century, University of Cambridge, university education, Victorian era, women's history

Introduction

Tradition is also responsible for no thought being given by the parents of the future of their girls. No friends dream of asking the mother of her girl as they would of her boy, “What is she going to do?” (Jopling, 1903, pp. 119)

In the late Victorian Era, middle-class women entered the workforce in increasing numbers. As the above quote from 1903 from Louise Jopling’s essay on women’s careers demonstrates, the long-standing tradition of women’s domesticity lingered, oftentimes affecting their ability to establish themselves in the professional sphere. Nonetheless, women learned to navigate traditional gender norms and find success in their careers. One major contributing factor to women’s increasing professional opportunities includes the movement for women’s higher education, which saw significant victories in the latter half of the nineteenth century. In particular, the University of Cambridge opened two women’s colleges. Emily Davies founded Girton College in 1869, while Henry Sidgwick opened Newnham in 1871. These colleges gave women of the white middle class the opportunity to cultivate their intellectual interests in an academic environment. Cambridge did not recognize women as full students, a direct result of traditional Victorian gender norms, which dictated that women did not share the same intellectual capabilities as men and should thus remain in the domestic sphere (Gould, 1997, pp. 127). Other historians have approached the subject of gender conservatism within Cambridge by focusing on the student experience. I will instead examine the lives of four Cambridge women in terms of their navigation of gender norms as both students and professionals, focusing my efforts on four pioneering women. Although these women had unique lives and circumstances, their experiences echo the many strategies Victorian women had to employ to establish themselves in their careers. I will argue through their strategic navigation of gender conservatism, these women could justify their presence within the masculine Cambridge community and inspire the next generation of female academics.

Jane Ellen Harrison

Jane Ellen Harrison and her career in Greek studies shows how women could outright rebel against Victorian ideals of womanhood and still become an influential member of the women's higher education movement. Her experiences demonstrate a more radical way of approaching gender norms, especially regarding behavior and appearance. She used her rebellious nature to cement herself as an academic and help the next generation of female students at Cambridge an unorthodox role model.

Harrison's student life echoed the sentiments of Victorian womanhood, although she fiercely objected to such ideals. From a young age, Harrison developed a disdain for domestic life. In one anecdote from her work *Alpha and Omega*, she remembered how her aunt reminded her of the powerful nature of gender roles, in which the aunt simply stated the dilemma of women's education, which questioned how a better education could help women in the household (Harrison, 1915, pp. 117). This one encounter with her aunt increased the scorn she felt towards the domestic sphere, recognizing that if she happened to enter it, she would be robbed of the opportunities to satisfy her intellectual curiosity. Her scorn towards women's traditional gender roles increased as she entered Newnham in 1874, where she and the other students had to behave according to strict guidelines. Harrison often clashed with the principal, Anne Jemima Clough, regarding her dress and behavior. Her tall figure made her an imposing individual, and she often wore bright tones that made her stand out even more (Peacock, 1988, pp. 93). Harrison always made a conscious attempt at asserting herself as an individual, as she felt that pandering to Victorian ideals would inevitably lead women back to the domestic sphere.

Despite not earning a Newnham lectureship in 1879, Harrison continued her intellectual career, shifting her focus from studies of Greek art to religion and rituals. She longed to continue her research after leaving Cambridge, but she felt that as a woman, it would be near impossible to

devote a life purely to scholarship in such a narrow discipline as Greek classics (Harrison, 1925, pp. 82-83). After Harrison successfully conducted pioneering research in the subject of Greek religion, Newnham offered her a position as a research fellow, which she quickly accepted in 1898. The position offered her an opportunity to further study her field, all the while being close to other scholars with similar intellectual ambitions (Lloyd-Jones, 2004).

However, her decision to return to Cambridge did not mean she would give up her defiance towards Victorian gender norms. Entering the field of lecturing could have been considered conforming to what Victorian culture dictated as the ideal female profession, but Harrison exhibited her eccentricity in defiance. According to a former student, Harrison's "striking appearance and often unorthodox clothing, added to her reputation as a scholar, made her one of Newnham's outstanding characters of that period" (Levyns, 1979, pp. 97). She may not have been a conventional role model for many of Newnham's students, but they admired her daring nature and for going against tradition to pursue her intellectual interests. Her teaching skills made lasting impressions on many of her students. Her previous apprehension towards teaching dissipated when she surrounded herself with others similar to her, and although they may not have been as bold in regard to defying gender norms, she still taught them to the best of her abilities in a respectful manner. Even though she entered a feminine profession, she did not necessarily reflect traditional notions of femininity. Through her unconventional dress and behavior to her advancement in the field of classical study, Harrison proved that traditional notions of gender could not prevent women from becoming intellectual pioneers, thus paving a new path for women in the academic world and inspiring those around her.

Charlotte Angas Scott

Women also pioneered in the field of mathematics, as can be seen in the case of Charlotte Angas Scott. She in particular demonstrates how women could bring themselves to the forefront

of education through strategic navigation of Victorian tradition, such as keeping a careful eye on her own and other women's appearances. At the age of eighteen, Scott began attending Girton with the aid of a scholarship and began studying mathematics. Girton presented its students with a rigid behavioral code that adhered to Victorian gender norms, which would impact Scott well into her professional career (Kenschaft, 2005, pp. 49).

Scott's greatest achievement while at Girton involved Cambridge's final examinations, also known as the tripos. In 1880, Scott read for the mathematics tripos with the permission of Cambridge's administration. Up to that point, Cambridge had barred women from taking these examinations, despite Newnham and Girton having been in operation for several years. The reasons for this prohibition lay with the preconceived notion that women did not share men's intellectual capabilities and thus should not attempt to take the same examinations as their male counterparts. To participate, women had to receive special permission. Scott's results on the tripos would change that tradition. She scored the eighth highest out of every person who attempted the examination, thus technically making her the "Eighth Wrangler." Although Scott could not officially take on the title of "Eighth Wrangler" due to Cambridge tradition barring women from the rankings, her accomplishment made national headlines and sparked a successful movement within the Cambridge community that allowed women's tripos results to be officially ranked, albeit separately from their male peers (Kenschaft, 2005, pp. 49). Her success defied Victorian tradition, as the final mathematics examinations had long been a pillar of masculinity within Cambridge.

Scott then pursued a career in education, in which she exhibited exceptional skills. Her impressive performance on the mathematics tripos landed her a lectureship at Girton, making her the third member of its staff. While she taught, she continued to further her own studies, earning her bachelor and doctorate degrees from the University of London. However, her most important contribution to education culminated in 1885 when she accepted a position at a burgeoning wom-

en's college in the United States, called Bryn Mawr. This newly established private institution assigned Scott as the only associate professor of mathematics and the only woman out of a total of five professors. Her research did not cease; she published multiple articles over the course of her career and a textbook that received praise for its inclusion of recent mathematical topics (Kenschaft, 1987, pp. 105). Her teaching abilities and research prowess allowed Bryn Mawr to become a proper learning center for women and the first women's college in the United States to grant its students the Ph.D. degree.

While at Bryn Mawr, Scott carefully and strategically balanced traditional notions of femininity with her own progressive ideas on women's higher education. Scott, having been educated in Girton's highly conservative atmosphere, transferred those ideals into her own profession, often remarking on the liberal way her students and colleagues dressed. In one letter to the college's president in 1898, she commented on "certain foolish young women on [the] teaching staff whose 'make up' [was] so conspicuous," having been "taken aback" to see one "renewing the make-up of the face between two classes" (Kenschaft, 1987, pp. 102). This criticism did not come from a place of malice but rather concern. With Bryn Mawr rapidly transforming into an epicenter for women's higher education, especially of the graduate level, Scott worried that the behavior of her colleagues could put the college at risk. Wearing make-up would be conforming to feminine ideals to an extent but emphasizing their femininity in a way uncharacteristic of tradition could risk their standing in the intellectual community. Furthermore, the "condescension" of her male colleagues added to her fears that her female colleagues' lack of awareness regarding their appearance could result in the further degradation of female academics in the eyes of the masculine world. A delicate balance existed between femininity and higher education, of which Girton's rigid behavioral code made Scott fully aware.

By carefully navigating gender conservatism, especially that of appearance, Scott achieved

an impressive level of success within Bryn Mawr and the American mathematics community that proved women's capabilities within a male-dominated field. She became the co-editor of the *American Journal of Mathematics* in 1899, in which she published several papers, and helped found the American Mathematical Society (AMS) with J. J. Sylvester in 1894. Scott worked vigorously to educate her students, many of whom went on to advocate for mathematics for women. In total, seven women earned their doctorates under Scott's advisement, and all but one became mathematicians (Kenschaft, 1987, pp. 105). Although Scott demonstrated caution when it came to gender norms affecting the careers of her and her students, she nevertheless fought against the odds and used her position as an instructor to inspire the next generation of female mathematicians.

Marion Greenwood Bidder

In addition to mathematics, women became successful in the field of natural sciences, and Marion Greenwood Bidder exemplifies how far Victorian gender norms could affect women's career within the scientific community. Born in 1862, Greenwood received a scholarship to attend Girton in 1879. She began to study natural sciences, another discipline dominated by a masculine culture. In 1884, after the end of her research period, Newnham quickly offered her a position as a demonstrator and lecturer of physiology and botany at the newly established Balfour Biological Laboratory for Women. Despite backlash from her male colleagues claiming that as a woman she would not be able to continue her research and teach, Greenwood accepted the position, remarking that the position would "mean no lessening of research, only a better arranging of the day's work" (Richmond, 1997, pp. 436). From 1884 to 1896, she published a total of eight papers in the *Journal of Physiology*, in addition to the large workload of being a demonstrator and the lab's eventual director (Mason, 2004). Keeping true to her words, she demonstrated an impressive ability to manage both her research and her duties at the laboratory, defying the expectations of her

male counterparts.

Greenwood's career shifted in 1899 when she married a fellow scientist, George Parker Bidder, in 1899, leading her to ultimately resign from her position at Balfour and give up her personal research (Mason, 2004). Her case represents a common predicament among women academics in the late Victorian era. Despite having increased opportunities for independent research at Newnham and Girton, women still faced the pressures of traditional womanhood, which required dedication to marriage and housewifery. Although some women continued to research as a partner to their husbands, others, like Greenwood, ceased completely. Those that did continue as researchers oftentimes gave up their own research in favor of their husband's (Gould, 1997). In Greenwood's case, her perfectionist nature caused her to relinquish her research in favor of being a better housewife.

Although her academic research had ceased, Greenwood used her position as a housewife to continue to promote women's education and defy the notion that women should be permanently relegated to the domestic sphere. In 1901, she and Florence Baddeley published *Domestic Economy in Theory: a Text-Book for Teachers and Students in Training*. The book aimed to inform its target audience of women about the science behind daily housework, such as sanitation and food contamination. In three sections, Greenwood and Baddeley discussed the science behind household chores, how to properly conduct such chores, and how to present this information in a teaching format. In addition to discussing science, the authors wanted their audience to develop their "powers of observation" and improve their "individual energies" and other "essential mental and moral qualities" (Bidder & Baddeley, 1901, pp. 2). By strategically centering the book around housework, Greenwood conformed to traditional notions of womanhood while promoting the scientific education of women in their positions as housewives. The mention of "moral qualities" in the introduction attests to her conforming to Victorian tradition, and the "mental" ones indi-

cates women's right to education. Overall, Greenwood defied tradition by establishing herself as a pioneering scientist, and although Victorian gender norms ultimately cut her professional career short, her desire to educate and inspire other women persevered.

Philippa Garrett Fawcett

Philippa Garrett Fawcett represents another case in which an educated woman successfully navigated the professional world by carefully monitoring her appearance. The daughter of lead suffragist Millicent Garrett Fawcett and Cambridge professor and liberal politician Henry Fawcett, she grew up in a politically active environment. By the age of sixteen, she began attending courses at University College, London, and Bedford College, studying mathematics and chemistry. By 1887, she received a Gilchrist scholarship to attend Newnham College. As a student, Fawcett excelled in both her academics and extracurriculars (Siklos, 1990).

Her greatest academic achievement culminated in the summer of 1890, when she read for the first half of the mathematics tripos. When the Cambridge Senate House announced the results, she received the title of "above the Senior Wrangler," meaning she scored higher than any other student on the exam and became the first woman in Cambridge's history to do so. (Siklos, 1990, pp. 25). The senior members of the Cambridge Senate House ultimately prevented her from being announced as the "Senior Wrangler," a masculine title reserved only for the mathematics tripos. Nonetheless, news of her success circulated across the academic world, with the *New York Times* announcing that her success had empowered the movement for women's higher education and gave "new dignity and encouragement to efforts... and institutions which have had to struggle in their time against much opposition, indifference, and disdain" ("Miss Fawcett's Honor," 1890). Similar to Scott, Fawcett used her intelligence to succeed on the mathematics tripos, once again upending a long-standing pillar of masculinity.

Along with her unprecedented success at Cambridge, Fawcett succeeded in traversing traditional gender norms that had the potential to threaten her status as an academic. During her time as a student at Newnham, she understood the importance of keeping her dress and manner being as modest as possible. A friend talking to the *New York Times* remembered Fawcett as dressing in the “most unassuming style” and being the “quietest of girls, with a perfect hatred of all formality and show” (“Miss Fawcett’s Honor,” 1890). According to Henry Montagu Butler, the master of Trinity College at the time, when Fawcett learned of her success at the tripos, she kept her excitement under control and remained the “perfect picture of modest maidenly simplicity” (M. G. Fawcett, 1924, pp. 141). As a student, she had to conform wholeheartedly to Victorian ideals of womanhood, as doing anything out of the ordinary would potentially jeopardize both her and her school’s social standing. Traditional notions of gender continued to affect her when she began to conduct research. While performing physics research at the Cavendish Laboratory, Fawcett worked under Sir J.J. Thomson, the director of the laboratory and who doubted the intellectual capabilities of women (Gould, 1997, pp. 127). Her 1894 physics paper opened with the assertion that the experiments of the study “were undertaken as Professor Thomson’s suggestion, and have been carried out with advantage of his advice and help” (P. G. Fawcett, 1894, pp. 263). As a woman in a male-dominated discipline, she found it difficult to establish herself as an academic. If she wanted her work to be respected by the scientific community, she had to attach herself to an influential male figure, and in this case, she chose to mention the Cavendish director by name to increase her chances of recognition. Altogether, her strategic navigation of gender conservatism allowed her to establish herself not only as an exemplary student but also as an outstanding researcher.

By carefully adhering to gender norms, Fawcett successfully established a career for herself and defied the status quo to better women’s chances in the professional field of education. After completing a year of research in 1893, she began a lectureship at Newnham, a position she

remained in until 1902. She helped students prepare for the mathematics tripos, and they often remembered her for her exceptional teaching skills (Siklos, 1990, pp. 33). Though she originally wished to pursue mathematics as a career, her mother and other like-minded figures showed concern about a woman in a masculine field, ultimately discouraging her from doing so (Gould, 1997, pp. 136). Despite the influence of Victorian ideals of womanhood, Fawcett demonstrated immense enthusiasm for mathematics. Teaching allowed her to conform to tradition, while also giving her the opportunity to partake in a subject she wholeheartedly enjoyed and inspire her students to cultivate their own abilities. Her high expectations of her students helped prepare them for the criticisms of the masculine world of academics. Her own experiences at Newnham further helped her in aiding her students traverse the conservative environment with Cambridge and increase their chances of success within the academic and professional worlds. Despite Victorian ideals of gender limiting her ability to pursue mathematics as a profession, Fawcett used the same determination that earned her the title of “above Senior Wrangler” to carve out a career in education that had lasting effects on those around her.

Conclusion

Overall, the careers of these four women illuminate the ability of women to revolutionize the field of education from within and further promote the movement for women’s higher education. Each of these pioneering women, at one point or another, returned to her former college to teach the next generation of students. Their navigation of gender conservatism within the Cambridge community demonstrates common situations women faced in the academic field. For instance, they would frame their work within gender norms, helping them earn the respect of their more conservative colleagues and further validate their professional positions. Greenwood, Fawcett, and Harrison used this gendered framework in varying ways, with Greenwood publishing a textbook regarding the science behind domestic economy, and Fawcett and Harrison centering

their respective careers around education. By balancing their professional and intellectual aspirations with traditional notions of Victorian womanhood, they gained the ability to better contribute to the movement for women's higher education.

Furthermore, the ever-present role of gender conformity in the lives of these academic women can be seen. For instance, Scott and Fawcett emphasized the importance of appearance, as many women in university could risk their standings as intellectuals if they did not adhere to ideals of Victorian dress and behavior. In a similar fashion, Greenwood relinquished her research to become a housewife, conforming to domestic tradition. However, in doing so, they gained the opportunity to advocate for women's rights in the intellectual community and to inspire the next generation of female scholars. With their adherence to tradition, each of these women defied the expectations of their male colleagues, be it through bold appearances, record-breaking test scores, or administrative roles within Cambridge. Although these women may have been pioneers in their respective fields, their experiences and strategies in regards to navigating Victorian tradition reflect the choices of many women who wished to enter and promote the movement for higher education.

REFERENCES

- “Miss Fawcett’s honor: The sort of girl this lady Senior Wrangler is. Significance of her success to the movement for higher female education – A friend’s account. (June 24, 1890). *New York Times* (1857-1922), 6.
- Bidder, M. G., & Baddeley, F. (1901). *Domestic economy in theory and practice: A text-book for teachers and students in training*. Cambridge University Press.
- Fawcett, M. G. (1924). *What I remember ...: Illustrated [with portraits]*. T. Fisher Unwin.
- Fawcett, P. G. (1894). The electric strength of mixtures of nitrogen and hydrogen. *Proceedings of the Royal Society of London*, 56, 263-71, www.jstor.org/stable/115602.
- Gould, P. (1997). Women and the culture of university physics in late nineteenth century Cambridge. *The British Journal for the History of Science*, 30 (2), 127-149. www.jstor.org/stable/4027714.
- Harrison, J. E. (1915). *Alpha and omega*. Sidgwick & Jackson, Ltd.
- Harrison, J. E. (1925). *Reminiscences of a student’s life*. Hogarth Press.
- Jopling, L. (1903). On the education of the artistic faculty. In E. M. M. McKenna (Eds.), *Education and professions* (pp. 100-172). Chapman & Hall Ltd.
- Kenschaft, P. C. (1987). Charlotte Angas Scott, 1858-1931. *The College of Mathematics Journal*, 18 (2), 98-110. www.jstor.org/stable/2686497.
- Kenschaft, P. C. (2005). “Charlotte Angas Scott.” In B. A. Case & A. M. Legget (Eds.), *Complexities: Women in mathematics* (pp. 48-52). Princeton University Press. <https://doi.org/10.2307/j.ctt1dr35cc.19>.

REFERENCES

- Levyns, M.R. (1979). Life in Peile Hall. In A. Phillips (Eds.), *A Newnham anthology* (pp. 95-98). Cambridge University Press.
- Lloyd-Jones, H. (2004). Harrison, Jane Ellen (1850-1928), classical scholar. In D. Cannadine (Eds.), *Oxford Dictionary of National Biography*. <https://doi.org/10.1093/ref:odnb/33734>.
- Mason, J. (2004). Bidder, Marion Greenwood [née Marion Greenwood] (1862-1932), physiologist. In D. Cannadine (Eds.), *Oxford Dictionary of National Biography*. <https://doi.org/10.1093/ref:odnb/48494>.
- Peacock, S. J. (1988). *Jane Ellen Harrison: The mask and the self*. Yale University Press. <https://www.jstor.org/stable/j.ctt2250xsc>.
- Richmond, M. L. (1997). 'A Lab of One's Own': The Balfour Biological Laboratory for Women at Cambridge University, 1884-1914. *Isis*, 88 (3), 422-455. www.jstor.org/stable/236151.
- Siklos, S. *Philippa Fawcett and the mathematical tripos*. Cambridge University Press, 1990.

COMMUNITY AND THE BUILT ENVIRONMENT: THE PHYSICAL AND SOCIAL CONSEQUENCES OF GENTRIFICATION IN CHARLOTTE'S LOCKWOOD

Department of Anthropology
Quinton Frederick and Nicole Peterson, Ph.D.

Abstract

This project examined the interactions between community relationships and physical space in Charlotte's Lockwood neighborhood. Property values in Lockwood are growing at one of the fastest rates in the country and show no signs of stopping. This growth made Lockwood a fitting place to investigate gentrification, an increasingly important issue in Charlotte and beyond. Previous researchers recorded oral histories from Lockwood's residents during this period of property value increase. Qualitatively coding these oral histories revealed a significant theme: residents consistently mentioned a decline in the neighborhood's sense of community. Additional interviews and archival research indicated dramatic changes to Lockwood's built environment. Many of Lockwood's historic homes have been replaced by new, larger houses with far less emphasis on community building spaces like front porches and backyards. In response, local non-profit Community Dream Builders creatively



Quinton Frederick

Quinton Frederick is a Levine Scholar majoring in architecture and history at UNC Charlotte. As a freshman in UNC Charlotte's School of Architecture, he discovered the fascinating intersection of history and physical space. With encouragement from the Levine Scholars Program, Quinton added a second major in history to explore this academic interest. This research project allowed him to investigate the two subjects through the lens



FACULTY ADVISOR Nicole Peterson, Ph.D.

Dr. Nicole Peterson is an Associate Professor of Anthropology at UNC Charlotte, and has examined Charlotte area food systems, how people adapt to changing climates and agricultural systems, and community-oriented sustainability efforts. Nicole has also been collaborating with Community Dream Builders for several years to understand neighborhood change. You can get more information about publications and courses at clas-pages.uncc.edu/nicole-peterson.

used Lockwood's physical space to bring residents together and encourage sustainable growth. The residents' comments about community interactions were examined through the context of these documented physical changes. Research showed that Lockwood residents rely on informal community building spaces like front porches and backyards to form connections with one another. The loss or obstruction of these crucial spaces was at least an indicator and perhaps an accelerator of social change in the neighborhood. As property values continue to rise, the remaining community spaces in Lockwood should be preserved and expanded.

Keywords: Lockwood, gentrification, community, built environment, oral history

Introduction

Gentrification has become something of a buzzword recently. Everyone seems to have an opinion on it and most people are not afraid to share theirs. But how many people really understand gentrification as a process and not just a word? Glass (1964) first coined the term “gentrification” as the process where “many of the working class quarters of London have been invaded by the middle classes,” (p. 22). Using this definition, researchers in the United States conducted a series of studies in what Freeman (2016) called the “first wave of gentrification research,” (p.163). Like Glass, these researchers generally defined gentrification as a process where middle-class, well-educated, white-collar workers moved into neighborhood’s close to the center city because of the lifestyle and opportunities it provided. The process usually displaced long term residents, rapidly changing the neighborhood’s physical and social fabric (Sumka, 1979). A “second wave of gentrification research” followed, where scholars found gentrification to be far more prevalent and much less distinct (Freeman, 2016) in that the causes and consequences of change became harder to identify. In this period of study, Kennedy and Leonard (2001) recognized that the term gentrification was “both imprecise and quite politically charged” for such a complicated phenomenon that looked different in each city, community and even person they investigated (p. 5). Agreeing with Kennedy and Leonard, Yonto and Thill (2020) claimed that “different dynamics” of gentrification in the New South provided a previously unexplored perspective (p.1). Given these challenges of defining “gentrification,” this study avoids employing a specific definition of the process. Instead, this paper will discuss the physical and social changes perceived by residents of Charlotte’s Lockwood neighborhood, a particularly unique and relevant case study.

Lockwood was first developed in the 1920s as a small neighborhood just outside of Uptown Charlotte. Then and now, the neighborhood is defined by three main avenues, Plymouth, Sylvania, Keswick, and their cross streets. Many of the early residents lived in modest bungalows

increased. The average home in Lockwood now costs close to three hundred thousand dollars. A recent study even identified Lockwood as one of the nation's most rapidly gentrifying neighborhoods (Realtor.com, 2019). As property values rose, some residents became concerned about the physical and social consequences of this growth. They worried that the neighborhood's social structure and built environment would dramatically change. A dedicated group of residents led by Mr. Chris Dennis began working to preserve the neighborhood as it grew. Community Dream Builders is a non-profit founded by Mr. Dennis with a mission to support sustainable community growth. This paper examines the physical and social changes taking place in Lockwood as well as the efforts by Community Dream Builders to preserve the neighborhood's identity. Studying these struggles and changes in Lockwood confirmed Kennedy and Leonard's ideas about gentrification; it is a complicated and extensive process best understood through the lens of those who experience it firsthand.

Methods

This research project relied on data collected by previous researchers. Starting in 2017, students led by Dr. Nicole Peterson collected oral histories from Lockwood's residents through interviews approved by UNC Charlotte's Institutional Review Board. The interviews were semi-structured- meaning researchers prepared questions but allowed the discussion to respond to the unique experiences of each subject. Over twenty hours of video recording captured the stories of twenty-one community members. Of these twenty-one interview subjects, thirteen (a majority) were long term residents, living in Lockwood for over ten years. Five of these long-term residents grew up in the neighborhood, while the others moved in later in life. Interviewees ranged in age from early 20s to late 70s, and while the majority of interviewees identified as Black, a few newer residents and a long-term landlord identified as white. In this paper, pseudonyms are used to protect the privacy of all interviewees except Dr. Tom Hanchett and Mr. Chris Dennis.

The resulting interviews provided rich insights into a wide variety of experiences, themes, and ideas about Lockwood. Previous researchers then edited and qualitatively coded these interviews using grounded theory (Thornberg and Charmaz, 2014). Two of the themes they identified formed the basis for this stage of the project, since residents consistently discussed changes to the social community and built environment in their oral history interviews.

In the projects current stage, additional qualitative coding of the interviews revealed new subthemes within the categories of change in the community and change in the built environment. Quotes about specific neighborhood changes were coded by the speaker's opinion of those changes, e.g. positive, negative, or unclear. Additionally, comments about community interactions were coded by the spaces where they occurred, e.g. the front porch, street, or backyard. This coding exercise sourced quotes from previous codebooks, interview transcripts, and the video recordings themselves. Reviewing similar studies in other cities also helped further guide the analysis of the data.

Additional research methods supplemented this coding methodology. A second interview was recorded and coded with Charlotte neighborhood historian Dr. Tom Hanchett, a participant in the earlier phase of the project. Dr. Hanchett answered new questions related to the connections between social activity and physical space in Lockwood. Archival research also brought additional context to quotes about the neighborhood's changing physical environment and history. For example, photographic records were found to match comments about specific demolished structures.

Results

Spaces and Community Interactions: Porches, yards, and streets

Throughout their interviews, residents consistently referenced the importance of informal community building spaces in Lockwood. One of the closest public spaces for neighborhood

residents, Greenville Park, is over a mile away across several major roads. Without easy access to traditional community building spaces, Lockwood residents found creative informal ways to interact with one another and build community. These activities occurred primarily in three distinct spaces: the front porch, backyard, and street. Together these spaces formed the backdrop for a strong informal care network that connected Lockwood's residents.

Lockwood residents fondly remembered gathering beneath large, covered porches, a trademark of the neighborhood's historic craftsman bungalows (Mayer, 2019). Donna, a long-term resident, recalled these front porch gatherings saying, "If it were cold, we had hot chocolate in the Styrofoam cups for the kids to drink before the bus came and I would read *Oh The Places You'll Go* every morning for any of the kids out there." Sixty-nine-year-old and long term resident Gloria said that they can't walk past one neighbor "without going up on her porch and giving her a hug and a kiss." Thirty-seven-year-old Marcus spent time in the neighborhood as a child and described front porch interactions as "the things you look for in a community, in a neighborhood, those are the things I will cherish for the rest of my life." At least seven other residents directly mentioned a positive community interaction taking place on the front porch. Community historian Dr. Tom Hanchett traced this tradition of front porch gatherings to the 1960s, when the neighborhood demographics transitioned from white to Black. Since then, Lockwood's members have used their front porches to form a close-knit community.

Although not mentioned as frequently as the front porch, many residents described gathering with their neighbors in backyards. After walking through the neighborhood, it's easy to understand why. Lockwood's backyards are surprisingly spacious, especially for a neighborhood so close to Uptown Charlotte. Donald, a long-term resident described a surprising backyard interaction saying, "you're in the house and all of a sudden you hear some noise, and you wonder what's going on and you've got a girl sitting in the back yard back there playing drums." Donald

continued, “But it’s your neighbor and it feels so good, you know?” Charles, a sixty-eight-year-old long-term resident, described backyard cookouts, saying “It was awesome and we would have some good times and she would invite everybody and anybody.” Donna even remembered that her neighbors attended a family wedding in her backyard, because community means “sharing experiences.” At least five of their neighbors referenced similar community interactions in the backyard.

Lockwood’s famous block parties perhaps united the neighborhood most of all. Every once and awhile, Lockwood residents met at one resident’s home for a neighborhood gathering that filled the wide streets. The entire community seemed to work together organizing these events. 22-year-old resident Mary described an elaborate process of attending meetings, passing out flyers, and cleaning the neighborhood (before and after). Others remembered preparing the food necessary to feed such a large crowd. Long-term resident Raymond said that the act of sharing food, “is why Lockwood is not just a neighborhood, but also a community.” At least eight residents described these block parties, but the events might have been best summarized by a sixty-three-year-old Henry who said, “The block parties were out of sight, we had a great time.” More than any other event, the Lockwood block parties demonstrated the strong social connections of Lockwood’s previous community.

Changing Community Interactions: distances and community events

According to Lockwood’s members, the neighborhood interacts differently today. Many residents claimed that the once closely-knit Lockwood community has changed, with resident interactions becoming less and less frequent. This point of view certainly fits neatly within prevailing narratives on gentrification (Sumka, 1979). The story in Lockwood was much more complicated though. Plenty of community members identified positive changes brought to the neighborhood by newer residents like Mr. Chris Dennis. Regardless of their opinions on the subject,

interview participants generally agreed that the neighborhood's social fabric changed due to an influx of new residents.

Interviewed Lockwood residents commonly contrasted the front porch gathering and block parties of past years with the current community, where they no longer knew many neighbors by name. Gloria said, "I got neighbors walking past me all day long that don't speak." Donna claimed that community gatherings had ceased because, "there have been so many harsh words spoken here and dissention, and disagreement, that I'm not sure we could ever bridge that gap." Forty-two-year-old Arthur gave one example of this dissention saying, "when they see a group of us socializing it's a problem so that's when you get the police coming up wanting to harass you... it doesn't take a rocket scientist to figure out where the calls are coming from." Seventy-year-old resident Roger said, "Some of the people that's been here forty-fifty years they don't trust the people that are just movin' in." At least seven other residents expressed similar concerns about the social changes occurring in Lockwood. They thought that Lockwood's carefully constructed informal care networks suffered due to new neighborhood transplants.

Some residents, however, found that positive community interactions actually increased due to new residents. Martha who recently moved in but also grew up in Lockwood said, "I love that about here, that everything is changing, and people are trying to come together in the neighborhood." At least five of their neighbors agreed. Interview participants often mentioned community projects, like the street murals, a neighborhood 5k, and a community festival as examples of improving social interaction within the neighborhood. Janet, a newer resident, noted how the street mural project brought people together saying, "we had to go door to door and get 75% of the people on the street to agree... I think that's community- trying to do good things together and getting to know what people care about." Much of this effort can be traced back to Mr. Dennis and the Community Dream Builders' quest to strengthen community ties in Lockwood. Mr. Dennis,

a relatively recent resident, saw opportunities in Lockwood's current situation. He said, "you just have to bring back the hope and demand resources, even if you have to create them yourself. It's not hard for anyone to do... if you believe you can change something, anything is possible." Many believed that new residents like Mr. Dennis were helping to increase community interactions that had declined.

The New Lockwood Built Environment: demolitions and preservation

Most of Lockwood's houses can be divided into two historical periods: craftsman bungalows built sometime around the 1920s and ranch style houses built between the end of World War Two and the 1960s (Mayer, 2019). For most of their lifetime, these houses remained largely untouched- a rare feat in Charlotte. Following recent gentrification though, several of these historic structures were demolished to make room for new (often dramatically different) houses. Renovations and additions further transformed the neighborhood's architectural character. Five residents specifically approved of these recent physical changes. The remaining sixteen interviewed residents either expressed concern or had mixed opinions.

Several interview subjects identified specific recently demolished structures. Terry who grew up in the neighborhood said, "I still don't know why. They just tore that one down right in front of their house. My uncle lived there for a long time." Another long-term resident James remembered a "rustic house with white columns" from the 1930s that was recently demolished. Perhaps they referred to a recently destroyed small Craftsman home with a wraparound porch where neighbors almost certainly gathered (Google Earth, 2015). A newer resident Dylan said, "The most recent homes like that have sold on my street are like over \$400,000 and they're tear-downs." At least five other residents mentioned the loss of specific structures with concern. But according to the interview participants, not all demolition was negative. Donald celebrated the destruction of a nearby former speakeasy. Generally, though, residents worried that the neighbor-

hood's history and identity was being erased through the loss of these buildings.

These demolished structures were almost always replaced with larger more modern homes, a trend that further concerned Lockwood residents. Janet said, "I mean it would be awesome if this could stay really wonderful close, mixed, income racially mixed [neighborhood]... you wonder these are really cool big houses, but they don't necessarily fit in." Meanwhile, Dylan asked, "are you one of the newbies is coming in, you know building the big nice houses, or are you gonna be one of the traditional people that's been here that's going to try to preserve?" They might have been thinking of two larger modern homes recently built on Sylvania Avenue, or an addition on Keswick (fig. 2). These new houses had far less emphasis on important community building spaces. At the two new houses on Sylvania, for example, the front porches did not include any furniture and the backyards were hidden with privacy fences. Six other residents made similar comments about new construction in Lockwood. They were concerned that these new houses, along with raising property values, further modified the already changing community by providing a physical indicator of the differences between new and old residents.

Figure 2

Recent Lockwood Construction



Not all of Lockwood’s new construction began with tearing down though. Many new residents chose to renovate their homes rather than replacing them. Henry described these changes, saying “I think it makes it a little better. I just got to be frank.” With the Lockwood Legends Arts facility, Mr. Dennis saved one of Lockwood’s historic homes from demolition (fig. 3). He remodeled the historic landmark to serve as a space for arts, culture and community interactions that will “get people to talk,” and “share commonalities.” Other initiatives like the Music Factory 5K Rock ‘N Run, colorful street murals, and neighborhood festival found similar success in bringing people together (Powell, 2018). Some residents, meanwhile, worried that beautification would raise property values and price other residents out of their neighborhood, citing neighborhoods like Charlotte’s NoDa. Dr. Hanchett remarked that some of these remodeled homes were in poor condition due to previous disinvestment and “absentee landlords.” New residents who invested in these homes helped preserve Lockwood’s historic built environment, but potentially raised property values at the same time (Leggett, 2014).

Figure 3

Lockwood Legends Arts Facility



Note. The Lockwood Legends House can be found in the Charlotte Landmarks Commission Historic Landmarks Register as the Butler House, named for its former owner.

Lockwood's Future is Just Beginning: further decline and displacement or creative neighborhood spaces

With so much social and physical change occurring, residents wondered what might come next. Some interview participants who negatively perceived previous neighborhood change forecasted additional decline. A vast majority, however, saw Lockwood's future differently. Participants who appreciated previous physical and social change understandably looked forward to the future. Surprisingly though, many of the residents who expressed concern about previous change also saw a brighter future for Lockwood and its people. All the interviewed residents could agree on one thing though; they each thought Lockwood's change was just beginning.

Many negative views of Lockwood's future focused on additional changes to the built environment. These residents worried that the physical changes they had already seen would increase soon. Gloria asked, "How can you [keep the same environment] when everybody's living on top of each other in expensive condos or co-ops or whatever they wanna call it... So they gotta make it look like Uptown." Perhaps they referenced Lockwood's designation as a focus area in Charlotte's 2040 Comprehensive Plan (Chemtob, 2020). Terry predicted the result of this growth, saying "a lot of people's gonna move out, that's been living here for years." At least seven other residents made similar claims. They feared the loss of their homes and neighbors at the hands of continued economic growth.

Most interview participants remained optimistic about Lockwood's future. Charles simply said, "this is going be a nice area." A few others made similarly general statements. Most residents, though, demonstrated their optimism by discussing specific improvements they hoped to see. Martha who recently moved in predicted that Lockwood might, "become more open and that it grows and a lot of things happen, I like to actually like try to make a park or something, people can go and walk their dogs, kids play." Placing a public park in the neighborhood was a popu-

lar idea, with at least six other residents making the same suggestion. Residents also mentioned adding a farmer's market, community center, historical markers, safety measures, and more. Lockwood's people understand that ideas about change can connect community and spaces. Mr. Dennis says,

I want to point out that the definition [of gentrification] fits the coined phase, but the things that curve the negative aspects are often missed. The onset is cause by defunding communities and removing or alienating them from resources. To curve this you just have to bring back the hope and demand resources, even if you have to create them yourself...Lockwood is still in a bubble of sorts that will eventually burst (I hope not), but external forces continue to build (taxes, desire to relocated closer to downtown, property values, etc). This is where the strategy came into play, that's a longer conversation and a committed sacrifice.

He concludes his comments on a draft of this paper with the question, "will we ever get gentrification right? Why has it not happened so far? Is it possible for all parties involved to be considered winners (happy with the results)?"

Discussion

The collected data showed that community interactions and physical space have a powerful connection in Lockwood. As property values grew and new residents moved in, many spaces for community interactions, like front porches and backyards, were obstructed or destroyed. These informal community building spaces are incredibly important to Lockwood's residents and their loss is significant. While it is hard to exactly determine if these social and physical structures suffered due to rising costs, it seems likely. Residents described many of these changes occurring around the same time property values began to rise (Legget, 2014). The loss of community

building space was at least an indicator and perhaps an accelerator of social change. Researching neighborhoods experiencing similar change could give additional information on the relationship between these factors.

Yet ideas about change also connect spaces and communities. Many of Lockwood's homeowners chose to preserve and expand the neighborhood's space for community interaction. Although there are several individual examples, most of this effort can be traced back to Mr. Chris Dennis and Community Dream Builders. The Lockwood Legend's house demonstrated that spaces for community interactions can be rebuilt in Lockwood. The spirit of Lockwood's previous community clearly lived on in these initiatives.

Kennedy and Leonard (2001) argued that residents and developers should spend "more time developing strategies to avert or address the adverse consequences of gentrification, and less time opposing or supporting the market-driven process itself" (p.3). Lockwood's people are clearly working to do just that. The more we can understand gentrification, the easier it will be to address. But gentrification is more than a buzzword; it's a complicated process with different consequences in each unique environment where it occurs, as Mr. Dennis suggests above. Lockwood residents demonstrated this by frequently contradicting conventional gentrification narratives. Some long-term residents appreciated and benefited from the changes associated with increasing property values. Meanwhile, several new residents worked to preserve and not destroy the identity of a community they just joined. They showed that this type of community change should be further studied, particularly in neighborhoods with unique circumstances like Lockwood. More importantly, Lockwood's members showed the value of firsthand accounts in this kind of research. If we want to properly address the consequences of gentrification, we have to understand the perspective of the people who experienced it.

Lockwood residents have already discovered effective strategies to address the negative

consequences of their growth. Community Dream Builders found opportunities to build community in the neighborhood through projects that echo Lockwood's collaborative past. I hope that work can continue. Many of Lockwood's residents also suggested a more formal solution: building a public park in the neighborhood. Lockwood residents deserve a park or similar community space to recover some of what was lost due to recent development. Community building space is an incredibly important part of Lockwood's past and future: it should be preserved and protected in all of its forms as the neighborhood grows.

Mr. Dennis claimed that communities that lacked resources were prime targets for gentrification. Surrounded by busy roads and industry, Lockwood has certainly struggled to access important resources in the past, but things are changing. He also identified another factor that creates opportunities within changing communities: hope. Through initiatives like the Lockwood Legend's art facility, residents are finding exciting ways to "bring back hope and demand resources." If Lockwood's people continue working together to build community, the neighborhood's future looks bright.

Acknowledgments

This research benefited from the meaningful contributions of several individuals. Dr. Nicole Peterson and several students conducted and analyzed over twenty hours of interviews that this paper examined, including Jessica Allison, Brittany Andrade, Ella Andrews, Rocío Arguijo, Lauren Ballard, Quinn Barnette, Tamunosaki Bilaye-benibo, Nicolas Bowers, Tee Brooks, Curtis Chance, Julia Delaney, Amanda Drake, Nasim Fekrat, Daniel Fogal, Adam Hasian, Ebony Hill, Jordan Hughbanks, Dat Huynh, Alyssa Jerome, Ronald Lacey, Leslie Mackie, Hadley Mason, Keshawn Matthews, Sydney Mattison, Jakia McCray, Phetrasy Phiansin, Juan Rico, Sierra Royalty, Maria Saleeva, Brad Sozanski, Jasmine Strickland, Carolina Helena Timoteo de Oliveira, Carita Westbrook, and Christin Wolf. Giselle Cruz-Pena also served as an important researcher

on the project. Mr. Chris Dennis and Community Dream Builders provided support and feedback at each stage of the project, as did Theresa McCormick-Dunlap. Dr. Tom Hanchett also gave a variety of valuable historical context and advice. Without their contributions, this project would not have been possible.

REFERENCES

- Chemtob, D. (2020, November 19). A Park on Top of I-277? Here are the Proposals to Reshape Charlotte's Center City. *The Charlotte Observer*. <https://www.charlotteobserver.com/news/business/development/article247264804.html>
- Freeman, L. (2016). Commentary: 21st Century Gentrification. *Cityscape*, 18(3), 163-168.
- Glass, R. (1964). Aspects of Change. In J. Brown-Saracino, *The gentrification debates: A reader*, 19-29. Taylor & Francis Group.
- Kennedy, M., & Leonard, P. (2001). *Dealing with Neighborhood Change: A Primer on Gentrification and Policy Choices*. The Brookings Institution Center on Urban and Metropolitan Policy.
- Lambert, L. (2019, April 15). America's 10 Fastest-Gentrifying Neighborhoods. *Realtor.com*. <https://bit.ly/3xHgjHh>
- Legget, P. (2014, June 14). A North End Charlotte Neighborhood Thinks Big. *The Charlotte Observer*. <https://www.charlotteobserver.com/article9133535.html>
- Mayer, S. V. (2019). *Designation Report on the Butler House*. Charlotte Landmarks Commission. <http://landmarkscommission.org/wp-content/uploads/2020/06/Butler-House-Designation-Report.pdf>
- Powell, H. (2018, August 23). Community Paints Mural to Remind Motorists to 'Drive Like Your Children Live Here.' *Spectrum News*. <https://spectrumlocalnews.com/nc/charlotte/news/2018/08/23/new-traffic-calming-murals-reminds-drivers-to-slow-down>
- Rao, S. (2020, July 24). Two Early 20th Century Buildings in Camp North End Area are Now Historic Landmarks. *The Charlotte Observer*. <https://www.charlotteobserver.com/news/business/article244241257.html>

REFERENCES

- Saile, D. (1986). *Architecture in cultural change: essays in built form & culture research*. School of Architecture and Urban Design, University of Kansas.
- Sumka, H. (1979). Neighborhood Revitalization and Displacement A Review of the Evidence. *Journal of the American Planning Association*, 45(4), 480–487.
- Thill, J., & Yonto, D. (2020). Gentrification in the U.S. New South: Evidence from Two Types of African American Communities in Charlotte. *Cities*, 97, 1-10.
- Thornberg, R., & Charmaz, K. (2014). Grounded theory and theoretical coding. *The SAGE hand book of qualitative data analysis*, 5, 153-69.
- Wright, G. (1981). *Building the dream: a social history of housing in America* (1st ed.). Pantheon Books.

UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE UNDERGRADUATE RESEARCH JOURNAL

The University of North Carolina at Charlotte Undergraduate Research Journal was established through the Office of Undergraduate Research. The publication of the journal is a year-long process that is possible through the efforts of volunteer reviewers, contributing student authors, and editors.

UNCCURJ | ISSUE 1 | <https://our.charlotte.edu>



The Office of Undergraduate Research
Atkins 237 (Area 49)
9201 University City Blvd. | Charlotte, NC 28223
undergradresearch@uncc.edu | (704) 687-5316