The Effects of Racialization on Skeletal Manifestations of Disease Among Migrants in Historic ST. Louis, Missouri

Kristina M. Zarenko

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THE EFFECTS OF RACIALIZATION ON SKELETAL MANIFESTATIONS OF DISEASE AMONG MIGRANTS IN HISTORIC ST. LOUIS, MISSOURI

by

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DEDICATION

For VAM
Semper Gumby!

For those who rest in the Terry Collection
May your voices continue to be heard
ACKNOWLEDGEMENTS

There are many people that have made this achievement possible, and I am thankful for all of them. First and foremost, I would like to extend my deepest appreciation to my family who supported me through all parts of this journey: every milestone, triumph, setback, and move. No matter how far I traveled, you were always with me.

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Dr. David Hunt and the Smithsonian Institution allowed research access to and photography of the Terry Collection over multiple years. Dave was the source of valuable insight into the history, people, and pathologies within.

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ABSTRACT

This research investigates the biological effects of racialization on migrants in late nineteenth and early twentieth century St. Louis, Missouri. Racialization is a form of structural violence in which real or perceived physical differences contribute to the creation of hierarchical racial categories along a continuum of whiteness. German and Irish immigrants and African American migrants from the South came to St. Louis in search of economic prosperity and in an attempt to escape poverty, famine, or conflict in their places of origin. However, racialization affected each migrant group’s access to housing and employment as well as their exposure to violence. These variable experiences with inequality and discrimination likely effected the prevalence of skeletal manifestations of pathology both among the migrant groups and between Missouri-born and migrant groups based on their position along the continuum of whiteness. Hypotheses were tested through skeletal observations of trauma, tuberculosis, vitamin D deficiency, and dental disease and disruption in a sample of 433 individuals from the Robert J. Terry Anatomical Skeletal Collection. Using a biocultural approach, data were contextualized in their historical environment to better understand the ways that intersectional identity exposed migrant and Missouri-born groups to structural violence. This research demonstrates that low socioeconomic status exposed all individuals to an increased risk of disease, but social mechanisms related to racialization contributed to additional adverse experiences that resulted in differential pathological outcomes.
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CHAPTER 1

INTRODUCTION

This dissertation investigates the biological effects of racialization and structural
time violence among German, Irish, and African American migrants to St. Louis, Missouri,
through analyzing skeletal indicators of tuberculosis, trauma, vitamin D deficiency (both
adults-onset osteomalacia and residual rickets), and dental disease and disruption,
collectively referred to henceforth as skeletal indicators of pathology, in the Robert J.
Terry Anatomical Skeletal Collection. The Terry Collection is a skeletal series comprised
of low socioeconomic status (SES) individuals from nineteenth and twentieth century St.
Louis who embodied poverty, inequality, and discrimination during life and after death
Pearlstein 2015; Muller et al. 2017). These forms of normalized social oppression
affected the people in the Terry Collection so deeply that they caused observable diseases
in the individuals’ skeletal remains (de la Cova 2010, 2019; Galtung 1969; Farmer 2004;
Klaus 2012; Nystrom 2014, 2017). Furthermore, sociocultural perceptions of race and
fitness of in-migrant groups likely varied their experiences and resulted in different
disease outcomes, especially when compared to native-born St. Louisans of a similar
SES.

In order to investigate the social mechanisms that influenced disease prevalence
among migrant groups, we must place skeletal observations of pathology within a
historical context. Increasing urbanization, westward expansion, migration, and
Industrialization made the late nineteenth to early twentieth centuries in the United States a tumultuous period of transformation. These changes effected the entire country but can be seen in specific cities as well. St. Louis, Missouri, nicknamed the “gateway” city, was a hub for many of the major population movements that occurred during the 1800s and 1900s. Its location on the confluence of the Mississippi and Missouri Rivers and its status as a large industrial city provided both an economic advantage for industry and trade and a route for travel (Troen and Holt 1977; Sandweiss 2003).

Many migrants’ goals of economic prosperity and a better life made St. Louis a desirable destination (Primm 1998; Troen and Holt 1977). German and Irish immigrants came to the city in large numbers fleeing famine and conflict in their home countries; these two groups would eventually make up approximately one-third of St. Louis’ population from the late nineteenth century through the 1930s (Detjen 1985; Faherty 2001; Kenny 2000; Pearlstein 2015). Over 1.5 million African Americans from the South traveled northward and westward immediately post-Reconstruction and during the Great Migration. They moved in search of freedom and economic opportunity (Jack 2007; Harris 2012; de la Cova 2014). The majority of European and African American migrants arrived at in St. Louis in severe poverty and poor health (Harris 2012).

Despite aspirations, the Gateway City was not without problems for new residents. The pervasive nature of factors like industrial pollution and inadequate sanitation infrastructure that could induce biological stress and disease made life in historic St. Louis potentially hazardous for all residents. Low SES city residents, which were most individuals in the Terry Collection, were exposed to additional risks and diseases based on their social status (Bernabe et al. 2009; Elani et al 2012; Goodman and
Leatherman 1998; Leatherman and Goodman 1997; Hunt and Albanese 2005; Roberts 2012). The majority of St. Louis’ poorest residents were unskilled laborers that participated in manual or factory work. Long hours and unsafe conditions contributed to workplace accidents that maimed or killed. Low wages limited the available housing options (Gottlieb 1991; Primm 1998; Kamphoefner 2003). Housing shortages plus severe overcrowding during the city’s rapid population growth increased the risk of contracting tuberculosis because of its airborne mode of transmission (de la Cova 2011, 2014; Primm 1998; Roberts 2012; Roberts and Buikstra 2003).

Newly settled migrants faced a multitude of challenges that often stemmed from systemic inequality based on perceptions of their race. Levels of discrimination, exclusion or inclusion in the job market, access to housing, and more were influenced by the degree to which migrants were perceived as being white or non-white. Inequality based on such racialization could be embodied as poor health outcomes and increased risk of disease (Farmer 2004; Klaus 2012).

1.1 Racialization and Risk of Disease

Race is a cultural construct whose boundaries change through time rather than a biological reality. Racial categories are based on phenotypic characteristics indicative of biological ancestry and are grouped according to socially created categories that are assigned cultural meaning. Though it is a construct, race has real biological effects and contributes to inequalities in health (Jacobson 1999; Gravelee 2009; Silverstein 2005). An individual’s perceived or socially assigned race affects their place within the social hierarchy and therefore their quality of life, access to resources, health outcomes, treatment (Bauer 2014; Briggs and Mantini-Briggs 2004; Orser 2007).
Racialization is a form of structural violence in which real or perceived physical differences contribute to the creation of racial categories. Racialization is not synonymous with racism, but the two concepts are often closely linked. When the elites’ hegemonic systems of classification categorize people, those placements translate into different experiences of prejudice and inequality (Fassin 2011; Jacobson 1999; Orser 2007). Part of the racialization process involves being socially ranked on a “continuum of whiteness”, on which the categories of “white” and “non-white” are opposed. Anyone who did not fit into one of those two categories fell somewhere in the middle as an “Other” (Orser 2007).

In the United States, African Americans were placed on the extreme non-white end of the continuum due to beliefs about social and biological inferiority (Graff 2014; Grossman 1989; Roberts 2009). During the nineteenth and twentieth centuries in the United States, there was not a homogeneous view of white Americans or white immigrants that placed everyone in either group on the same level. Whiteness was primarily reserved for U.S.-born Euro-Americans. Accordingly, this group faced the least number of barriers. Foreign-born Europeans could be ranked as white Others to differing degrees. (Jacobson 1999; Orser 2007; Pearlstein 2015).

In the context of historic St. Louis, African American migrants, European immigrants, and Missouri natives were racialized and placed according to the continuum, which affected their daily lives. Hierarchical racialization differentially distributed everyday experiences with discrimination, violence, and structural inequality. Disparities in hiring practices, income, housing availability, and exposure to violence affected quality of life. For example, African Americans, whether native to Missouri or from the
South, were placed at the bottom of the social hierarchy, which subjected them to immense discrimination (Jacobson 1999; Orser 2007; Pearlstein 2015). The amount of inequality they endured manifested as negative health outcomes. As a result, African Americans in St. Louis had a lower life expectancy and almost double the death rate than Euro-Americans (Judson 2012; Mangold 1917).

1.2 Marginalization, Anatomization, and the History of Dissection

To study the Terry Collection is to also explore the history of anatomy and its interconnection with attitudes about marginalized populations because postmortem treatment of the dead reflects their identity during life (de la Cova In Press; Pérez 2012). These people and the implications of society’s perceptions of them are the focus of this dissertation, thus it is important to not only understand the history in which they lived but also the circumstances that led to their current place in an anatomical skeletal collection. The Terry Collection is composed almost completely of low SES individuals whose bodies were not claimed from the local morgue after death. Rather than use taxpayer money to bury them in a pauper’s grave, the state sent them to Washington University Medical School to be used as cadavers in anatomical instruction (Hunt and Albanese 2005). The use of almost exclusively poor and marginalized individuals in medical education indicates the entrenched societal and legal inequalities present in the nineteenth and over half of the twentieth centuries (Nystrom 2014).

The origins of the Terry Collection are intimately tied to the history of anatomical dissection in the United States, which developed on a similar path to the United Kingdom (Richardson 2001; Sappol 2002). The discipline of anatomy in both countries was initially related with punishment of criminals (Nystrom 2014; Richardson 2001; Sappol
2002). In Britain, the horror of and aversion to anatomical dissection was due to a combination of folkloric beliefs about the deceased’s soul, religious concerns about the afterlife, and shame because of the long association of dissection with postmortem punishment for executed murderers (Chamberlain 2012; Hildebrandt 2008; Richardson 2001). Thus, dissection was related to violation, transgression, and capital punishment (Nystrom 2014; Richardson 2001; Sappol 2002).

The 1832 Anatomy Act in England outlawed dissection of condemned murderers in favor of unclaimed bodies of the poor derived from public hospitals, poorhouses, and workhouses (Boston and Webb 2012; Chamberlain 2012; MacDonald 2016; Richardson 2001). The punishment of the poor in an increasingly democratic system was enabled through their “Othering” by key middle-class groups, like doctors and medical students, who saw impoverished and non-white bodies as different from their own, cementing social stratification (Crossland 2009; de la Cova In Press; Martin 2016; Nystrom 2011, 2014, 2017; Sappol 2002). The poor were also constructed as usable commodities to the state through anatomy act legislation (Martin 2016; Sharp 2000). The law instituted a perspective shift where dissection was seen as a redemption instead of a punishment (Pearlstein 2015); the poor who received public aid during life could repay their debt to society postmortem (Nystrom 2014). The denial of a burial, a respectful practice afforded to the rest of society, in favor of dissection saved the taxpayers money and also benefited the broader community by contributing to the advancement of medicine (MacDonald 2016; Nystrom 2014; Sappol 2002; Sofaer 2006).

Only those who were unclaimed, or, much later, wished to donate their bodies for dissection, were supposed to be used, but the high demand for anatomical instruction
meant that families’ claims and decedents wishes to be interred without disruption were frequently overlooked (MacDonald 2009). Additionally, remains were supposed to be decently interred after dissection according to the law, but a proper burial did not always occur. Instead remains were often commingled with others, operating theater waste, and animal parts before burial in unconsecrated ground or unmarked graves (Crossland 2009; Hodge et al. 2017; MacDonald 2009, 2016; Nystrom 2017).

While laws that prohibited grave robbing in the U.S. date back to 1789, the practice continued even after states began instituting anatomy laws allocating the bodies of the unclaimed poor and indigent to medical schools (Sappol 2002; Muller et al. 2017). The first American anatomy act that allotted bodies of the impoverished to medical schools passed in 1831 in Massachusetts but applied only to Boston (Sappol 2002). Anatomy acts were put in place throughout much of America in the following decades, primarily in response to an increased demand for cadavers in medical schools. The uptick was a result of increasing scientific thought, a growing number of medical schools, and competition between schools and regions to draw students (Sappol 2002). Additionally, medical students were more likely to study at a school that could offer dissection-based anatomy courses (Sappol 2002).

Anatomical legislation in the U.S. featured race more centrally than in Britain. In the nineteenth century, anatomy acts targeted racialized minorities, especially those who lived in poverty. African Americans, immigrants, and Native Americans, in addition to the poor, were exploited by medical professionals and targeted as sources of cadavers for dissection through grave robbing and later legislation (Blakely and Harrington 1997; Davis 2017; DeWitte 2015; Halperin 2007; Nystrom 2014, 2017; Sappol 2002; Savitt
1982, 2007). The bodies of lower-class white Americans – poor, transient, and indigent – and European immigrants were also sent to medical schools (Savitt 1982). Those who were dissected were sometimes donated or sold, as was the case of enslaved African Americans (Savitt 1982). Others were unclaimed due to the distance they migrated, lack of living relatives, or other circumstances. More commonly, however, the families were present but too poor to pay for burial, if efforts were made to notify them at all (Sappol 2002). Though some states enacted willed body donation laws earlier, the Uniform Anatomical Gift Act became the dominant legislation in 1968 (Muller et al. 2017; Quigley 2001). However, anatomy acts remain in place in many states (e.g. Bernstein 2016a; Friesen 2009; North Carolina General Assembly 2018a, 2018b).

Anatomical legislation that targeted the poor and the Other denied mortuary rituals not only to the deceased but also to their community, thereby weakening social networks and reinforcing societal stratification. As in Britain, the legal statutes shifted the perspective from the poor as people to the poor as commodities that could make their contributions to society postmortem by serving as “specimens” for the education of society’s elite (Hodge et al. 2017; MacDonald 2016; Nystrom 2014, 2017; Pearlstein 2015; Richardson 2001; Sappol 2002; Sofaer 2006). The process of stripping these people of flesh and dignity for the purposes of curation was dehumanizing. The individuals in the Terry Collection, therefore, embody racialized identity, discrimination, and other forms of structural violence that were formalized by anatomy acts. They were marginalized during life and silenced after death.

Historical literature is often written from the perspective of those with economic, political, or social power, and, as such, commits erasure as often as it provides
information. Likewise, as much as bioarchaeological research techniques glean information about the past, they can also anonymize the samples they are applied to, turning people into numbers, measurements, pathologies, and p-values (Hosek and Robb 2019; Knudson and Stojanwoski 2008; Pearlstein 2015; Watkins and Muller 2015). It is important not to lose the humanity of the skeletal remains we study in the sea of data and statistical analyses. The aims of work with anatomical skeletal collections, and bioarchaeological research in general, should be about contextualizing disease and trauma data in a way that brings nuance and meaning to patterns and returning personhood to the silenced (de la Cova 2010, 2011, 2014, 2019; Blakely and Harrington 1997; Muller et al. 2017; Nystrom 2017; Pearlstein 2015). For this reason, anyone working with the collection should acknowledge its history and its relation to changes in the ethics of anthropology over time. Researchers must be aware of their privileged role in the production of scientific knowledge from the skeletal remains of these marginalized people and seek to rehumanize the Othered through their work (de la Cova 2019; Muller et al. 2017; Pearlstein 2015).

1.3 Aims of the Dissertation and Relationship to Existing Literature

This dissertation belongs to a subset of research that focuses on reconstructing lifeways from documented anatomical skeletal collections (de la Cova 2010, 2011, 2014, 2019; Muller et al. 2017; Pearlstein 2015; Watkins 2003, 2012; Watkins and Muller 2015). The Terry Collection is one of only a few documented historical anatomical collections within the United States, the others being the George S. Huntington Collection at the Smithsonian Institution, the Hamann-Todd Human Osteological Collection at the Cleveland Natural History Museum in Cleveland, Ohio, and the W.

Documented skeletal remains, which may also include those from historic or institutional burial grounds, have varying degrees of associated documentation. Related records provide more information than can be assessed only from skeletal remains, thus they are an important asset to research that seeks a more nuanced understanding of the relationships between population structure, power dynamics, SES, and health (Herring and Swedlund 2003; Mant and Holland 2016; Martin et al. 2012; Walker 1995; Watkins and Muller 2015). Therefore, this dissertation contextualizes skeletal analyses along with collection documents within the history of African American migrants and European immigrants in St. Louis. Situating the results as such provides insight into the combined consequences of social, biological, political, and economic factors that marginalized residents of the Gateway City (Leatherman and Goodman 1997; Rankin-Hill 1997; Wiley and Cullin 2016).

The primary question of this dissertation research is how racialization along the continuum of whiteness produced biological consequences for European immigrants, African American migrants, and U.S.-born Missourians in St. Louis. Despite a common SES at time of death, differences in racialization likely affected health outcomes among groups with different areas of origin (the country or region of the U.S. that individuals
resided in before (im)migration). These outcomes are assessed through the prevalence of trauma, tuberculosis, vitamin D deficiency, and dental disease and disruption in a sample of 433 individuals from the Terry Collection. If low SES had a larger influence on the migrant groups than racialization, then these six pathological indicators are expected to be equally distributed among migrant and native groups. Based on a historical understanding of the time period as well as disparities that persist to this day (CDC 2012:177; CDC 2017), the following hypotheses lay out the findings predicted for this study.

**Hypothesis 1:** African American individuals will have a higher frequency of all skeletal pathological indicators than any other group in this sample. African Americans will have the highest prevalence of all pathological indicators – tuberculosis, trauma, vitamin D deficiency, and dental disease and disruption – because they have experienced the most discrimination and inequality due to their marginalization at the extreme non-white end of the continuum, which affects access to jobs, higher quality housing, and adequate nutrition. Furthermore, they will be at a higher risk of developing vitamin D deficiency rickets and osteomalacia due to darker skin pigmentation (Åkeson et al. 2016; Chaplin and Jablonski 2013; Clemens et al. 1982; Holick and Chen 2008; Jablonski and Chaplin 2012).

**Hypothesis 1.1:** African American migrants from the South will have a higher frequency of skeletal pathological indicators than African Americans born in Missouri. Individuals from both regions of origin experienced enslavement, Jim Crow laws that enforced segregation
between Blacks and whites, and violence. However, migrants from the South also experienced the stresses of the Great Migration and were marginalized within the St. Louis African American community over cultural differences and economic competition. The additional migration and marginalization factors exposed them to higher risks of trauma and disease.

- **Hypothesis 2**: European immigrants from Germany and Ireland will have lower frequencies of skeletal pathological indicators than African Americans but more than Euro-American Missourians. As northern Europeans, German and Irish immigrants were placed higher on the continuum than African Americans. However, these two groups were racialized separately, therefore, they are expected to have differences in skeletal manifestations of diseases

- **Hypothesis 2.1**: Irish immigrants will show higher levels of skeletal pathological indicators than German immigrants. Irish immigrants were primarily Catholic, which resulted in social marginalization in a predominantly Protestant American society (Ignatiev 1995; Jacobson 1999; Kenny 2000; Pearlstein 2015). The majority of German immigrants were Protestant, allowing for religious assimilation with the majority of the United States (Conolly-Smith 2004; Ignatiev 1995; Kenny 2000; Pearlstein 2015). Additionally, Irish immigrants were significantly worse off financially than German immigrants, often arriving in the U.S. and St. Louis with little to no specialized job skills or economic capital because of the severe famine in Ireland (Halloran
Finally, Germans were stereotyped more favorably than Irish immigrants, which accompanied differential economic mobility (Kenny 2000; Luebke 1990).

- **Hypothesis 3**: Native-born Euro-American Missourians will have the lowest levels of skeletal pathological indicators. Native-born Euro-American St. Louisans will have the lowest frequency of diseases in comparison to the migrant groups because they are placed highest on the continuum of whiteness and therefore did not have to face the same discrimination or restrictions leveraged at other groups.

1.3.1 Literature Review

The research focus of this dissertation, the effects of racialization on skeletal manifestations of disease in migrants to historic St. Louis, is not currently well addressed, although the historical literature has information about these population movements’ origins, destinations, groups, and motivations involved (Dieter 1983; Faherty 2001; Jack 2007; Kamphoefner 2003; Kenny 2000; Luebhke 1990; Troen and Holt 1977). Little information in the historical literature exists that explores the influence intersections of migration status and racialization had on stress and disease. The paleopathological and bioarchaeological scholarship that addresses European immigration to America or African American migration within the U.S. through documented skeletal collections usually only investigates one group at a time (Watkins 2003, 2012; de la Cova 2010, 2011, 2014; Pearlstein 2015). Works that compare these groups treat all Black or white individuals as one homogenous group (de la Cova 2010, 2011, 2014; Pearlstein 2015; Steckel and Rose 2002). Therefore, this dissertation research is important because it
presents a biohistorical narrative addressing the skeletal indicators of pathology and the unique experiences of Irish and German immigrants, African American migrants, and Missouri-born Euro-Americans and African Americans of the Gateway City. Adding to the body of anthropological literature in this way will facilitate a deeper understanding of the biocultural effects of social marginalization and (im)migration in history.

By addressing each migrant group individually, this study seeks to understand the multi-factorial association between racialization, social status, and disease. As such, this research contributes to broader trends in the realms of anthropology, bioarchaeology, and paleopathology. The biocultural framework used in this study situates skeletal indicators of disease within the sociocultural and environmental context of nineteenth and twentieth century St. Louis (Agarwal and Glencross 2011; Goodman and Leatherman 1998; Goodman et al. 1984; Knudson and Stojanowski 2008; Martin et al. 2013). Therefore, this work is built upon research that connects skeletal observations with interpretations of health, disease, population structure, social dynamics, and environment (Buikstra and Beck 2006; Cohen and Armelagos 1984; Larsen 2015; Roberts and Manchester 2005; Steckel and Rose 2002). The rapidly-growing, densely-populated, urban setting of historic St. Louis makes studies of health, environment, and population changes that accompanied urbanization and industrialization particularly relevant (Newman and Gowland 2017; Schell 2010; Steckel 2009; Steckel and Rose 2002; Tegtmeyer and Martin 2017; Zuckerman 2014) as well as the effects of social status and SES (Anroman 2014; de la Cova 2010, 2011, 2014; Leatherman and Goodman 1997; Pearlstein 2015; Schell 2014; Watkins 2003, 2012).
The work of this dissertation builds upon temporally comparable scholarship in
three areas: African American biohistory (Angel et al. 1987; Blakey 2001; Blakey and
Rankin-Hill 2009; Davidson et al. 2002; Kelley and Angel 1987; Nystrom 2013; Owsley
et al. 1987; Rankin-Hill 1997; Rathbun 1987; Rathbun and Steckel 2002), almshouse and
institution cemeteries (Byrnes 2015; Dougherty 2011; Higgins 2003; Higgins et al. 2002;
Milligan 2010; Phillips 2001, 2017), and postmortem anatomical dissection (Blakley and
Harrington 1997; Crossland 2009; de la Cova 2019, In Press; Flies et al. 2017; Halling
and Seidemann 2017; Hodge et al. 2017; Muller et al. 2017; Nystrom 2011, 2014, 2017,
2017a; Novak 2017; Richardson 2001; Sappol 2002). This literature discusses the history
and experiences of the poor and the marginalized in the U.S. and provides a foundation
for the methods and investigations of the hypotheses presented here.

African American biohistory uses multiple sources of skeletal and textual
evidence to understand how enslaved Africans and their descendants adapted and
persisted in response to numerous environmental and social stressors. Blakey (2001)
provides a thorough review of the bioarchaeology of the African Diaspora. Within the
U.S., bioarchaeological analyses have been conducted on samples from cemeteries
(Blakey 2001; Blakey and Rankin-Hill 2009; Davidson et al. 2002; Nystrom 2013;
Rankin-Hill 1997; Rathbun and Steckel 2002) and anatomical skeletal collections (de la
demographic structure of enslaved individuals in Harris County, Texas using the 1850
and 1860 census records. Some work highlights the heterogeneous nature of the African
Diaspora, indicating differences between individuals born in Africa and those born in

A large part of the research in the realm of African American biohistory has focused on determinations of health and quality of life from evidence of skeletal pathology and stress (Rose and Rathbun 1987). Though African Americans were a marginalized group throughout history, specifics of time, place, and origin affected experiences that may be read from their skeletons. Owsley et al. (1987) investigated the skeletal remains of 26 individuals, both adults and children, in a colonial-era New Orleans cemetery. The cemetery was used for burial of both white citizens of the city and enslaved individuals of African ancestry. The authors interpreted differential distribution of patterns of arthritic change and bone hypertrophy as evidence of occupational differences among enslaved peoples in an urban setting compared to a rural one. Additionally, dental caries and antemortem tooth loss were high in this sample, suggesting a cariogenic diet high in corn meal, fine flour, and molasses (Owsley et al. 1987). Rathbun (1987) examined the remains of enslaved African Americans from a late nineteenth century South Carolina plantation cemetery. The South Carolina sample had high incidences of linear enamel hypoplasia and evidence of infection. Additionally, females were living longer than males, and skeletal changes that Rathbun related with demanding physical labor associated with enslavement were found in all individuals (Rathbun 1987).

Rathbun and Steckel (2002) compared the health of enslaved and free individuals of African ancestry in the nineteenth century. Based on their results, the authors claim that free Blacks from Philadelphia were in relatively better “health” than the enslaved
samples from South Carolina. The authors attributed this difference to the early nineteenth century time period, which occurred before discrimination, immigration, and industrialization increased in urban areas, and social networks, such as churches, that aided in buffering stress (Rathbun and Steckel 2002). Nystrom (2013) and Angel et al. (1987) also studied free Blacks from the Newburgh Colored Burial Ground and the First African Baptist Church in Philadelphia, respectively. Nystrom (2013) attributed his findings of dental health comparable to that of upper-class whites to political and social changes. Those changes, associated with the Industrial Revolution, brought better opportunities to African Americans (Nystrom 2013).

Angel et al. (1987) found that the stresses of urban living disproportionately affected females as evidenced by their lower average age at death compared to males in the sample. Only small differences were observed between the First African Baptist Church sample and that of enslaved individuals from Catoctin Furnace, Maryland, which the authors interpret as conditions only marginally improving for free African Americans in the antebellum period (Angel et al. 1987). The Catoctin Furnace sample was also used by Kelley and Angel (1987) in their comparison of life stresses in skeletal samples from the eighteenth, nineteenth, and twentieth centuries. The authors emphasize the environment as a determinant of health, which may explain why results do not indicate linear change through time in any of the skeletal markers observed (Kelley and Angel 1987).

Instead of comparing free and enslaved individuals, Davidson et al. (2002) studied urban and rural African American populations. Skeletal remains from the Freedman’s Cemetery in urban Dallas, Texas, and Cedar Grove Cemetery in rural
southwest Arkansas were examined. Overall, health was similar across both samples, with evidence of stress increasing through time, especially in Dallas, due to increasing industrialization and urbanization outpacing city infrastructure. A high frequency of periosteal lesions on the visceral ribs were present and reflect that tuberculosis was the leading cause of death for African Americans at the turn of the century (Rose and Hartnady 1991; Davidson et al. 2002). An analysis of cortical bone maintenance in the sample from Cedar Grove Cemetery revealed low cortical area percentage, high rates of resorption to formation, and poor calcium homeostasis in both males and females. These findings were not related to age, indicating that the African Americans in this sample experienced heavy nutritional and disease-related stress in the post-Reconstruction period (Martin et al 1987).

The second area of investigation into marginalization as well as poverty that this dissertation builds upon concerns almshouses and poorhouses. Research utilizing these remains combine their analyses with historical records to illuminate the variable effects of poverty and buffering factors among low SES groups who entered these institutions. Work on poorhouse and almshouse skeletal remains has been done on nineteenth century institutions in New York state (Byrnes 2015; Higgins 2003; Higgins et al. 2002; Phillips 2001, 2017), an almshouse in Washington D.C. (Watkins 2003, 2012), and the Milwaukee County Institution cemetery (Dougherty 2011; Milligan 2010). These studies focus on the health and conditions faced by almshouse or asylum residents, who were often the most impoverished and vulnerable members of society.

Investigating skeletal remains associated with the Oneida County Asylum, Phillips (2001) describes the biomechanical consequences of labor therapy offered at the
asylum. Able-bodied inmates were pushed to do extreme physical labor that continued throughout their entire lifespan and resulted in fractures and other forms of skeletal trauma. Disabled inmates who could not participate in labor therapy had shorter lives, poor oral health, and more chronic infections compared to other inmates (Philips 2017).

Byrnes (2015) studied disability and care by assigning levels of physical impairment to individuals from the Erie County Poorhouse, over half of whom were immigrants. Males had more severe impairments than females and ratings of physical disabilities increased in older age groups (Byrnes 2015).

Work on the Monroe County Almshouse from Rochester, New York, by Higgins et al. (2002) and Higgins (2003) found that adults in the sample, many of whom were European immigrants, had relatively stress-free childhoods, as indicated by a lack of growth stunting and low linear enamel hypoplasia presence. The urban environment and unsanitary conditions of the almshouse made them susceptible to infectious disease (Higgins et al. 2002). Those same city and almshouse conditions had an even greater influence on the subadults in the sample, causing high levels of morbidity and mortality (Higgins 2003). An urban setting also affected the individuals in the Milwaukee County Institution Grounds Cemetery, who faced increased risk of injury through the upsurge of mechanization that accompanied industrialization as well as interpersonal violence (Dougherty 2011). Despite the known health risks that increase with urbanization, Milligan (2010) described these individuals as healthier when compared to contemporaneous samples, attributing her results to public health reforms that took place in Milwaukee during their lifetime.
Watkins (2003) utilized the Cobb Collection to investigate patterns of arthritic change among African Americans in Washington, D.C.’s neighborhoods and the city almshouse during the late nineteenth and early twentieth century. The results indicated only nuanced differences between almshouse residents and the general population, though almshouse residents were generally seen as the most impoverished portion of the population. Similar results were found in Watkins’ (2012) study focusing on degenerative joint disease, trauma, and cause of death between samples from these two groups. A variety of factors influenced differences in the social context and well-being of groups that may be perceived as homogenous; in this case, low SES African Americans in D.C. Factors included migration, poverty gradients, and local conditions (Watkins 2012).

With the exception of the Washington, D.C. studies, the above-discussed institutions housed overwhelmingly Euro-American and European immigrant individuals (Byrnes 2015; Diner 1983; Pearlstein 2015). The majority of research concerning such establishments has not explored the nuances between ethnic groups. Instead, most studies treated almshouse residents as a homogenous group of white individuals, when many were foreign-born immigrants in addition to native-born Euro-Americans. A similar trend of homogenizing occurs in literature utilizing anatomical skeletal collections. Recognizing nuances within groups is critical in more accurately investigating the sociocultural influences on disease and violence exposure. The intersections of identity layers, such as SES, migration status, or ethnicity, affect racialization and marginalization, which in turn differentially effected lived experiences.

In her research on the George S Huntington Collection, Pearlstein (2015) does take ethnic variation into account by utilizing racialization to consider differential
experiences among immigrant groups. She analyzed the experiences of late nineteenth and early twentieth century German, Irish, and Italian immigrants to New York City within this anatomical skeletal collection. She found that, contrary to expectation, native-born U.S. citizens had higher frequencies of all pathologies except lytic lesions than the immigrant groups (Pearlstein 2015).

In comparing nineteenth and twentieth century Euro-American and African American males from the Terry Collection, the Hamann-Todd Osteological Collection, and the Cobb Collection for patterns of trauma and disease, de la Cova (2010) found that trauma patterns between these groups differed. Tensions between ethnic groups over employment competition associated with the Great Migration related to patterns of injuries in African Americans. Euro-American fracture patterns stemmed from cultural practices like boxing and fighting in saloons (de la Cova 2010). De la Cova (2011) additionally found that African American males had a higher frequency of infectious diseases than Euro-American males from the same data. These results were attributed to the Great Migration, during which large numbers of African Americans moved to densely populated urban areas with poor housing during and after Reconstruction (de la Cova 2011). Furthermore, Omran’s model (Omran 1971) – stating that disease patterns would transition from infectious to degenerative illnesses as the primary forms of morbidity and mortality – was not experienced by Reconstruction-born African Americans at the same time as the rest of the U.S. The delay was due to combined experiences of migration, low SES, and marginalization (de la Cova 2014).

The bioarchaeology of dissection, which was introduced in a prior section, analyzes evidence of dissection cuts, postmortem articulation hardware, and primary
historical sources to illuminate the demographics of those individuals used in medical
dissection and their treatment in terms of systemic inequality, personhood, and the history
of medicine. While some studies originate from work with museum collections (de la
Cova 2019, In Press; Muller et al. 2017; Muller and Butler 2017; Pearlstein 2015), others
have utilized remains associated with historic medical institutions (Blakley and
Harrington 1997; Davis 2017; Flies et al. 2017; Halling and Seideman 2017; Hodge et
al. 2017; Owsley et al. 2017), church cemetery samples (Novak 2017), and evidence
associated with poorhouses or public cemeteries (Nystrom 2017a; Nystrom et al. 2017).
Many others write about the subject from a historical, pedagogical, or ethical perspective
(e.g. Crossland 2009; DeWitte 2015; Feber and Wilde 2011; Halperin 2007; Hildebrandt
2008, 2016; Jones and Whitaker 2012; Richardson 2001; Sappol 2002; Walker 2000;
Winkelmann and Güldner 2004). Through the use of contextualized and biocultural
approaches, dissected remains provide insight into the construction or destruction of
social identity and the embodiment of social inequality (Nystrom 2017).

1.4 Health and Stress in Skeletal Remains

Health is a complex, difficult to define phenomenon that encompasses multiple
areas of well-being (Brüssow 2013; DeWitte and Stojanowski 2015; Gage and DeWitte
2009; Reitsema and McIlvaine 2014; Temple and Goodman 2014; WHO 2020). The
medical definition of health is the absence of disease (Brüssow 2013; Gage and DeWitte
2009). Health is also sometimes defined as the ability to adequately perform all activities
of daily life (Gage and DeWitte 2009). These two definitions do not always hold true,
especially for observations in skeletal remains. More holistically, the World Health
Organization defines health as “a state of complete physical, mental, and social well-

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being and not merely the absence of disease or infirmity” (WHO 2020). This definition is difficult to conceptualize, operationalize, and study in living and skeletal populations (DeWitte and Stojanowski 2015; Jadad and O’Grady 2008; Temple and Goodman 2014).

Health is relative in addition to being difficult to define. What one individual considers healthy may not be the same for another, or an individual’s self-perception of health and quality of life may not match up with their physiological state. Health status and perceptions of health may be influenced by individual, household, and community factors that mediate the effects of socioeconomic and environmental conditions (Reitsema and McIlvaine 2014).

Skeletal health does not correlate exactly with general health. Few of the areas that constitute health as proposed by the World Health Organization (2003) are visible in or may be inferred from skeletal remains (DeWitte and Stojanowski 2015; Reitsema and McIlvaine 2014; Temple and Goodman 2014). Therefore, reconstructing the health of a population from skeletal remains or comparing the “healthier” nature of one group over another is fraught with difficulty. A proxy for health employed by bioarchaeologists is stress. Stress, defined as a physiological disruption of homeostasis due to external environmental, nutritional, or other pressures, has a more operational definition than health (Mays 2012; Reitsema and McIlvaine 2014; Temple and Goodman 2014). Health and stress are sometimes used interchangeably, but they are not synonymous terms. Skeletal lesions indicate that a physiological disturbance occurred at or over a specific time, but they lack the contextual information for inferring health status (Goodman and Temple 2014). Even in circumstances where historical and demographic information is
available, such as the Terry Collection, there is still inadequate information for assessing health because the majority of the factors that could mediate the influence of SES and the environment are unknowns. It is important to have as much contextual information as possible in order to best describe the synergistic interactions between cultural, environmental, biological, economic, and psychological factors that culminate in the skeletal response when studying indicators of stress (Reitsema and McIlvaine 2014).

Even under ideal circumstances, studying skeletal indicators of stress still has limitations. Samples of deceased individuals are inherently biased. They are comprised of only those individuals that were at greatest risk of death at a given time and birth cohort. The people that die at a given age are likely not representative of the overall living population because they were those with the highest risk of death, or frailty (DeWitte and Stojanowski 2015; Wood et al. 1992; Wright and Yoder 2003). Therefore, the frequency of skeletal stress markers in skeletal samples is likely more than was in the living population, also known as the concept of selective mortality (DeWitte and Stojanowski 2015; Wood et al. 1992). Selective mortality is also predicated on the fact that individuals within a population vary in levels of frailty in both known and unknown ways (DeWitte and Stojanowski 2015; Wood et al. 1992; Wright and Yoder 2003). Bioarchaeologists and paleopathologists can control for sources of heterogeneity in frailty like sex, SES, or social status but not ones that involve inherent biological variation such as genetically or epigenetically controlled functions (DeWitte and Stojanowski 2015).

Additionally, patterns of osseous reactions may refer to an infectious or inflammatory process, but overall only a small percentage of all pathological conditions impact bone. Therefore, many individuals die with no skeletal lesions present because the
pathology only affected soft tissue, or it progressed so rapidly that no skeletal response was possible (Buikstra and Beck 2006; DeWitte and Stojanowski 2015; Goodman and Armelagos 1989; Wood et al. 1992). The presence of skeletal evidence of disease also does not mean that condition was the cause of death.

1.5 Format of the Dissertation

Now that the aims and hypotheses of this dissertation have been introduced, the rest of the dissertation is organized in the following format. Chapter 2 provides a history of St. Louis, focusing on migration and living conditions in the city. The sociocultural and historical context of St. Louis is an integral part of conducting a biocultural study of skeletal remains from the Gateway City.

Chapter 3 describes the biocultural approach and the other theoretical lenses through which this research is framed. The cultural part of the biocultural perspective recognizes that structural violence in the form of systemic oppression results in negative health outcomes through power, access to resources, and economic inequalities in the segments of a population that experience it (Farmer 1996, 2004, 2005; de la Cova 2019; Klaus 2012; Nystrom 2017). Structural violence, a type of indirect violence, is built into social, political, and economic systems and is exerted by everyone in the dominant group to varying degrees against those who are marginalized in some way. Intersectionality theory helps to parse out in what ways the layers of identity and other social factors overlap at the level of individual experience and compound the exposure to structural violence and health disparities. The concept of embodiment acknowledges that environmental conditions, including structural violence, social and personal identity, and racialization, are biologically incorporated into the body. Embodiment is therefore a way
to explain how the adverse circumstances the migrants to St. Louis faced resulted in observable skeletal pathology.

The application of embodiment, structural violence, and intersectionality can also be extended to the process of anatomical dissection. The dead that were involuntarily sent to medical schools for dissection embody society’s disparaging views of the poor and the marginalized (Nystrom 2017; Richardson 2001; Sappol 2002). Migration status, sex, SES, and racialization intersected in axes of disadvantage that heightened the risk of being anatomized after death.

An account of the materials and methods used to conduct research follows the historical context and theoretical approaches. Chapter 4 provides the history of the Terry Collection and describes the demographic composition of the research sample. The chapter also details the procedures used to assess the recorded skeletal indicators of stress and pathology. The final section explains the statistical analysis methods utilized and leads in to Chapter 5, which contains the results of those analyses.

Chapter 6 discusses the study’s findings through the theoretical frameworks introduced in Chapter 3. Contextualizing the findings in the history of St. Louis draws connections between embodied evidence of disease and the institutionalized inequality at its root. The limitations of the study make up the final portion of the chapter.

Considering the unique history of the Terry Collection, Chapter 7 adds to the discussion of the ways that involuntary anatomical dissection constituted structural violence and deconstructed the personhood of the individuals in this sample. The existing arguments are viewed through the lens of ethics in medicine, anthropology, and anatomy. The purpose of Chapter 7 is to raise awareness of the implications of the collection’s
history. Researchers who engage with Terry Collection, and other similar collections, must acknowledge their place in the system that contributed to the silencing and deconstruction of personhood of the individuals they study. The information presented here continues the conversation started by others (i.e. de la Cova2019, In Press; Nystrom 2011, 2014, 2017; Pearlstein 2015) about how to best return the voice to the marginalized deceased while learning from them.

Finally, the dissertation concludes with Chapter 8, which offers a summary of the research aims and findings. It also situates the study within its broader relevance to the discipline of anthropology.
CHAPTER 2

A HISTORY OF MIGRANTS IN ST. LOUIS

The period of time spanning the late nineteenth and early twentieth centuries in the United States was one of dynamic demographic movement and social change. The migrations that occurred reshaped the American countryside and cities through exponential population growth, industrialization, and wars. Large-scale migration from Europe and the American South put multiple cultural groups in close proximity within St. Louis, fostering job competition and ethnic tension. This historical setting provides the context for skeletal observations of pathology. Understanding the history of St. Louis integral in investigating the biological effects of racialization and structural violence among German, Irish, and African American migrants to St. Louis. Therefore, this chapter introduces the development of St. Louis from small trading settlement into a large industrial city that acted as a hub for migration and immigration.

2.1 The History of St. Louis

2.1.1 The Founding of St. Louis

In 1764, Pierre Laclede founded the settlement that became present-day St. Louis to secure French control over the Mississippi Valley (Troen and Holt 1977; Judson 2012). Even at such an early time in its development, St. Louis’ position at the confluence of the Mississippi, Missouri, and Illinois rivers made it an important center for trade and travel. This position would later earn the city its moniker of “Gateway to the American West”.

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Since its founding, St. Louis was a settlement with a diverse body of inhabitants, including French and Spanish colonists, enslaved Africans, and free individuals of African ancestry (Troen and Holt 1977; Holland 2003; Sandweiss 2003; Judson 2012). The diversity of inhabitants continued through the twentieth century with the city acting as one of the major loci for migration and immigration in the U.S.

St. Louis and the surrounding areas became U.S. territories in 1803 as part of the Louisiana Purchase (Primm 1998). The first American Census of St. Louis in 1810 counted the population of city and county as just over 5,000 (Judson 2012:208). New technology, like the invention of the steamboat, coupled with high European immigration to the area, transformed St. Louis from a small European trading outpost to America’s greatest inland port (Judson 2012). By the 1860 census, the city’s population had increased exponentially surpassing 160,000 residents (Judson 2012:208; U.S. Census Bureau 1864). In this way, St. Louis’ population growth followed the trends associated with contemporaneous large industrialized cities in the U.S. (Judson 2012).

2.1.2 Migration History and Population Growth of St. Louis

St. Louis has been a “majority-minority” city as far back as the early part of the nineteenth century. A city fits this designation when over half of the population is made up of smaller minority ethnic groups that total a number larger than the dominant ethnic group (Kamphoefner 2003). During the peak early years of St. Louis’ growth, between 1830 and 1860, the majority of migrants were foreign-born. The potato famine (1845-1846), longer periods of food scarcity, and the “young Ireland” rebellion (1848) were push factors for the Irish. Germany experienced political and economic restructuring following the Napoleonic wars (1815), milder harvest failures and food scarcity, and a
failed revolution (1848). These events sent hundreds of thousands of people from both regions fleeing to America (Bodnar 1987; Kamphoefner 2003; Primm 1998). In 1850, Germans comprised about one-third of the population, representing the most prevalent immigrant group in the city. The Irish constituted the second largest group from Europe (Kamphoefner 2003). It was not only foreign immigrants that came to St. Louis during the nineteenth century. Merchants, artisans, professional men, and chiefly non-slave holding southerners were drawn to the city by high wages, opportunities, and booster literature. The growth was so rapid that housing construction could not keep up with demand (Primm 1998).

By the 1850 census the city’s total population grew again to 77,860 (Primm 1998; U.S. Census Bureau 1853). The majority of St. Louisans had been born abroad (Kamphoefner 2003). Natives of Germany were the most prevalent and outnumbered Missouri-born citizens. The Irish were the second most numerous followed by the British then the French. In 1860, St. Louis had over 160,000 residents, with just over 50 percent of the population being foreign-born (Kamphoefner 2003:83; Judson 2012: 208). The population explosion occurred alongside a business boom, which put pressure on the city to continue housing, street, and other city structural improvements (Primm 1998. German and Irish Emigrant Societies were created to support new arrivals and help them find work as cooks, maids, valets, nurses, seamstresses, gardeners, and laborers (Primm 1998). A smaller number were professionals or skilled workers in more specialized areas (Primm 1998).

Between 1860 and 1880, St. Louis’s population increased by over 100 percent, to 350,518, and its geographic area tripled in size (Corbett 1999; Jack 2007:120; Judson
2012:209; U.S. Census Bureau 1883). The Civil War decreased migration nationwide, particularly in St. Louis where its connection to New Orleans by way of the Mississippi River was blocked until 1863. The number of European immigrants also decreased to 36 percent in 1870 (Kamphoefner 2003:84). Despite the decline in foreign-born arrivals, St. Louis remained a majority-minority city for the rest of the nineteenth century.

From 1880 into the twentieth century, European immigration continued to persistently decrease. German immigration peaked in 1882, but St. Louis continued be an attractive destination for this group through the turn of the century. By 1910, the city’s population was almost 700,000 residents (U.S. Census Bureau 1913). The number of native German or first-generation German-American St. Louisans stayed relatively constant at just under one-third of the city’s population (Detjen 1985:9). Irish immigration followed a similar pattern after the turn of the century. The majority of Irish immigrants came from the area that came to be known as the Irish Free State, which was established in 1922 after much conflict, famine, and a civil war. There were also immigrants present from Northern Ireland but in much smaller numbers¹.

By 1930, Irish-born or first-generation Irish-American individuals accounted for 11 percent of St. Louis’ population. About one percent of all St. Louisans were born in Ireland while the remaining 10 percent had at least one parent that had been born abroad

¹ The numbers in most of the historical literature and the notations in the Terry Collection discuss these immigrants and subsequent generations only as ‘Irish’; these sources do not distinguish between immigrants from Northern Ireland (presently still called the same) and the Irish Free State (presently called the Republic of Ireland or Ireland) after the latter’s formation in 1922. The U.S. Census is one source that distinguishes between two countries regarding immigration. In order to best compare with the majority of historical literature, I combine population statistics available in the census from the two states and use the term “Irish” or “Ireland” in my writing to denote citizens coming from the island of Ireland, which includes both countries.
(U.S. Census Bureau 1931:331). The large numbers of immigrants to St. Louis, especially the Germans and Irish, helped keep St. Louis among the top ten largest cities in the United States from 1850 through 1960 (Troen and Holt 1977: xxi; Gibson 1998).

While European immigrant numbers peaked then began to decline in the late nineteenth century, the African American population grew six times faster than the general population between 1860 and 1880 (Jack 2007:120). Prior to 1860, St. Louis differed from other southern or border-state cities because it lacked a significant African American population, making it more similar demographically to the Northeast (Judson 2012:209). The city had a high percentage of enslaved and free individuals of African ancestry during its colonial period, but their numbers did not grow at the same rate as other ethnic groups. One reason the numbers stayed low is that Missouri, since the colonial era, employed a “black code” that restricted the actions of both free and enslaved African Americans. These laws prohibited both groups from entering, assembling, or moving within the state without permits and outlawed the education of individuals of African ancestry. Such legislation served to keep the number of African Americans in Missouri as low as possible and oppress those that did live there (Judson 2012; Missouri Digital Heritage 2019).

When the Civil War (1861-1865) broke out, Missouri was one of the slave-holding states that did not secede from the Union and became a border state. Even though it did not support the Union’s war effort, it did serve as a Union route to move supplies from the North into the South and eventually fell under Union control (Corbett 1999; Davis 2011; Judson 2012). Border state cities like St. Louis were a common destination for runaway individuals escaping slavery in the Confederate South during the war.
Contraband camps, camps that sheltered enslaved African American refugees fleeing the Confederacy to the North or to Union Army lines, were present in St. Louis (Davis 2011). The camps were so named because formerly enslaved people were considered property of rebellious Confederates. Thus, they were subject to confiscation by Union troops making them “contraband” (Corbett 1999).

Conditions in the camps varied. Many of the structures were hastily and poorly built, overcrowded, and prone to disease outbreaks. Slavery existed in border states like Missouri as a concession to pro-slavery Unionists, but in the absence of strong enforcement the treatment of runaway slaves entering contraband camps varied. The reception could be welcoming, hostile, or expose the formerly enslaved people to traders who sought to kidnap and resell them into slavery (Corbett 1999). The Union army did employ contrabands and eventually allowed men to join their ranks to fight in exchange for certificates of emancipation and wages (Corbett 1999; Davis 2011). In addition to military aid, the refugees received assistance from societies in St. Louis, such as the American Missionary Association, Contraband Relief Society, Colored Ladies’ Contraband Relief Society, as well as existing churches and communities. These organizations and private citizens came together to provide food, goods, and education to the African Americans fleeing enslavement and seeking freedom during the Civil War (Corbett 1999; Davis 2011). As a result, the number of African Americans in St. Louis rose during the years of the Civil War, from 3,297 in 1860 to 22,088 in 1870. (Davis 2011; Judson 2012:212). After the Civil War and Reconstruction (1865-1877) ended, the migration continued.
The first mass migration of African Americans happened during the Exodus of 1879. As many as 20,000 African Americans fleeing violence, oppression, and sharecropping-induced poverty in the post-Reconstruction South made their way north along the Mississippi River on riverboats (Corbett 1999; Jack 2007:28). The Exodusters’ goal was to reach Kansas, which was rumored to have true freedom, economic opportunity, and available land. However, many only had enough money to reach St. Louis, which was the pivot stop of the trip where northward travel shifted westward to Kansas (Corbett 1999; Jack 2007). Many Exodusters did eventually make it to Kansas (Jack 2007). St. Louis’ African American community aided Exodusters that stayed, temporarily or permanently, in the Gateway City by providing medical care and financial support (Corbett 1999; Jack 2007). Migrants were fed and housed in churches and parishioners’ homes while being fed and encouraged by private citizens (Corbett 1999; Jack 2007; Holland 2003). Due to the Exodusters, 1880 St. Louis had the third largest African American community in the nation and it would continue to increase (Troen and Holt 1977).

Post-Reconstruction violence, sharecropping, and Jim Crow laws in the South and manufacturing jobs in St. Louis created a push-pull effect that continued migration from the rural South to the Northeast and West through the turn of the century, including St. Louis (Harris 2012; Judson 2012). These conditions were compounded by the collapse of the cotton industry in 1910 due to a boll weevil infestation and the inability to export cotton to Europe because of World War I. Thousands of African Americans lived in poverty and harsh conditions due to the sharecropping system, crop failure, and scarce job opportunities in southern cities. When the demand for labor in the factories of
industrialized northern and western cities grew during World War I, companies, including those in St. Louis, began to recruit African American workers from the South. Foreign immigrants formerly filled some of these jobs, but a rise in anti-immigrant sentiment, a reduction in the number of immigrants from abroad because of World War I, and lower wages made African Americans a more favorable choice (Grossman 1989; Harris 2012). Discrimination was still rampant against African Americans, who were often excluded from labor unions and all but the most menial occupations for the lowest wages, but job opportunities were present (Corbett 1999; Headlee 2004; Rudwick 1972; Wilkerson 2010). Over 90 percent of African American workers were employed as domestics, factory workers, or common laborers (Holland 2003:75). African American women were employed at double the rate of their Euro-American counterparts but primarily in less desirable domestic service jobs (Corbett 1999; Judson 2012:214). Despite opposition, African American males found work at similar employment rates as white males. Employment as strike-breakers caused racial tensions to skyrocket as Euro-Americans were angry over perceived lost jobs, anti-union sentiment, and feared the high number of African Americans migrating into the area from the South (Rudwick 1972). The tension over strike-breaking eventually led to one of the worst riots in 20th century U.S. history, further detailed in section 2.2.4.

Increased employment opportunities created a massive migration of African Americans from the South to the North and West between 1910 and 1970, called the Great Migration (Harris 2012). In 1910, seven million out of the over eight million African Americans living in the United States resided in the South. Between 1910 and 1940, 1.5 million moved northward. This number was surpassed during the second half of
the Great Migration when five million Southern African Americans migrated between 1940 and 1970 (Harris 2012: 25, 49). From 1910 to 1950, the African American population of St. Louis tripled. The substantial increase during this forty-year period made the Black population more visible to White residents and increased White Flight to the suburbs (Corbett 1999; Judson 2012).

St. Louis’ position as a hub on the routes of multiple population migrations means its history is filled with rapid population growth and city expansion during the nineteenth and twentieth centuries. Such an influx of people created economic, environmental, health, and infrastructure challenges for all residents of St. Louis. However, the effects were especially magnified for the most vulnerable segments of the population: the poor, African Americans, and foreign-born immigrants.

2.2 Living Conditions of Migrants to St. Louis

All migrants to St. Louis during the nineteenth and twentieth centuries came with the same basic goals of finding work, financial security, and improving their lives (Primm 1998; Troen and Holt 1977). Regardless of century, place of origin, or route, the actual conditions new migrants encountered did not meet their expectations. Even as beautification, building, and hygiene improvements were implemented in St. Louis, the conditions in which new migrants and other low-income residents of St. Louis lived did not improve. In addition, the impoverished state of most migrants upon arrival to the Gateway City, the availability and condition of housing, environment, interpersonal violence, institutionalization, and racialization also posed challenges to the prosperity and health of the migrants.
2.2.1 Racialization

All migrants clearly faced a multitude of insults to their health after they arrived in St. Louis due to their low SES. Beyond SES, however, not all migrant groups were perceived equally. Therefore, each group experienced the effects of poverty and discrimination differently due to racialization along the continuum of whiteness, which was introduced in section 1.1.

Descriptions of immigrants as ruddy, swarthy, or with animal-like features emphasized socially manufactured differences between groups that were not superficially apparent (Jacobson 1999; Pearlstein 2015). Portrayals of foreign-born arrivals to this U.S. with this verbiage encouraged and validated their rank of less-than-white on the continuum. Germans held a higher position than the Irish on the continuum because American society preferred the majority Protestant Germans, who they perceived as industrious, intelligent, and efficient, to the Catholic Irish (Luebke 1990). For instance, employers preferred to hire German females to Irish or African American applicants for domestic service. If factories or offices were going to employ women they were also more likely to hire white women, often immigrants or the children of immigrants (Corbett 1999).

Religious and cultural differences further stratified immigrants on the continuum of whiteness. Heavy Catholic immigration from Ireland and Germany drew the ire of Protestant Euro-Americans, who were the majority in the United States (Faherty 2001). Even within immigrant groups, Protestants marginalized Catholics and Jews effectively dividing immigrant communities (Faherty 2001; Jacobson 1999; Orser 2007). During
World War I and World War II, Germans were forced to suppress their cultural heritage because of anti-German sentiment (Corbett 1999).

African Americans were put on the extreme nonwhite end of the continuum. They experienced severe inequality and discrimination that affected their health (Orser 2007; Pearlstein 2015). The crude death rate for African Americans in St. Louis in 1910 was 26, which was almost double the rate for Euro-Americans (Judson 2012; Mangold 1917:53). The mindset that perpetuated slavery and segregation influenced deep-seated prejudices against African Americans. Additionally, scientific racism was used to support bigoted ideas about the inferiority of non-white races (Roberts 2009). These ways of thinking influenced the economic opportunities and health of African Americans.

Migrants’ racialized ranking within the social hierarchy effected all aspects of life. As discussed in the following sections, placement on the continuum relates to exposure to disease and trauma. Migrants embodied the everyday conditions they faced, including economic discrimination, housing segregation, and violence, as skeletal evidence of pathology and trauma.

2.2.2 Employment

It is important to note that many migrants, and individuals in the Terry Collection, that found their way to St. Louis were low SES. Migrants’ rank on the continuum correlated with jobs available to them and with their ability to improve their SES. Literature demonstrates that employment discrimination was prevalent, especially against African Americans (Headlee 2004; Corbett 1999; Kenny 2000; Rudwick 1972; Wilkerson 2010). A consequence of such discrimination was poverty, which is a risk factor for many health problems, including tuberculosis, malnutrition, and trauma.
(Roberts and Buikstra 2003; Roberts 2012). It also could affect access to health and dental care, exacerbating the prevalence of dental disease and other conditions. Continued poverty due to low wages may have meant that the quality or quantity of food purchased was insufficient. An inadequate diet would raise the possibility of having nutritional deficiencies, lowered immune response, or stunted growth. Additionally, a lower income combined with discriminatory housing practices led to poor-quality and overcrowded living situations for all migrant groups.

The goal of finding secure work with better wages was one reason all migrant groups journeyed to St. Louis. The majority filled unskilled, low-wage positions, often in factories or domestic service. These jobs did not greatly improve their financial situation though the wages were often better than their previous situations (Primm 1998). Both white and Black migrants coming from the South had similar education levels, rural backgrounds, and migration times, which meant that they qualified for similar low-wage unskilled labor positions, as it did for most foreign immigrants (Gregory 2005). Skin color outweighed those similarities, though. African American workers did not have comparable wages to Euro-American workers. For example, between 1939 and 1969, African American Southerners living in the Great Lakes states made between 50 and 75 percent of white Southerners’ wages (Gregory 2005:96). African American women were often employed in undesirable domestic service jobs, although the families’ preferences were to hire Euro-American women, especially native-born Americans or German immigrants. Therefore, there was always more demand for than supply of domestic workers because those jobs were viewed as low status by female workers, due to long
hours, lack of privacy, and constant surveillance that accompanied living with families, in comparison to sales, office, or factory work (Corbett 1999; Diner 1983).

2.2.3 Housing and Environment

The overall environmental conditions in St. Louis were poor, especially during industrialization. Lack of pollution regulations meant coal smoke and smog from factories, houses, and trains were encompassing and uncontrolled throughout St. Louis until the early twentieth century (Primm 1998). Residents of the city and surrounding suburbs would have been exposed to the air pollution could have caused respiratory health problems or exacerbated pre-existing ones.

Where urban air pollution affected everyone in the area, the housing situation was more varied. New arrivals to the city tended to settle in neighborhoods of similar ethnic or racial composition due to the existence of support networks, similar customs, and familiar language. For example, the Kerry Patch was a predominantly Irish neighborhood where new immigrants settled; the Ville was one of several African American neighborhoods (Corbett 1999; Faherty 2001; Holland 2003). During the mid-nineteenth century, poor German and Irish immigrants lived in appalling conditions: crude shanties, uncollected garbage in streets, alleyways, and yards, and large areas of standing water (Corbett 1999). Poor public sanitation throughout St. Louis meant that several severe Asiatic cholera epidemics occurred in the city. Though the disease affected both rich and poor, more Irish and German immigrants died of cholera than native-born Americans, which was perceived as evidence of the laziness, ignorance, and lax morals of immigrants (Corbett 1999; Daly 2008).
St. Louis’s population growth was so rapid during the influx of European immigrants in the late nineteenth century and African American in the twentieth century that housing construction could not meet demand (Primm 1998; de la Cova 2014). Unable to find housing elsewhere because of poverty and discrimination, slums of tenement housing around the industrial and downtown areas of the city were filled with foreign-born immigrants and African Americans. These buildings were vastly overcrowded, poorly ventilated, and dilapidated, which likely had detrimental effects on the health of individuals residing within them (Primm 1998; Judson 2012; de la Cova 2014). African Americans in St. Louis lived in areas where the population was significantly higher than the city average (Roberts 2009). Around the turn of the twentieth century, the African American population averaged 82 people per acre whereas the overall city average was only 12 people per acre (Holland 2003:75). Such crowded conditions would have only worsened with the influx of migrants post-Reconstruction and during the Great Migration. Proximity and overcrowding caused infectious diseases, such as tuberculosis, to spread rapidly through crowded apartments and entire buildings (Roberts 2009).

These housing problems persisted well into the twentieth century. Even as other areas and infrastructure were rebuilt and modernized during the mid-twentieth century, the condition of the tenements did not improve. Pre-1900 tenement buildings were never remodeled. There were shared toilet facilities or even a lack of indoor toilets, inadequate plumbing, a lack of running water, and poor insulation (Primm 1998). An overall lack of building maintenance and overcrowding also persisted maintaining the risk of infectious and respiratory diseases that began in the previous century. In addition to the conditions
inside the tenements, many tenement locations afforded no nearby shopping or health care facilities. Nearby jobs were scarce, public transportation was inadequate, and recreational spaces non-existent (Corbett 1999; Primm 1998).

By the mid-twentieth century, the demand for low-income housing far exceeded the number of units available. New Deal (1933-1936) legislation shifted the responsibility of providing decent housing for the nation’s poor to the government, but American involvement in World War II (1941-1945) prevented the construction of new housing when the legislation was originally signed during the Great Depression (Judson 2012:220). When construction of two new low-income housing projects, one for African Americans and one for Whites, started after the second National Housing Act (1949), eligibility conditions meant that there were far more qualified tenants than units of public housing. Those who resided in these projects got their first experiences with central heat and indoor plumbing (Corbett 1999). Demand was higher than the number of new units built in these projects. Plus, the requirement that one substandard housing unit be torn down for every new unit built resulted in further decreased housing options for the poor (Leven 1976; Judson 2012: 220-1).

Legal housing segregation, which primarily targeted African Americans, was also present in St. Louis, especially during the early twentieth century when Americans were more overtly racist than any other time since the antebellum period (Corbett 1999). St. Louis voters approved the Segregation Ordinance of 1916 as a measure to prevent anyone from moving to a block with 75 percent or more households of the opposite race. However, a Supreme Court ruling made it unenforceable within a year (Corbett 1999; Judson 2012:221). The court’s ruling did not stop the effort for legally enforceable
segregation to stop the perceived flood of African American migrants, whose numbers grew four times faster than Euro-Americans in St. Louis between 1910 and 1920, from encroaching on “white” neighborhoods (Corbett 1999:158). Though the residential Segregation Ordinance did not legally stand for long, the creation of “Restricted Zones” skirted the Supreme Court ruling by pressuring realtors and homeowners in all white neighborhoods to sign legally enforceable contracts prohibiting the sale or lease of their homes to African Americans (Judson 2012). *Shelley v Kramer* (1948) ended this practice and the legal residential segregation in St. Louis. The legacy of these segregation ordinances continued for several more decades: the same neighborhoods that were designated as Restricted Zones were red-lined as uninsurable by the Federal Housing Administration. Denying mortgages meant that entire neighborhoods lost the benefit of a home mortgage and often homeownership (Corbett 1999; Judson 2012).

### 2.2.4 Violence

Social conditions in St. Louis were also hostile to all migrant groups. The mix of ethnicities and cultures produced ethnic and religious tensions (Troen and Holt 1977). Small-scale interpersonal violence was common. Large-scale attacks, most often in the form of riots, also took place. These riots targeted groups that were blamed as the root of whatever problem was perceived by the rioting group, frequently white males. Riots in the late nineteenth century primarily targeted foreign-born immigrants whereas riots during the early twentieth century targeted African Americans.

Nativist groups led anti-immigrant riots in the 1840s through the start of the Civil War (Primm 1998; Kamphoefner 2003). A brawl-turned-riot between Irish immigrants and a nativist mob in 1849 damaged Irish businesses, injured many, and resulted in
arrests. In 1852, a mob of Know-Nothings, a name given to a nativist group because of their refusal to answer questions about the organization or its goals, harassed “lower orders” of society, the “free mulattos”, Irish laborers, and drifters, in the downtown areas (Faherty 2001; Primm 1998). The mob primarily targeted established Irish residents and businesses instead of the destitute Irish famine refugees (Faherty 2001). The Nativist Riot in 1854, which resulted from ethnic and political tensions on Election Day, lasted several days until the militia was able to subdue it. Incidents like these continued to occur through the end of the 1850s (Primm 1981).

Tensions between African Americans and Euro-Americans grew more intense through the turn of the twentieth century due to large numbers of African American migrants moving out of the South during the Great Migration (1916-1970). More White individuals left the South than African Americans during this period, but their movements rarely received attention from residents in their new cities or in local or national news media. Most attention was focused on foreign immigrants or African American migrants (Gregory 2005). Unlike African Americans, whites were never described as a crisis or seen as harmful to cities or anywhere else they settled (Gregory 2005).

Between 1910 and 1920 the African American population of St. Louis rose dramatically in a very short amount of time due to the increased demands for labor (Corbett 1999; Gregory 2005). Tensions between African Americans and Euro-Americans increased particularly during union strikes. Unions were exclusively comprised of white workers. They resented African American, especially recent migrants from the South, who broke union strikes (Rudwick 1972). During the four-year period
between 1915 and 1919, there were eighteen race riots, the largest of them being the East St. Louis Race Riot of 1917. East St. Louis, Illinois, was a city just across the river from St. Louis that is sometimes considered a suburb of the Gateway City. The riot lasted for ten days and required the intervention of the Illinois National Guard (Rudwick 1972; Troen and Holt 1977). These events as well as occupational risks and overcrowded housing exposed migrants to St. Louis to a higher risk of violence, traumatic injury and disease.

2.3 Historiography

Bioarchaeologists should seek to contextualize skeletal observations within the history of the people and time periods they are studying by using as many types of sources as possible. The necessity of incorporation of historical sources and ways to integrate them have been discussed by multiple sources within the discipline (e.g. Mant and Holland 2016; Herring and Swedlund 2003; Larsen 2015; Martin et al. 2013; Mitchell 2012, 2017). Following their example, different types of sources were involved in compiling this chapter’s history of St. Louis and the migrant groups that resided there as well as the interpretation of the results in chapter 6. Within the scope of this dissertation, secondary sources in the form of monographs on the city, groups, and population movements provided the bulk of the historical information but journal articles were also used. Additional data were gleaned from primary sources: census records, Centers for Disease Control statistics, and newspapers. In addition to using these sources, bioarchaeologists must also be critical of the perspectives of all historical sources, their approaches and perspectives, and their gaps. The following paragraphs conduct a brief historiography of the monographs used in this dissertation.
The Gateway City lives up to its other nickname of “Fourth City”, a moniker bestowed during the period between the end of the Civil War and 1904 when it was the nation’s fourth largest city behind New York City, Philadelphia, and Chicago. The nickname indicates one of the obstacles of synthesizing a history of St. Louis: the former fourth largest city brings less focus as an important and influential player in history when compared with the metropolises that held the first three spots. There is a plethora of books that address the topics and groups contained within this dissertation. However, very few of them mention St. Louis within their pages and fewer still focus on the city or its people as their primary subject. All of the monographs utilized here drew upon a similar set of sources to craft their narratives. They cite other books on the topic. Census records and newspapers as well as materials from the archives of the Missouri Historical Society are the most common primary sources. A few additionally incorporate archival material in the form of city plans or maps, written accounts, and interviews.

The most comprehensive volume on the history of St. Louis is James Neal Primm’s Lion of the Valley (1998). As an urban history, its strengths lie in bringing together a vast amount of information to provide a monograph that covers 200 years of St. Louis history. Primm primarily focused on the founding and development of the city and what he deemed the major people and events that influenced its trajectory. However, by covering so much time, this book glosses over more everyday individual or community level information in favor of a less personal overview of the city’s growth and change through time. Troen and Holt (1977) follow a similar pattern to Primm (1998). As Corbett (1991:1) describes it, conventional urban histories like Primm’s “do too little to explore the vital textures of urban life; they are poorly suited for capturing the
complex and contradictory processes that make a city.” Corbett’s writings (1991, 1999) as well as Wright (2002) and Corbett and Miller’s (1993) explore places and people that are the less obvious, more marginalized in history to provide an account of the past that escapes more conventional accounts. These works, like volumes such as Christensen (1973), Sandweiss (2003), Rudwick (1973), Lang (2009), Lipsitz (1991), Judson (2012), and Corbett and Miller (1983), provide a particular perspective while being less comprehensive in scope, which allows for more attention to the author’s chosen topics or viewpoints.

Books that take a social history perspective within the urban history landscape seek to reconstruct the experiences of ordinary people and connect them to the larger processes simultaneously occurring (Tilly 1985). Therefore, most focus on specific groups such as women (e.g. Corbett 1999), immigrants (e.g. Detjen 1985; Diner 1983; Faherty 2001; Ignatiev 1995; Kamphoefner 1987; Kenny 2000), and African Americans who migrated out of the South (e.g. Jack 2007; Gregory 2005; Trotter 1991; Wilkerson 2010). Unlike the general urban histories discussed in the previous paragraph, social histories more thoroughly explore the experiences of daily life in the city, struggles and obstacles unique to that group, and, in the case of migrants, the factors that led them to leave their state or country of origin. Those who delve into the experiences or history of particular groups sometimes have personal connections to them (e.g. Faherty 2001; Luebke 1990; Detjen 1985), which could influence their perspective on the material presented.

Though present, there are fewer of these sources specifically related to St. Louis. Writing on Germans in Missouri tend to focus on their agricultural role in farming areas
rather than life in St. Louis. Likewise, information about the Irish experience pre-immigration and reception in other northern cities far outweigh the sources that are specific to the Gateway City. Chicago and New York are the primary foci not only for immigration but also for the Great Migration, though some of the information may be applied to St. Louis. The works in this category are beneficial because they offer alternate view of events and life in the past, however, just as any work, they may be biased based on the author’s viewpoints.

2.4 Summary

St. Louis, Missouri, began as a small but important frontier settlement that grew into one of the largest industrial cities in America. The Gateway City’s position at the confluence of major rivers led to industrialization and population growth. As a large industrial city, St. Louis attracted many foreign and domestic migrants attempting to pursue better work and life opportunities. Poor conditions abroad and in the American South meant that foreign immigrant and African American migrants to St. Louis were impoverished upon arrival, seeking financial security and a better life. However, conditions in St. Louis posed challenges to their health and well-being. Racialization resulted in discrimination, SES, job security, housing quality, exposure to violence, and risk of disease exposure. The focus of this dissertation is whether these historical contexts disproportionately affected differentially racialized migrant groups in St. Louis.
CHAPTER 3

RESEARCH FRAMEWORKS

This study situates how racialization and migration to urban St. Louis affected its low-socioeconomic residents within a biocultural framework to understand the biological, environmental, and sociocultural effects of migration and racialization. The biocultural approach acknowledges that social, biological, political, and economic factors can result in the manifestations of diseases present in individuals from the Terry Collection. Looking beyond the pathological agents at work in disease enables a more holistic understanding of the ways that sociohistorical processes of oppression and inequality intertwine with biology to produce negative health outcomes.

The lenses of three separate but interrelated frameworks – structural violence, intersectionality, and embodiment – add to the biocultural approach in order to understand the ways that social, economic, and political processes and structural oppression work on individuals that beget disease. Each individual has multiple, intersecting layers within their identity that serve as multiplicative advantages or disadvantages in relation to lived experiences. The intersectional nature of identity can predispose or protect, compound or mitigate in the face of structural violence. The patterns of structural violence and social oppression that are embodied in the skeletons of migrant groups within the Terry Collection via tuberculosis, vitamin D deficiency, dental disease, and trauma are better understood by engaging with the variables of sex, migration status, age, and ancestry simultaneously rather than separately. In doing so, this
research examines not only the distribution of disease but also the ways that multiple axes differentiate social identity and political-economic factors that coalesced in historic St. Louis to enact structural suffering upon the individuals in the Terry Collection during life and after death.

Additionally, following Sofaer (2006) and Nystrom (2011), the work addresses the postmortem treatment of the individuals in the context of their remains as material culture. The Terry Collection was created within an anatomical setting and therefore has a dual position as both individuals and educational objects. The treatment of all Terry Collection individuals within the realm of anatomical dissection and curation is a result of their embodied antemortem and postmortem identities. For them, ancestry, migration status, sex, and SES intersect in an axis of disadvantage that heightened the risk of involuntary assignment to the gross anatomy laboratory at Washington University School of Medicine.

3.1 Approaches to Research

3.1.1 The Biocultural Approach

A biocultural framework synthesizes biological and cultural anthropological perspectives to recognize the combined influence of social, biological, political, and economic factors on humans (Leatherman and Goodman 1997; Rankin-Hill 1997; Wiley and Cullin 2016). This multidimensional lens understands that human biology is affected by stresses produced by the natural environment, access to material resources, ideology, and distribution of power (Goodman et al. 1984; Leatherman and Goodman 1997:1; Rankin-Hill 1997). Viewing biology, political economy, and history as entangled processes allows biological anthropologists to investigate the ultimate causes of skeletal
pathology (Goodman and Leatherman 1998). The biocultural perspective is important to this dissertation research because it broadens the domain of biological anthropological analysis beyond immediate causes of biological conditions to include socioeconomic and historical circumstances (Goodman and Leatherman 1998). It also frames diseases or malnutrition as products of social relationships and processes rather than natural or inevitable stressors (Leatherman and Goodman 1997:2; Goodman and Leatherman 1998). Applying a biocultural approach recognizes that the individuals in the Terry Collection were affected not only by their own biology but also by their living environment and sociopolitical standing in industrialized St. Louis.

3.1.2 Structural Violence

There are many definitions of violence. The most common one involves a physical force enacted by an actor that intends somatic injury as a consequence (Galtung 1969). That definition of violence was too narrow, which is why Galtung (1969) distinguishes between multiple types of violence, including physical or psychological. Furthermore, he divides violence into two categories: 1) direct or personal, where a subject commits violence upon an object or individual, or 2) structural or indirect, where there is no immediate actor/subject. Structural violence broadly describes normalized social structures of oppression that are exerted systematically by all members of a certain social order (Farmer 2004; Galtung 1969; Klaus 2012; Nystrom 2014). Structural violence recognizes that indirect violence is built into the societal, political, and economic structures and presents in the form of inequalities of power, resource access, agency and wealth that cause injury or death to humans (Galtung 1969; Farmer 1996, 2005; Klaus 2012). Direct violence is usually the result of a relatively brief incident of
physical injury and therefore kills more quickly. Structural violence may endure and produce injuries throughout an individual’s entire life course, killing its victims slowly (Galtung and Höivik 1971; Klaus 2012).

There is no one social factor that predisposes an individual to structural violence. Simultaneous interactions of multiple social factors (gender, perceived race, ethnicity, SES, immigration status, sexual preference, etc.) differentially weighted in different settings and times constitute vulnerability (Farmer 2005). In order to describe and understand suffering brought about by structural violence and how social factors play a role, analyses must be geographically broad enough to take the interconnectedness of the research area into account and historically deep enough to understand the formation of the political and economic processes at play (Farmer 2005).

Structural violence has been applied within medicine and medical anthropology, particularly to research that utilizes a biocultural framework focused on the biological, socioeconomic, and political origins of health outcomes and disparities. It is known that a lack of social and economic resources has a synergistic effect on poor health status (Ahnquist et al. 2012). Medical anthropologists use a framework of structural violence to explain the historical, structural, and social processes that result in negative health outcomes and inequalities seen currently. Such literature varies widely in application and locale. Topics addressed include the HIV/AIDS in Haiti and globally (Farmer 1996, 2004, 2005; Parker 2002), tuberculosis in Haiti and Russian prisons (Farmer 2005), the Venezuelan cholera epidemic and the contributions of communication in epidemiology to disease spread and blame of those suffering (Briggs and Mantini Briggs 2004), the role of structural violence in clinical medicine (Farmer et al. 2006), Latino immigrants to the
U.S. (Quesada et al. 2011), human rights (Farmer 2005; Ho 2007), and many more than can be detailed here. Structural violence in medical anthropology is also intertwined with public anthropology and the production of knowledge that can maximize social and economic rights and save lives (Biehl and Moran-Thomas 2009). Such research is well-situated to address disparities in clinical care, structural vulnerability, and the uneven distribution of health risks internationally with the aim of improving policy and access to care (Bourgois et al. 2017; Farmer et al. 2006; Ottersen et al. 2014).

Outside of the realm of medicine, the structural violence framework has been applied to many other areas of inquiry, including occurrences along the United States-Mexico border (De León 2015; Magaña 2011; Martinez et al. 2014; Quesada et al. 2011). Children, during life and after death, are subjected to multiple forms of direct and indirect violence that stem from poverty and inequality (Drybread 2013; Korbin 2003). Finally, research has documented how interactions between governmental agencies or bureaucratic planning enforces structural inequalities in U.S. academic institutions (Bernbeck 2008), how government frames poverty and therefore poverty assistance (Hodgetts et al. 2014), and placement and availability of food outlets and supermarkets in urban centers (Lane et al. 2008; Rodgers and O’Neill 2012).

Bioarchaeologists also use structural violence as one of the frameworks through which they interpret the lived experiences of people from their skeletal remains. Bioarchaeology was, and still is to some extent, primarily concerned with the history of violence in humans (Martin et al. 2012; Redfern 2017; Tegtmeyer and Martin 2017; Walker 2001). Violence has traditionally referred to a type of direct, interpersonal conflict. However, bioarchaeologists have called for an expansion of the concept of
violence within the discipline to include structural violence (Klaus 2012; Martin and Harrod 2015).

In bioarchaeological populations, similar to the rest of the research in section 3.1.2, socially and economically marginalized groups are at higher risk of the effects of structural violence, including disease, direct violence, and postmortem mistreatment. Crandall (2014) uses disparate rates of scurvy in the ancient American Southwest as evidence that political centers leveraged political-economic power systems to subject certain more marginally located communities to food insecurity, disease, and interpersonal violence. Gengo (2014) argues that the higher prevalence of co-occurring periodontitis and systemic periostitis among Black individuals as compared to white individuals in the Terry Collection are result of the embodiment of structural inequality and violence. Pearlstein (2015) investigates racialization of immigrant groups in the Huntington Collection and its influence on the observed disease frequencies. Schug (2013) shows that risk of infectious disease was unevenly distributed among burial groups indicating the vulnerability of socially and economically marginalized individuals in Harappa.

Structural violence and direct violence may also coincide in the past. In U.S. anatomical skeletal collections, patterns of trauma and injury recidivism in low SES individuals are related to institutionalization and discrimination based on SES, ancestry, mental illness, or vices (de la Cova 2012, 2017). Geber (2015) uses differences in perimortem weapon trauma in two early medieval skeletal populations to discuss strategic violence (not an attempt to terminate a dispute but to draw attention to and manifest power, thus a form of structural violence) versus tactical violence (resolution of
a dispute through direct conflict). The escalation of direct intergroup violence can lead to captive-taking and acceptable violence against captive women (Martin et al. 2010). The decline in female status and morbidity due to conflict-caused food shortages and life sequestered within fortifications (VanDerwarker et al. 2016). Prince-Buitenhuys et al. (2017) use modern forensic skeletal evidence of transient and homeless individuals to support the finding that low SES populations have higher rates of injury recidivism. Finally, structural violence in bioarchaeology has been applied to the postmortem treatment of human remains, especially in regard to involuntary anatomical dissection (Crossland 2009; Davis 2017; de la Cova In Press; Flies et al. 2017; Muller et al. 2017; Nystrom 2011, 2014, 2017; Pérez 2012; Sappol 2002) but also relating to postmortem agency (Crandall and Martin 2014; Sofaer 2006; Tung 2015).

3.1.3 Racialization and the Continuum of Whiteness

The concepts of racialization and the continuum of whiteness were both introduced previously in sections 1.1 and 2.1.1, however, they serve as one of the foundational approaches to my research, so they are briefly defined here again. Racialization is a form of structural violence in which real or perceived physical differences contribute to the creation of racial categories, which translates into different experiences of prejudice and inequality (Fassin 2011; Jacobson 1999; Orser 2007). The way society perceives or assigns racial categories affects a group’s or individual’s place on the continuum of whiteness. Continuum placement relates to quality of life, access to resources, health outcomes, treatment, and beyond (Bauer 2014; Briggs and Mantini-Briggs 2004; Orser 2007). Racialization processes affected African Americans, immigrants, and those perceived as the Other including the poor (Jacobson 1999; Orser
Racialization as Other or “non-white” compounds the effects of structural violence and SES and causes health disparities within a population (Bauer 2014; Briggs and Mantini-Briggs 2004; Fassin 2011; Gravelle 2009; Gengo 2014; Jacobson 1999; Orser 2007; Silverstein 2005; Watkins 2012).

3.1.4 Intersectionality

Bioarchaeologists, and anthropologists in general, frequently group their samples by ancestry, sex, age, or other social categories for comparative analysis. However, according to intersectional theory, these categories are not truly separable as their intersection create meaningful categories with unique experiences. First proposed by Black feminist scholars, intersectionality theory argues that race and sex or gender cannot be treated as distinct subjects of inquiry (Bauer 2014; Crenshaw 1989, 1991; Collins 2015). An intersectional framework views identity as the intersection of multiple mutually constituted and reciprocally constructed layers that are lived simultaneously and therefore inseparable (Bauer 2014; Bowleg 2012; Collins 2015; Davis 2008; Yaussy 2019). Acknowledging such intersections in identity enables the experiences of those at the margins to be considered.

Outside of feminist scholarship, intersectionality has been applied effectively to health research. The intersectional framework is effective because it draws attention to heterogeneity of causal processes and their consequences regarding health disparities (Bauer 2014). Intersectional theory is also useful because it utilizes the meeting of multiple social categories at the level of individual experience to view numerous interrelated systems of privilege and oppression at the local and structural levels (Bowleg 2012; Hankivski et al. 2010). Gender, sex, race, ethnicity, income, social class, SES,
education, age, sexuality, immigration history, and more influence health through the intersection of these multiple identities or social positionalities (Bauer 2014; Hankivski et al. 2010; Sen and Iyer 2012). Life experiences, therefore also health, are not simply cumulative (Bauer 2014; Veenstra 2011). Each layer of disadvantage or advantage within an identity is multiplicative rather than additive (Veenstra 2011). Therefore, intersections among context specific advantaged and disadvantaged axes, which create a multiplication factor when more than one are present, are more relevant to lived experiences or health outcomes than any individual axis of inequality taken into account separately (Veenstra 2011; Yaussy 2019). For example, because gender and its effect on health can be culturally constituted in positive and negative ways, what it means to be a woman and the health implications thereof may differ for Aboriginal women versus non-Aboriginal women, African American women versus non-African American women, or other women (Bauer 2014; Crenshaw 1989, 1991; Hankivski et al. 2010; Sen and Iyer 2012).

Intersecting marginalizations interact with broader structural inequality within society in ways that produce and maintain social, economic, and political disparities and related health consequences (Bowleg 2012; Yaussy 2019).

Specific research in public health has addressed how intermediate groups in multi-dimensional socioeconomic societies provide insight into the ways economic class or gender advantages can be leveraged to gain entitlements. Research has addressed how class or gender advantages relate to access to treatments of long-term illnesses in Karnataka, India (Sen and Iyer 2012), inequalities in women’s health among different groups in Canada is caused by interacting social factors in addition to multidimensional identities (Hankivski et al. 2010), and how public health can use intersectionality theory
in quantitative applications (Bauer 2014). Additionally, due to the social justice focus of public health, intersectionality is an ideal theoretical tool for the discipline because of its ability to conceptualize how social and structural factors influence health (Bowleg 2012; Hankivski et al. 2010). It also concentrates on multiple historically oppressed populations, which is in line with the original intent of the intersectional theoretical perspective (Bowleg 2012).

Bioarchaeology has drawn on feminist inquiry and public health methodology and perspectives for years. However, intersectionality has only very recently become an explicitly used theoretical framework in this discipline (e.g., Agarwal, 2012; Arnold, 2016; Byrnes 2017; Geller 2017; Muller and Butler 2018; Thedéen, 2012; Torres-Rouff and Knudsen, 2017; Yaussy 2019), although it has been an implicit concept within the discipline for longer (e.g. Buikstra and Beck 2006; Das 2008; de la Cova 2011, 2017; Nystrom 2017; Price 2012; Roberts and Buikstra 2003; Watkins 2003). The following studies show the range and depth of intersectionality theory in bioarchaeology, thereby indicating utility of its application to this dissertation study.

Arnold (2016) and Agarwal (2012) address intersectionality differently than the previous authors. Both works argue that intersectionality is a way to examine gender spectrums through material culture skeletal manifestations disease. Torres-Rouff and Knudsen (2017) use an integrated and contextualized multiscalar bioarchaeological approach to examine individual and group social identities in the mortuary record of northern Chile. In an effort to better contextualize human remains within social and material culture information, the authors analyze multiple lines of bioarchaeological, genetic, archaeological, and biochemical evidence: biodistance and relatedness from
cranial metric and non-metric traits, geographic origins and mobility through stable isotope analyses, sex and age determination from skeletal elements, and community identity through cranial vault modification.

Kjellström (2014) analyzes the effects of social status and age on trauma rates between sexes in medieval Sweden. During normal periods, gendered violence varied by age and prestige. Women experienced non-lethal violence, most likely abuse, often during fertile years whereas weapons trauma in males was viewed positive due to cultural attitudes towards fighting. Intergroup conflict exposed both women, children, and men equally to high levels of violence (Kjellström 2014). Thedéen (2012) addresses identity through box brooches found with females in burials, originally thought of as representing the Gotlandic ethnicity. The wide range of brooches indicates hybridization and creolization through migration and trade in urban contexts; brooches kept their female specific connotation but cannot be used to identify ethnicity.

Muller and Butler (2018) examine the intersections of gender, impoverishment, and race in the formation of a twentieth century fetal and infant anatomical skeletal collection. The study found that structural violence against impoverished, Black women increased the probability that their fetal remains would be utilized for anatomical research (Muller and Butler 2018). Yaussy (2019) analyzes skeletal indicators of frailty by age, sex and SES. Her results do not support her hypothesis that three-way associations among pathology, SES, and sex. However, the findings do indicate earlier age at death is related to marginalized identities suggesting that intersecting axes of privilege, marginalization, and structural inequality can explain patterns of skeletal stress indicators (Yaussy 2019).
Intersectionality is an open-ended concept, which allows it to be used in a wide range of disciplines and investigations (Davis 2008). As bioarchaeology continues to utilize and explore an intersectional approach, its uses, definitions, and benefits will become clearer.

3.1.5 Embodiment

Embodiment theory is the understanding that the body biologically incorporates environmental circumstances, including biological, ecological, and social factors (Krieger 2005; Zuckerman et al. 2014) Embodiment indicates that clues to patterns and social disparities in health are found in the synergistic interplay within and between bodies and their environment (Krieger 2005; Zuckerman et al. 2014). Embodiment fosters a view of the body as the subject of culture rather than an object to be studied in relation to culture (Csordas 1990). The body, therefore, is the ultimate symbol of social interactions and cultural ideology (Martin et al. 2013); it is the interface between lived experience and the environment (Zuckerman et al. 2014). Thus, it is critical to move beyond viewing the body through simple categories to see it as the product of interrelated environmental and sociocultural phenomena (Martin et al. 2013). These interrelated phenomena include viewing the body as a symbol for sociocultural interactions (Csordas 1994; Joyce 2005; Krieger 2005), as material cultural (Sofaer 2006), the ways people inhabit their bodies so that these ways become habituated (Mascia-Lees 2011; Scheper-Hughes 1994), the Cartesian duality of body and self (Scheper-Hughes and Lock 1987; Sharp 2000), conceptualizations of the body (Joyce 2005; Lock 1993; Mascia-Lees 2011; Scheper-Hughes and Lock 1987; Sofaer 2006;), and the transformation of the body by sociocultural, environmental, and political forces (Csordas 1994; Krieger 1999, 2005;
Lock 1993; Scheper-Hughes and Lock 1987; Van Wolputte 2004). These experiences form the social body and the social skin that adorns it. The social skin is comprised of all dimensions of identity both individually expressed to be read by others and that which is imposed by broader society (Turner 2011).

Social meaning, personal expression, history, and environmental conditions are all incorporated into the body (Lock 1993; Krieger 1999; Knudson and Stojanowski 2008). These factors combine with the interrelated phenomena that form the social body and social skin to become the lived experience of an individual, which are recorded on the body (Csordas 1990; Csordas 1994; Joyce 2005; Krieger 2005; Sofaer 2006). The concept of the body as a representation of society, lived experience, and a vessel for identity is one of the focuses of contemporary social theory (Joyce 2005).

Archaeologists have used embodiment theory to conceptualize identity construction. Individuals are constantly manipulating and maintaining their identities through material ornamentation and clothing, body modification, and body position or gesture to self-identify as members of a group (Fisher and DiPaolo Loren 2003; Joyce 2005; Knudson and Stowjanowski 2008). Archaeologists utilizing embodiment have begun to consider the complex relationships between the body and practices of representation. As a result, the seemingly rigid and accepted boundary between the body surface constructed by and for exterior society and the interior person has become questioned (Joyce 2005; Knudson and Stojanowski 2008). The whole biological person is both the vehicle for and result of social action (Joyce 2005). Therefore, one of the most analytically powerful approaches utilizing embodiment theory for bioarchaeologists is
viewing the body as the sum of lived experiences (Csordas 1994; Knudson and Stojanowski 2008; Krieger 1999, 2005; Lock 1993).

Bioarchaeology can provide direct information on lived experiences through contextualized analyses of skeletal material (Knudson and Stojanowski 2008). Bone reflects the total environment in which people exist due to plasticity, the biological process of adaptation to external stressors whether environmental, traumatic, cultural, or pathological. Plasticity responses will vary by degree between individuals and may be altered by human action (Sofaer 2006). Therefore, skeletal changes will occur when an insult is induced. A skeleton without any pathologies or anomalies does not necessarily imply perfect health; the individual may have died quickly, before bone had a chance to respond (Sofaer 2006; Wood et al. 1992). Plasticity is contextually specific; therefore, it is important to examine that complete historical, economic, and sociocultural environment to determine the nature of and possible cause of variation in its effects. In living and past populations, the concept of plasticity can additionally help redirect interpretations of differences in biological characteristics across populations from innate biological distinctions to variances in social contexts (Krieger 2005). By incorporating the way the body has adapted to environmental or cultural stressors biologically (plasticity) with the social body and lived experiences, embodiment theory seeks a holistic view where the biological, the social, and the self are given equal weight.

Biological anthropology has often applied embodiment to living populations to address health consequences of sociopolitical and economic processes through biocultural analyses of human skeletal remains (Nystrom 2011). Nguyen and Peschard (2003) give an overview of scholarship addressing anthropological approaches to
inequality and disease primarily as they relate to living individuals. Other research focuses on specific outcomes, such as cardiovascular disease, low birth weight, or diabetes, and argues that unequal distribution of these conditions across racial categories are the result of the embodiment of those socially defined categories (Dressler et al. 2005; Gravlee 2009; Kuzawa and Sweet 2009).

Despite high implicit use in research on identity in past populations (Knudson and Stowjanowski 2008), there are fewer works in bioarchaeology that explicitly define and utilize this theoretical framework. Zuckerman et al. (2014) use embodiment theory in their argument for a relational ethics in bioarchaeology that gives voice to the narratives of skeletal remains of marginalized, disenfranchised, and impoverished individuals. Skeletal analyses can provide direct information about the effects of inequality and oppression that would be otherwise inaccessible and, in doing so, reconstitutes agency to the studied group (Zuckerman et al. 2014). Embodiment is also employed in a critical and reflexive examination of personhood and the archaeological body (Leighton 2010).

3.2 Approaches to the Postmortem Body

Embodiment in bioarchaeology also emphasizes the body as material culture (Joyce 2005; Nystrom 2011; Sofaer 2006). This lens considers the modification of the biological, through physical or anatomical means, as a reflection of the social world – how the physical body can be a political artifact, display group affiliation or status, or the site of embodied agency (Crandall and Martin 2014; Lock 1993; Nystrom 2011; Sofaer 2006; Tung 2015; Verdery 1999). Viewing the body as material culture applies to anatomical skeletal collections, which may be viewed as both human remains and educational objects.
Regarding the Terry Collection, anatomical legislation reflected entrenched views of the poor and the Other that lead to the transformation of unclaimed, low SES St. Louisans into objects used in medical education. Disrupting post-death rites and rituals impacted views of the body. The body is the ultimate symbol of social interactions and cultural ideology; it reflects life and was once life itself (Sofaer 2006:45). Therefore, there is not a dichotomy between life and death but rather a continuous connection where the deceased may retain social influence on the lives of others and reveal their experiences through their remains (Sofaer 2006). Thus, it is critical to move beyond viewing the body through simple categories (age, sex, presence or absence of pathology) to see it as the product of interrelated phenomena (Krieger 2005).

The body is both material and biological due to its social significance and commodification during life and after death (Sofaer 2006). Such duality further supports the lack of dichotomy between science and identity or humanism (Martin et al. 2013; Sofaer 2006). Bodies have strong cultural, transcendental, and spiritual properties, even after death, which conflicts with the types of commodified bodies—rationalized, fragmented, depersonalized, and anonymous—required by medical, forensic, and biotechnical scientists (Schepfer-Hughes 2011). Commodities are material objects, so the commodification of the body highlights its materiality (Sofaer 2006). In her review of commodification literature, Sofaer (2006:64) distinguishes between two types of commodification: 1) bodies and body parts treated as objects through sale, theft, inheritance, or capture, and 2) the making of objects from bodies through deliberate postmortem manipulation. Though grave robbing and medical dissection are only included in the first type of commodification, the Terry Collection individuals fit both
forms. The deceased were first sent to the Washington University Medical School for dissection, but then they were deliberately depersonalized and transformed into objects— from cadaver to skeleton to specimen—that could be bought, sold, and displayed for the benefit of medical education of white elites (Crossland 2009; de la Cova 2019, In Press; Flies et al. 2017; Muller et al. 2017; Sappol 2002). The transformation from person to object occurred through a specific and well-honed process with the intent of curation (de la Cova 2019, In Press).

The people in the Terry Collection embody social identity, commodification, discrimination, and other forms of structuralized violence that were formalized within the anatomy acts. Research on structural violence has focused primarily on life experiences and living people, even if interpreted after death. Just as inequality may become embodied as health disparities in living people, the dead may also embody inequality through the fate and postmortem treatment their remains (Blakely and Harrington 1997; de la Cova 2011, 2014, 2017, 2019; Nystrom 2011, 2014, 2017; Pearlstein 2015). Postmortem treatment of the dead relates to their antemortem cultural reality and identity. Conduct regarding the deceased indicates cultural realities and beliefs of that society or group (Pérez 2012). Institutionalized restriction of burial and legalized dissection of marginalized individuals reflects contemporary entrenched societal and legal inequalities due to society’s disparaging view of those groups (Nystrom 2014).

Mortuary rituals also reflect an embodied worldview (Stutz 2003). Mortuary rituals are rites that operate on personal, social, and symbolic levels. They are performed by survivors close to the deceased and are important for transitioning out of the liminality created by the death (Stutz 2003:58,67). These rituals redefine the cadaver, which is an
abject (neither object nor subject), in order for the dead to pass out of the world of the living and the world of the living to move on (Stutz 2003). Using involuntary creation of cadavers, as occurred in the formation of the Terry Collection, breaks the traditional mortuary rituals afforded to the rest of society. Forgoing or actively enacting legislation that prevented mortuary rituals in favor of involuntary dissection, a phenomenon often seen as a punishment, is a form (actually two) of structuralized violence (Muller et al. 2017). These actions also served as a mechanism of social abandonment (e.g. Biehl 2013) and social oppression to break bonds within immigrant, African American, and poor communities.

3.3 Summary

Understanding the relationship between disease and inequality should integrate embodiment theory, social processes, local meanings, and a cross-cultural perspective (Nguyen and Peschard 2003). In the context of this dissertation, the individuals in the research sample are viewed through a biocultural lens to interpret the effects of structural violence, particularly racialization of the origin subgroups within the research sample, that are embodied as skeletal evidence of pathology. Structural violence during life and after death varies across groups and individuals due to the intersection of multiple layers of socially significant factors that constitute identity. The use of the research approaches outlined here broaden bioarchaeological analyses from descriptive reporting to contextualize them within the relationships of culture, history, biology, and environment.
CHAPTER 4

MATERIALS AND METHODS

The analysis of skeletal indicators of pathology among German and Irish immigrants, African American migrants, and individuals born in Missouri took place on a sample from the Terry Collection. This chapter introduces the collection as well as the methods used to identify and record skeletal evidence of trauma, tuberculosis, vitamin D deficiency, dental caries, dental abscesses, and linear enamel hypoplasia. These indicators are related to social and environmental conditions found in historic St. Louis. The precise ways that those relationships were present was investigated through statistical analyses, which are described in the final part of the chapter.

4.1 The Robert J. Terry Anatomical Skeletal Collection

Dr. Robert J. Terry, a comparative and human anatomist, started the eponymous skeletal series for education and research purposes when he began his tenure as chair of the Anatomy Department of Washington University in St. Louis in 1910 (Hunt and Albanese 2005; Trotter 1981). After his retirement in 1941, Mildred Trotter succeeded Terry as professor of anatomy and continued adding to the collection. The individuals in the collection are on permanent loan to the Smithsonian Institution’s National Museum of Natural History (Hunt and Albanese 2005; Trotter 1981).

Terry curated his eponymous skeletal collection from cadavers that came to the medical school for dissection primarily from St. Louis hospitals and institutional
morgues. A small portion originated from other institutions throughout Missouri (Hunt and Albanese 2005; Trotter 1981). These individuals are overwhelmingly derived from low SES classes, which is why the collection consists of individuals who were unclaimed by relatives at the morgue. Unclaimed individuals became property of the state, and, as such, they would have been buried at taxpayers’ expense. To avoid the expenditure, they were made available to the medical school for use in anatomy instruction instead (Hunt and Albanese 2005). The use of unclaimed bodies in medical education was common within the United States and Canada through World War II; many of the laws that allow this practice are still active in much of the United States (Bernstein 2016a,b; Friesen 2009; Hunt and Albanese 2005; North Carolina General Assembly 2018a, 2018b).

The Terry Collection is comprised of 1,728 documented individuals who lived in St. Louis between 1828 and 1965 (Hunt and Albanese 2005; de la Cova 2011; Muller et al. 2017). Morgue records are available for all individuals. This documentation provides the deceased’s name, sex, age, and race (Hunt and Albanese 2005). Although the term race is used in the original records, ancestry is a more accurate term and will be used in more often in this dissertation. Additional information in associated Terry Collection records includes cause and date of death, the morgue or institution where death occurred, and some information pertaining to the processing of the cadaver (Hunt and Albanese 2005). The provided information on each individual’s country or state of origin is especially of interest to this research because it is the basis for placing migrants into groups that correspond to their sociocultural, and thus racialized, categorization.
4.1.1. The Sample

Individuals in the research sample (total n=433) were selected from each of the groups: German immigrants, Irish immigrants, African American migrants from the South, and individuals of both European and African ancestry born in Missouri. These groups were identified based on the state and country of origin listed in morgue records. The demographic, age, and year of birth distribution of my sample is displayed in Table 4.1 and Figure 4.1.

Table 4.1 Demographic distribution of the Terry Collection sample

<table>
<thead>
<tr>
<th></th>
<th>South</th>
<th>Missouri</th>
<th>German</th>
<th>Irish</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>European Ancestry</strong></td>
<td>0</td>
<td>71 (16.4%)</td>
<td>69 (15.9%)</td>
<td>30 (6.9%)</td>
<td>170 (39.3%)</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td>0</td>
<td>34 (7.9%)</td>
<td>48 (11.1%)</td>
<td>27 (6.2%)</td>
<td>109 (25.2%)</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>0</td>
<td>37 (8.5%)</td>
<td>21 (4.8%)</td>
<td>3 (0.7%)</td>
<td>61 (14.1%)</td>
</tr>
<tr>
<td><strong>African Ancestry</strong></td>
<td>194 (44.8%)</td>
<td>69 (15.9%)</td>
<td>0</td>
<td>0</td>
<td>263 (60.7%)</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td>116 (26.8%)</td>
<td>33 (7.6%)</td>
<td>0</td>
<td>0</td>
<td>149 (34.4%)</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>78 (18.0%)</td>
<td>36 (8.3%)</td>
<td>0</td>
<td>0</td>
<td>114 (26.3%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>194 (44.8%)</td>
<td>140 (32.4%)</td>
<td>69 (15.9%)</td>
<td>30 (6.9%)</td>
<td>433 (100%)</td>
</tr>
</tbody>
</table>

Figure 4.1 Distribution of birth years in the Terry Collection sample
Due to small numbers present in the collection, all individuals with the listed country of origin as Ireland and Germany were included in the sample. Added to those groups were the children of German and Irish immigrants. These first-generation German- or Irish-Americans were categorized as “German” or “Irish” in the associated records despite being born in America. This discrepancy is an indicator of how these individuals were racialized – Othered as part of a foreign group rather than accepted as citizens – by broader society. The reason for including first-generation German- and Irish-Americans with the European immigrant subgroups is twofold: 1) to reflect societal views indicated by the morgue records, and 2) it increases the number of individuals in each group to bolster the ability to conduct statistical analyses. The sample demographics by origin group with first-generation individuals separated is displayed in Table 4.2.

African American migrants from the American South came to St. Louis during the Exoduster movement and the Great Migration. Individuals listed as “black” on their morgue record and born in one of the southern, formerly slave-holding states were eligible for this category. The sample group was selected using a random number generator within Microsoft Excel™ from a pool of all individuals that met the criteria.

The same random number generator was used to select the sample of individuals born in Missouri. This group includes people categorized as both “black” and “white” on their morgue records. The Missourian subsample did not experience the same stresses related to (im)migration, and therefore it provides a comparison for both the African American and European migrants to St. Louis.
Table 4.2 Sample distribution with number of first-generation individuals indicated

<table>
<thead>
<tr>
<th>Ancestry</th>
<th>South</th>
<th>Missouri</th>
<th>German</th>
<th>1st Gen.</th>
<th>Irish</th>
<th>1st Gen.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>German-Am.</td>
<td></td>
<td>Irish-Am.</td>
<td></td>
</tr>
<tr>
<td>European Ancestry</td>
<td></td>
<td></td>
<td></td>
<td>15 (3.5%)</td>
<td>14 (3.2%)</td>
<td>16 (3.7%)</td>
<td>170 (39.3%)</td>
</tr>
<tr>
<td>Male</td>
<td>0</td>
<td>71 (16.4%)</td>
<td>54 (12.5%)</td>
<td></td>
<td></td>
<td></td>
<td>109 (25.2%)</td>
</tr>
<tr>
<td>Female</td>
<td>0</td>
<td>34 (7.9%)</td>
<td>40 (9.2%)</td>
<td>8 (1.8%)</td>
<td>12 (2.8%)</td>
<td>15 (3.5%)</td>
<td>61 (14.1%)</td>
</tr>
<tr>
<td>African Ancestry</td>
<td>194 (44.8%)</td>
<td>69 (15.9%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>263 (60.7%)</td>
</tr>
<tr>
<td>Male</td>
<td>116 (26.8%)</td>
<td>33 (7.6%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>149 (34.4%)</td>
</tr>
<tr>
<td>Female</td>
<td>78 (18%)</td>
<td>36 (8.3%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>114 (26.3%)</td>
</tr>
</tbody>
</table>
4.2 Methods of Data Collection and Analysis

Patterns of disease and stress among sample groups were identified through macroscopic observations of osseous reactions. Bone is a living material that is constantly remodeling throughout a person’s lifetime. Differences in remodeling processes in the face of insults give paleopathologists indications about the nature of an individual’s morbidity. Skeletal manifestations of disease are the result of external insults that provoke an osseous response (Mays 2012). Physiological disruptions, or biological stress, that affect individuals may be induced by biological, environmental, or cultural factors that include a wide range of phenomena such as psychological stress, specific disease agents, or poor nutrition (Goodman et al. 1984; Goodman and Martin 2002; Mays 2012; Reitsema and McIlvaine 2014). If effected by these insults, bone can react in a number of ways: through proliferation, resorption, or a combination of both processes. Patterns of bony reactions may indicate a specific disease, such as tuberculosis or treponematosis, or non-specific processes, such as inflammation or unidentifiable infection (Ortner 2003; Roberts and Manchester 2005; Brickley and Ives 2008; de la Cova 2011; Pearlstein 2015). However, some individuals will die of diseases that only affect soft tissue (Goodman and Armelagos 1989) or progress so rapidly that there is no skeletal response (Buikstra and Beck 2006; Wood et al. 1992). Analyses of skeletal patterns of disease are thus inherently limited in scope but are useful when focused on pathological indicators that have a known component of skeletal involvement. Furthermore, as discussed in section 1.4, health is difficult to quantify. Determinations of health from skeletal remains are problematic because they cannot address all aspects of what constitutes health (DeWitte and Stojanowski 2015; Reitsema and McIlvaine 2014;
Therefore, this dissertation focuses on indicators of disease and stress rather than health.

4.2.1 Skeletal Pathological Indicators

Skeletal pathological indicators are defined as external mechanisms of injury, disease processes, growth disruption, or nutritional deficiencies that are the result of physiological disruptions severe or chronic enough to result in skeletal changes. Pathological conditions examined and recorded for this research are skeletal evidence of trauma, tuberculosis, vitamin D deficiency (osteomalacia and residual rickets), dental caries, abscesses, and linear enamel hypoplasia (LEH). Observations of presence or absence of these conditions were recorded according to the commonly accepted protocols described below and summarized in Table 4.3.

Table 4.3 Literature containing guidelines for recording observations of pathological changes in skeletal remains

<table>
<thead>
<tr>
<th>Pathological indicator</th>
<th>Observation procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overarching Methodological Texts</td>
<td>Buikstra and Ubelaker 1994; Ortner 2003; Buikstra 2019</td>
</tr>
<tr>
<td>Trauma</td>
<td>Judd and Redfern 2012; Lovell 1997</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>Kelley and Micozzi 1984; Roberts 2012; Roberts and Buikstra 2003; Roberts and Manchester 2005</td>
</tr>
<tr>
<td>Vitamin D Deficiency</td>
<td>Brickley et al. 2005, 2007; Brickley and Ives 2008; Ives and Brickley 2014; Brickley et al. 2014; Brickley et al. 2018</td>
</tr>
<tr>
<td>Dental Disease &amp; Disruption</td>
<td>Goodman and Rose 1991; Hillson 2005; Lukacs 2012</td>
</tr>
</tbody>
</table>

4.2.1.1 Trauma

Trauma is defined as a wound or injury to living tissue caused by an extrinsic mechanism (Lovell 1997; Judd and Redfern 2012). Many injuries can cause trauma in a living person that will only damage soft tissue instead of effecting bone. Due to the nature of bioarchaeology, only skeletal observations of trauma (and all other pathological
indicators in this study) are available, which represents a limitation to the entire field (Buikstra and Beck 2006; Martin et al. 2013). Fractures are the most common type of direct violence visible in the osteological record.

Figure 4.2 Example of a healed fibula fracture in individual TC287

Trauma was recorded as present in an individual if evidence of antemortem fractures, dislocations, amputations, gunshot wounds, or knife wounds was observed. Fractures are defined as a partial or complete break in the continuity of a bone (Lovell 1997). Since sharp, blunt, and projectile trauma may disrupt bone continuity knife and gunshot wounds as well as amputations fall into category of fracture (Judd and Redfern 2012; Lovell 1997). Dislocations are defined as the total displacement of the articular surfaces of a joint whereas subluxations are a partial displacement (Lovell 1997). The mechanism of traumatic injury was specified only in cases where, due to evidence present or associated documentation, the etiology was clear (Judd and Redfern 2012). Due to limitations of osteological research, identifying the exact mechanism of injury and
intention behind it (i.e. accidental fall or international interpersonal violence) was not possible in most cases.

4.2.1.2 Tuberculosis

Tuberculosis is an infectious disease, caused by *Mycobacterium tuberculosis*, that is associated with poverty and inequality (Ortner 2003; Roberts and Buikstra 2003; Roberts 2012). There are many risk factors that predispose people to tuberculosis in contemporary populations; some, like age and sex, are biological factors while others are environmental, such as an overcrowded living situation, urban settings, vitamin D deficiency, and poor air quality. Socioeconomic factors, including poverty, poor diet and hygiene, migration, and reduced access to healthcare, also increase the risk of developing tuberculosis (Roberts 2012).

The bacteria leave the lungs via the bloodstream, and, once mobile, can enter the skeleton. Though any bone may be affected, they gravitate towards areas of hematopoietic marrow and thus cancellous bone (Ortner 2003; Roberts and Buikstra 2019). Tuberculosis was recorded as present or absent based on characteristic skeletal changes. In adults, tuberculosis of the spine, or Pott’s disease, is a common presentation and a skeletal change characteristic of this infection. Pott’s disease is caused by lytic abscesses on the anterior surface of one or more vertebral bodies that lead to cavitation (Ortner 2003; Roberts and Buikstra 2019; Roberts 2009). The abscesses eventually induce structural weakness and collapse the vertebral body, resulting in a kyphotic hunched position of the back and even paralysis or death in severe cases (Roberts 2009). The most frequent regions for the manifestation of Pott’s disease is the lower spine in general, L1 vertebra specifically (Ortner 2003; Roberts and Buikstra
In some cases, spinal tuberculosis may transfer down to the hip joint via the psoas major muscle, which runs paravertebrally starting around L2 through the pelvic girdle to attach on the femur (Ortner 2003; Roberts and Buikstra 2019).

Figure 4.3 Pott’s disease of the lumbar vertebrae in individual TC468

In long bones, tuberculosis primarily remains localized to the metaphyses or epiphyses due to hematopoiesis (Roberts and Buikstra 2019). Infectious of the synovial membrane may affect the adjacent joint resulting in tubercular arthritis (Roberts and Buikstra 2019). Such arthritis could present as resorptive grooving or cavitations of the articular surfaces along the line of the synovial membrane or the ligaments (Roberts and Buikstra 2019). Tuberculosis of the joints are relatively less common than spinal
involvement. Though any joint may be affected, the most common are the hip, the knee, and the elbow, though most cases develop in childhood and adolescence (Roberts and Buikstra 2019).

Additionally, tubercular infection may affect the ribs. Though described clinically as lytic lesions, studies on dry bone indicate that the infection causes periosteal new bone formation on the visceral surfaces of ribs (Kelley and Micozzi 1984; Roberts et al. 1994; Roberts and Buikstra 2003, 2019; Roberts and Manchester 2005; Santos and Roberts 2006; Roberts 2012). Usually middle ribs are affected (Ortner 2003; Roberts and Buikstra 2019). The reaction is caused by inflammation of the pleura, which is in contact with the visceral rib surfaces, and therefore can provoke a bony response in that area (Buikstra 2019). Though research on documented human skeletons suggests that rib involvement is more likely to be related to tuberculosis than any other pulmonary disease, it cannot be

![Figure 4.4 Periosteal new bone formation on the visceral rib of individual TC521](image)

Photo by John V. Mortenson
Photo by John V. Mortenson

Figure 4.4 Periosteal new bone formation on the visceral rib of individual TC521
solely used as an indicator of tuberculosis infection like Pott’s disease (Roberts and Buikstra 2003, 2019).

An individual was identified as having tuberculosis in their skeletal remains if they had changes indicative of Pott’s disease. An individual was also recorded as present for skeletal tuberculosis if they had a combination of at least two of the following: skeletal changes at joint surfaces, periosteal new bone formation on visceral ribs, or a recorded cause of death as tuberculosis. Although tuberculosis is identifiable in skeletal remains, it only affects osseous tissue in about three to five percent of active cases (Roberts and Buikstra 2019; Holloway et al. 2013). The low involvement of the skeletal system means that actual prevalence of this infectious disease in any skeletal sample may be underestimated. Therefore, whether tuberculosis was listed as a cause of death in morgue records was also noted for each individual in the research sample. The inclusion of this variable, abbreviated as TBCOD, better reflects the true occurrence of tuberculosis among migrant populations in historic St. Louis.

4.2.1.3 Vitamin D Deficiency

Vitamin D is a pro-hormone that is vital for good skeletal health and other bodily functions. It plays a significant role in the homeostasis of calcium and phosphorus, which gives it an important role in the mineralization of osteoid, the collagen-based matrix that precedes bone, during growth (Brickley et al. 2005; Brickley and Mays 2019). If osteoid is not mineralized properly, the bone either does not harden sufficiently, making it prone to bending during weight-bearing, or is weakened and prone to buckling fractures.

Vitamin D intake is dependent on primarily cutaneous sunlight exposure via ultraviolet (UV) radiation. Of the types of UV radiation, UVB is most necessary for the
processes related to cutaneous vitamin D production (Jablonski and Chaplin 2012). Skin pigmentation levels in humans evolved as an adaptation to levels of UV radiation (Jablonski and Chaplin 2010, 2012). Darker, eumelanin-rich pigmentation occurred in intense UV radiation environments nearer the equator due to its protective properties against high levels of UVB (Jablonski and Chaplin 2010, 2012). Outside of the tropical latitudes, light pigmentation allowed better production of vitamin D in low UVB environments at higher latitudes (Jablonski and Chaplin 2010).

Migration or enslavement meant that people spent large periods of their lives in an environment different from that adapted to by their ancestors (Jablonski and Chaplin 2012). This mismatch can affect health. The risk for vitamin D deficiency increases in higher latitudes that correlate with lower rates of UVB sunlight exposure, especially for individuals with higher amounts of melanin leading to darker skin pigmentation (Åkeson et al. 2016; Chaplin and Jablonski 2013; Clemens et al. 1982; Holick and Chen 2008; Jablonski and Chaplin 2012). It is not possible to determine melanin amount or skin pigmentation from skeletal remains alone. Terry Collection documents indicating ancestry may give a very basic idea of skin pigmentation, but do not go beyond classifications of “black” or “white”, and therefore are unable to provide an accurate idea of the degree of pigmentation, which would affect vitamin D synthesis.

Vitamin D status in individuals and populations represents a complex relationship between sociocultural factors that determine interaction with the environment. St. Louis is not at so high a latitude that it presents an extreme low in UVB presence (the city lies at less than 42° latitude), but its temperate climate may also have played a role in seasonally restricting cutaneous sunlight exposure (Jones 2018; Robinowitz 2009). For
example, high coverage clothing in multiple layers may have been worn during cold winters. Additionally, cultural practices such as beliefs about appropriate clothing or the amount of skin that may be exposed in public would have restricted sunlight exposure and therefore cutaneous synthesis (Drummond and Wilbraham 1958; Roberts and Cox 2003; Brickley and Ives 2008; Brickley et al. 2014). Socioeconomic status along with place of residence affects determinants of vitamin D levels (Brickley et al. 2014). In an urban environment, low SES individuals likely encountered factors such as long hours of factory or other indoor work, tenement housing without much natural light, or air pollution that blocked sunlight, which made it possible for individuals with a variety of skin pigmentation to suffer from vitamin D deficiency (Brickley et al. 2014; Brickley and Mays 2019). Finally, gender-related differences in activity can influence sunlight exposure (Veselka et al 2018).

Vitamin D may also be gained, though in smaller parts, through dietary consumption. It is found in eggs, oily fish, and liver (Brickley and Ives 2008; Jones 2018). In the U.S., since approximately the mid-1930s, milk fortified with vitamin D was available (Bishai and Nalubola 2002; Jones 2018). However, there is no federal mandate of vitamin D fortification of eligible foods, which means that the decision to add vitamin D to milk lies with states or individual manufacturers (Bishai and Nalubola 2002; Calvo et al. 2004; Jones 2018). While milk and ready-to-eat cereals are the predominant food sources of vitamin D and are uniformly fortified in the U.S. at present, there was likely less widespread availability of vitamin D fortified products in the 1930s (Calvo et al. 2004; Jones 2018). As milk enriched with vitamin D became newly available, it is
possible that it was only added to more expensive brands that individuals of low SES were less likely to afford.

Furthermore, vitamin D plays a role in the immune system, so deficiency may be related to additional adverse health outcomes (Brickley et al. 2014; Chaplin and Jablonski 2013; Jablonski and Chaplin 2012). Insufficiency and deficiencies of this vitamin may increase the risk of developing diseases such as multiple sclerosis, tuberculosis, dental caries, type 1 and type 2 diabetes, cardiovascular disease, several types of cancer, and rheumatoid arthritis (Brickley and Ives 2008; Brickley et al. 2014; Calvo et al. 2004; Roberts 2012; Robinowitz 2009; Schroth et al. 2016). Cardiovascular disease, schizophrenia, and various types of cancers have also been linked to vitamin D levels (Brickley et al. 2014).

A deficiency of vitamin D presents in two different forms that occur across diverse life stages: rickets in subadults and osteomalacia in adults. Since all individuals in the Terry Collection are adults, only residual rickets, or evidence that an individual experienced a past episode of rickets during infancy, childhood, or early adolescence, is observable (Brickley et al. 2018). Despite known causal factors, it is not possible to determine from skeletal remains alone whether the deficiency was initiated by lack of adequate sunlight exposure through environmental, occupational, or cultural factors, skin pigmentation, inadequate diet, or a combination of several of these variables (Brickley et al. 2014). However, examining the full biocultural context of human remains may provide insight into possible population specific proximal determinants (Brickley et al 2014).
Vitamin D deficiency during growth and development of subadults, or rickets, leads to inadequate mineralization of the growing bone. Through movement and weight-bearing, flaring of long-bone metaphyses and sternal rib ends, concavity of diaphyses, and bending deformities of long bones may occur due to biomechanical deformation of weakened, poorly mineralized bone (Brickley and Mays 2019). While bending is most commonly seen in the lower limbs, it is also possible in other elements. The build-up of osteoid during the period of deficiency ossifies during recovery and leads to bone thickening (Brickley and Ives 2008; Brickley and Mays 2019). For residual rickets, diagnostic features include residual bending, most common in the leg long bones, increased angulation of femoral neck, cortical thickening in bend concavities, protrusion of sternum, and lateral straightening of rib shafts (Brickley and Ives 2008: Table 5.8). Although visible bending deformities of long-bones are considered macroscopic diagnostic features for this condition, rickets is not the only condition that

![Figure 4.5 Residual rickets as seen in bending deformities of the femora of individual TC583](Photo by Kristina M. Zarenko)
may cause bowing changes. Macroscopic observations of residual rickets may not always match with microscopic observations (Veselka et al. 2019).

Figure 4.6 A pseudofracture in the sacrum of individual TC1496R indicating probable osteomalacia

Osteomalacia develops in response to long periods of vitamin D deficiency in adulthood, after growth has ended (Brickley et al. 2018). Adult metabolism of vitamins and bone remodeling causes a different manifestation than childhood rickets. Buckling fractures or pseudofractures (Looser’s zones) are the most common lesions associated with osteomalacia. Bending of weight bearing bones such as the pelvis, proximal femur, sacrum, sternum, and vertebrae may indicate osteomalacia, though it usually happens in very extreme cases (Brickley et al. 2005; Ives and Brickley 2014; Brickley and Mays 2019). Bending indicative of osteomalacia is distinct from that associated with residual rickets due to the presence of pseudofractures and differences in bone texture (Brickley
Deformities on the scapulae and ribs are also possible (Brickley et al. 20007; Ives and Brickley 2014).

Strongly diagnostic features indicative of osteomalacia include multiple pseudofractures present as linear ridges of irregular, spiculated bone on ribs, pseudofractures on pubic rami, adjacent placement of the public rami, ilial pseudofractures adjacent to the greater sciatic notch, and Looser’s zones on the lateral border or infero-lateral spinous process of the scapula (Brickley and Ives 2008: Table 5.11). Diagnostic features of osteomalacia include increased posterior scapular curvature, metacarpal or metatarsal pseudofractures, pseudofractures of the medial femoral neck or shaft, multiple often adjacent compete rib fractures, buckling or folding of vertebral bodies, and multiple sites of biconcave compression of superior and inferior vertebral surfaces (Brickley and Ives 2008: Table 5.11).

Individuals in the Terry Collection sample were recorded as having either form of vitamin D deficiency if they displayed at least one strongly diagnostic feature or several diagnostic features as listed in Brickley and Ives (2008: Tables 5.8 and 5.11). For osteomalacia, if strongly diagnostic characteristics were not present but diagnostic features were, the diagnosis was listed as likely or possible. Although the two forms of vitamin D deficiency originate at different life stages, due to low numbers, identified or possible cases of either residual rickets or osteomalacia were combined into a single category of present vitamin D deficiency.
4.2.1.4 Dental Disease and Disruption

There is a relationship between oral health and overall health (Kinaston et al. 2019; Sabbah et al. 2007), and socioeconomic inequality is correlated with oral health disparities (Bernabe et al. 2009; Borrell and Crawford 2008; Brodeur et al 2000; Elani et al. 2012; Sabbah et al. 2007; Steele et al. 2015). Dental caries and abscesses are diagnosed from the destruction of enamel and dentin, for caries, and alveolar bone, for abscesses (Lukacs 2012). Dental abscesses indicate the inflammation of the pulp chamber due to excessive attrition or untreated, invasive dental caries (Buiksra and Ubelaker 1994). The demineralization process of dental caries is caused by bacterial fermentation of dietary carbohydrates, especially refined sugars, which produces organic acids that attack dental hard tissues (Kinaston et al. 2019; Lukacs 2012. The etiology of dental caries is an important research focus because dental caries is still highly prevalent at present and represent a public health concern (Lukacs 2012). Recent research has
indicated a connection between dental caries and vitamin D deficiency (Grant 2016), atherosclerosis (Glodny et al. 2013; Kholy et al. 2015), systemic infection (Kholy et al. 2015), and diabetes mellitus (Jawed, et al. 2011; Singh et al. 2016). Although treatable today, if left untreated caries may progress to complete tooth destruction and loss, dental abscesses, or infection that can affect the body beyond the oral cavity. New developments in research investigating the relationship between diet, subsistence, and dental disease indicate the genetic variation of reproductive biology, enamel microstructure, oral ecology, and pathogenic microorganisms in the oral cavity that influence sex differences in caries prevalence (Lukacs 2012).

Another condition affecting the tooth is enamel hypoplasia. Linear enamel hypoplasia (LEH) is a disruption of enamel formation, amelogenesis, during the formation of tooth crowns due to periods of intense stress (physiological perturbations), hereditary anomalies, and localized trauma (Buikstra and Ubelaker 1994; Goodman and Rose 1990, 1991; Hillson 2005, 2014; Kinaston et al. 2019). Enamel hypoplasia presents most often as depressed bands in the enamel but may also appear as pits or other defects (Bocaege and Hillson 2016; Buikstra and Ubelaker 1994; Goodman and Rose 1990; Hillson 2005, 2014; Kinaston et al. 2019). Like rickets and stature, LEH can be used to infer information about the environment or health status during childhood. A physiological response to stress is to reallocate energy to coping mechanisms (higher priority functions necessary for survival) in a way that can result in arrested growth in the form of enamel hypoplasias or stunted stature (Weston 2012). However, the specific type of stress that induces an arresting response during amelogenesis is unknown.
Figure 4.8 Abscess exposing the roots of the left lateral maxillary incisor and canine in individual TC1239R

Figure 4.9 Linear enamel hypoplasia (LEH) visible on the right mandibular canine of individual TC1554
Caries, abscesses, and hypoplasias were recorded as present or absent for each individual. Caries presence was recorded if dark eroded areas or large open cavities on the tooth crown were present (Buikstra and Ubelaker 1994; Lukacs 2012; White and Folkens 2005; White et al. 2012). An abscess was recorded as present if a drainage channel leading from the apex of the tooth root through adjacent alveolar bone, either active or with evidence of healing, was observed (Buikstra and Ubelaker 1994; Lukacs 2012; White and Folkens 2005; White et al. 2012). LEH were marked as present if at least one tooth presented with depressed linear bands in the enamel (Kinaston et al. 2019; White and Folkens 2005; White et al. 2012).

### 4.2.2 Statistical analyses

To understand the distribution of presence and absence of pathological conditions within the Terry Collection sample, initial analyses were performed with the data divided into origin, sex, and ancestry cohorts (Table 4.1. Summary statistics within sample cohorts, including frequencies, mean, range, were performed as the initial analyses of numerical data. Statistical analyses were then performed on groups using SPSS 25.0 (IBM Corp. 2017). Tests compared observations of pathological indicators between area of origin groups and other subgroups within the sample to assess whether significant differences exist and evaluate the hypotheses of this study. Statistical significance was defined at the level of p<0.05 for all tests.

Since the pathological data collected was nominal, Chi-square analyses were employed for all comparisons between pathological indicator presence across demographic categories. One assumption of the Chi-square test is that cross-tabulation tables will have few to no cells with expected counts less than five (McHugh 2013). Low
frequencies of individuals with skeletal pathological changes may occur in this sample due to divisions of the sample into subgroups for comparison or rarity of pathological conditions. In instances that low frequencies violate this assumption of a Chi-square test, either a Fisher’s Exact Test or Likelihood Ratio value will be used to determine significance between examined variables instead. Fisher’s Exact Test was used with 2x2 tables when more than 20 percent of the cells have expected counts less than five; Likelihood Ratio was used in tables larger than 2x2 when more than 20 percent of the cells have expected counts less than five (Meyers et al. 2013; VanPool and Leonard 2011). If the Chi-square test indicates that a significant difference exists between the targeted groups or variables, a Cramer’s V post-hoc test determined the strength of the relationship (Kendall and Stuart 1979; McHugh 2013; Pearlstein 2015). Cramer’s V results and their correspondence to relationship strength are listed in Table 4.4 (Kendall and Stuart 1979; Pearlstein 2015).

### Table 4.4 Cramer’s V statistic result and the corresponding strength of the Chi-square relationship

<table>
<thead>
<tr>
<th>Cramer’s V statistic</th>
<th>Relationship strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>.00-.09</td>
<td>Very weak</td>
</tr>
<tr>
<td>.10-.19</td>
<td>Weak</td>
</tr>
<tr>
<td>.20-.29</td>
<td>Moderate</td>
</tr>
<tr>
<td>.30 or greater</td>
<td>Strong</td>
</tr>
</tbody>
</table>

Analyses of variance (ANOVA) and independent sample T-tests were performed to understand the age distribution among groups in the sample. Numerical data analyzed in this dissertation are ages at death. In conducting ANOVAs, Levene’s test was used to test homogeneity of variances. If equal sample sizes between examined groups were not present during an ANOVA test, the Welch adjustment was used to determine if a
statistically significant difference existed instead. Welch was chosen because it is more powerful in showing differences that are present in the case of unequal sample sizes (Liu 2015). Additionally, Games-Howell post-hoc tests indicated between which groups the significant relationships occurred in the case of unequal sample sizes among tested groups (Shingala and Rajyaguru 2015).

4.3 Summary

The skeletal pathological conditions described in this chapter are used as indicators of social conditions in historic St. Louis, Missouri. They were chosen because they manifest in skeletal remains and relate to deficiency, poverty, and marginalization. All individuals in the Terry Collection were low SES at the time of their death, but that status did not affect all groups within the research sample the same way. Variation in frequencies of pathological indicators among migrant groups give insight into the heterogeneity of experiences among those groups. Those analyses take place in the following chapter, addressing the research questions of this study regarding the effects of racialization of migrants to St. Louis.
CHAPTER 5

RESULTS

Results obtained from the sample of 433 Terry Collection individuals indicate that there are some differences among origin, ancestry, and sex cohorts (Table 4.1 and 4.2). Some patterns, such as African Americans having the highest frequencies of all indicators, fit with the hypotheses of the study. Other evidence, especially that surrounding the European immigrant and Euro-American groups, does not support the predictions of the dissertation. For all tables, bolded numbers in the significance column indicate a significant result (p<.05). An asterisk next to a number in the significance column indicates that Fisher’s Exact Test or Likelihood Ratio values were used to determine significance.

5.1 Statistical Analysis of Age

The average age at death of this sample is 53.18 years. The distribution of age at death for sex and area of origin groups is presented in Table. 5.1. The ANOVA adjusted through the Welch test (F=49.241, p<.001) indicate that all differences among origin groups, except between German and Irish immigrants, are significant, showing that Southern migrants were dying at younger average ages than any other group (Table 5.2).

An independent sample T-test shows differences in mean age at death between males and females in the sample. Equal variances cannot be assumed (F=6.768, p=0.01).
Average age of death for males is 52.59 years and for females it is 54.03 years (Table 5.1). However, these differences are not statistically significant ($t= -.084$, $p=.401$).

Table 5.1 Mean age at death by region of origin and sex

<table>
<thead>
<tr>
<th>Region of Origin</th>
<th>Mean Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>South</td>
<td>46.83</td>
</tr>
<tr>
<td>Missouri</td>
<td>53.54</td>
</tr>
<tr>
<td>Mo. African American</td>
<td>49.93</td>
</tr>
<tr>
<td>Mo. Euro-American</td>
<td>57.04</td>
</tr>
<tr>
<td>Germany</td>
<td>67.09</td>
</tr>
<tr>
<td>Ireland</td>
<td>61.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
<th>Mean Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>52.59</td>
</tr>
<tr>
<td>Female</td>
<td>54.03</td>
</tr>
<tr>
<td>Total Sample</td>
<td>53.18</td>
</tr>
</tbody>
</table>

Table 5.2 Games-Howell post-hoc test to determine significance of mean age at death differences between region of origin groups

<table>
<thead>
<tr>
<th>Origin</th>
<th>Origin</th>
<th>Mean Difference b/t Origin Groups</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>South</td>
<td>Missouri</td>
<td>-6.706</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>German</td>
<td>-20.258</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Irish</td>
<td>-14.17</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Missouri</td>
<td>South</td>
<td>6.706</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>German</td>
<td>-13.553</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Irish</td>
<td>-7.464</td>
<td>.015</td>
</tr>
<tr>
<td>German</td>
<td>South</td>
<td>20.258</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Missouri</td>
<td>13.553</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Irish</td>
<td>6.088</td>
<td>.053</td>
</tr>
<tr>
<td>Irish</td>
<td>South</td>
<td>14.17</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>Missouri</td>
<td>7.464</td>
<td>.015</td>
</tr>
<tr>
<td></td>
<td>German</td>
<td>-6.088</td>
<td>.053</td>
</tr>
</tbody>
</table>

In combining sex and ancestry categories, homogeneity of variances between the subgroups are unequal. Significant differences exist between groups of European and African ancestry (Tables 5.3 and 5.4). No significant differences exist between sex.
groups of the same ancestry. People of European ancestry of both sexes are living longer than African Americans. The mean age at death for African American males (47.24) is about 12 years lower than that of European ancestry males (59.97). The difference between African American (48.17) and European ancestry (65.00) females is even larger.

Table 5.3 Mean age at death for sex and ancestry groups

<table>
<thead>
<tr>
<th>Sex &amp; Ancestry</th>
<th>Mean Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Euro. Ancestry Male</td>
<td>59.97</td>
</tr>
<tr>
<td>African Ancestry Male</td>
<td>47.24</td>
</tr>
<tr>
<td>Euro. Ancestry Female</td>
<td>65.00</td>
</tr>
<tr>
<td>African Ancestry Female</td>
<td>48.17</td>
</tr>
<tr>
<td>Total Sample</td>
<td>53.18</td>
</tr>
</tbody>
</table>

Table 5.4 Games-Howell post-hoc test to determine significance of mean age at death differences between sex and ancestry groups

<table>
<thead>
<tr>
<th>Sex &amp; Ancestry</th>
<th>Sex &amp; Ancestry</th>
<th>Mean Difference b/t Groups</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Ancestry Male</td>
<td>African Ancestry Male</td>
<td>12.731</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>European Ancestry Female</td>
<td>Euro. Ancestry Female</td>
<td>-5.028</td>
<td>.059</td>
</tr>
<tr>
<td>European Ancestry Female</td>
<td>African Ancestry Female</td>
<td>11.806</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>African Ancestry Male</td>
<td>Euro. Ancestry Male</td>
<td>-12.731</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>African Ancestry Male</td>
<td>Euro. Ancestry Female</td>
<td>-17.758</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>African Ancestry Female</td>
<td>African Ancestry Female</td>
<td>-0.925</td>
<td>.974</td>
</tr>
<tr>
<td>European Ancestry Female</td>
<td>Euro. Ancestry Male</td>
<td>5.028</td>
<td>.059</td>
</tr>
<tr>
<td>African Ancestry Male</td>
<td>African Ancestry Male</td>
<td>17.758</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>African Ancestry Female</td>
<td>African Ancestry Female</td>
<td>16.833</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>African Ancestry Female</td>
<td>Euro. Ancestry Male</td>
<td>-11.806</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>African Ancestry Male</td>
<td>African Ancestry Male</td>
<td>0.925</td>
<td>.974</td>
</tr>
<tr>
<td>Euro. Ancestry Female</td>
<td>African Ancestry Female</td>
<td>-16.833</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Independent samples T-tests are also used to discover statistically significant difference among African Americans born in Missouri and the South. There is only a small difference, approximately three years, in mean age at death between these groups.
(p=.201), with Southern migrants (46.83 years) having a lower mean age than African Americans born in Missouri (49.93 years). The same pattern is seen for African American males (p=.356, Missouri males=49.52 years, Southern males=46.59 years) as well as African American females (p=.411, Missouri females=50.31 years, Southern females=47.18 years) from these two regions.

The mean age at death for Euro-American Missourians is 57.04 years. White males born in Missouri average 51.38 years old at time of death, whereas white females born in the state average 62.24 years of age. An independent samples T-test indicates that there is a significant different between these two means (F=1.201, p=.001).

Independent samples T-tests were also conducted to determine differences between mean age at death among Euro-American Missourians and German and Irish immigrant groups. White Missourians died at 57.04 years of age on average whereas German immigrants had a mean age at death of 67.09 years (F=5.424, p<.001). There is not as great of a difference between Euro-American Missourians and Irish immigrants. Irish immigrants have an average age at death of 61.00 years (F=1.664, p=.133).

### 5.2 Statistical Analysis of Skeletal Observations of Disease

#### 5.2.1 Total Sample Analyses

Looking at the frequency of skeletal pathological indicators between ancestry groups, listed in Table 5.5, four exhibit significant differences: LEH (p=.037, v=.100), dental caries p<.001, v=.187), TBCOD (p<.001, v=.187), and trauma (p<.001, v=.269). Individuals of African ancestry have higher frequencies of every indicator except for trauma. Similarly, males have higher frequencies of all pathological indicators than females in the sample (Table 5.6). Of those, trauma (p=.010, v=.123), dental caries
abscesses (p<.001, v=.168), and LEH (p=.041, v=.099) differ significantly.

Table 5.5 Chi-square analyses of skeletal pathological indicators between ancestry groups

<table>
<thead>
<tr>
<th>Indicator</th>
<th>African</th>
<th>European</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>86(19.9%)</td>
<td>102(23.6%)</td>
<td>31.326</td>
<td>&lt;.001</td>
<td>.269</td>
</tr>
<tr>
<td>TB skeletal</td>
<td>8(1.9%)</td>
<td>1(0.2%)</td>
<td>3.045</td>
<td>* .096</td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>68(15.7%)</td>
<td>18(4.2%)</td>
<td>15.121</td>
<td>&lt;.001</td>
<td>.187</td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>19(4.4%)</td>
<td>11(2.6%)</td>
<td>0.09</td>
<td>.764</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>211(48.8%)</td>
<td>107(24.8%)</td>
<td>15.154</td>
<td>&lt;.001</td>
<td>.187</td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>82(19%)</td>
<td>39(9%)</td>
<td>3.349</td>
<td>.067</td>
<td></td>
</tr>
<tr>
<td>LEH</td>
<td>92(21.3%)</td>
<td>43(10%)</td>
<td>4.356</td>
<td>.037</td>
<td>.100</td>
</tr>
</tbody>
</table>

Table 5.6 Chi-square analyses of skeletal pathological indicators by sex

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Male</th>
<th>Female</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>125(28.9%)</td>
<td>63(14.5%)</td>
<td>6.579</td>
<td>.010</td>
<td>.123</td>
</tr>
<tr>
<td>TB skeletal</td>
<td>8(1.9%)</td>
<td>1(0.2%)</td>
<td>3.224</td>
<td>* .092</td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>59(13.6%)</td>
<td>27(6.2%)</td>
<td>3.626</td>
<td>.057</td>
<td></td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>17(4%)</td>
<td>13(3%)</td>
<td>0.114</td>
<td>.736</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>210(48.6%)</td>
<td>108(25%)</td>
<td>21.433</td>
<td>&lt;.001</td>
<td>.223</td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>88(20.4%)</td>
<td>33(7.6%)</td>
<td>12.22</td>
<td>&lt;.001</td>
<td>.168</td>
</tr>
<tr>
<td>LEH</td>
<td>90(20.8%)</td>
<td>45(10.4%)</td>
<td>4.196</td>
<td>.041</td>
<td>.099</td>
</tr>
</tbody>
</table>

When the sample is further divided into combined sex and ancestry categories (Table 5.7), males of African ancestry have the highest frequencies of all pathologies except for trauma. They have significantly more TBCOD (sig<.001, v=.216), dental caries (p<.001, v=.314), dental abscesses (sig=.001, v=.200), and LEH (p=.009, v=.164). Males of European ancestry have the highest rates of skeletal trauma reported (sig<.001, v=.304).

The frequency of pathological indicators by origin group (Table 5.8) reflects the frequencies and relationships identified in the comparisons above. Migrants from the
South, so individuals of African ancestry, have the highest numbers of almost every pathological indicator. Tuberculosis as cause of death (sig<.001, v=.210) and dental caries (sig=.018, v=.153) presence are statistically significant among African Americans. The only exceptions are trauma, in which migrants from the South and Missourians are tied (sig<.001, v=.305), and vitamin D deficiency (sig=.012, v=.165), of which Missourians have a higher frequency.

5.2.2 Within Group Analyses – Individuals of African Ancestry

Analyses were conducted comparing African American migrants from the South and individuals from Missouri of African ancestry by origin group as well as origin group and sex in order to determine whether there are statistically significant differences between migrants coming to St. Louis and individuals who were native to Missouri. Tables 5.9, 5.10, and 5.11 present the results.

Migrants from the South consistently have more incidences of skeletal pathology than their African American Missourian counterparts. This holds true for both comparisons between males and females across the categories. Dental abscesses are statistically significant in the origin category comparison (p=.023, v=.140) and between the males (p=.029, v=.179). Skeletal evidence of vitamin D deficiency is present in one more individual from Missouri than the South and three more Missouri females than southern females (Fisher’s Exact Test=.022, v=.233).
### Table 5.7 Chi-square analyses of skeletal pathological indicators by combined sex and ancestry categories

<table>
<thead>
<tr>
<th></th>
<th>African Ancestry Males</th>
<th>European Ancestry Males</th>
<th>African Ancestry Females</th>
<th>European Ancestry Females</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer’s V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>49 (11.3%)</td>
<td>76 (17.6%)</td>
<td>37 (8.5%)</td>
<td>26 (6%)</td>
<td>40.031</td>
<td>&lt;.001</td>
<td>.304</td>
</tr>
<tr>
<td>TB skeletal</td>
<td>7 (1.6%)</td>
<td>1 (0.2%)</td>
<td>1 (0.2%)</td>
<td>0</td>
<td>7.774</td>
<td>* .043</td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>45 (10.4%)</td>
<td>14 (3.2%)</td>
<td>23 (5.3%)</td>
<td>4 (0.9%)</td>
<td>20.171</td>
<td>&lt;.001</td>
<td>.216</td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>10 (2.3%)</td>
<td>7 (1.6%)</td>
<td>9 (2.1%)</td>
<td>4 (0.9%)</td>
<td>0.25</td>
<td>* .970</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>129 (29.9%)</td>
<td>81 (18.8%)</td>
<td>81 (18.8%)</td>
<td>27 (6.3%)</td>
<td>42.572</td>
<td>&lt;.001</td>
<td>.314</td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>57 (13.2%)</td>
<td>31 (7.2%)</td>
<td>25 (5.8%)</td>
<td>8 (1.9%)</td>
<td>17.253</td>
<td>.001</td>
<td>.200</td>
</tr>
<tr>
<td>LEH</td>
<td>54 (12.5%)</td>
<td>36 (8.3%)</td>
<td>37 (8.6%)</td>
<td>8 (1.9%)</td>
<td>11.585</td>
<td>.009</td>
<td>.164</td>
</tr>
</tbody>
</table>

### Table 5.8 Chi-square analyses of skeletal pathological indicators by origin group

<table>
<thead>
<tr>
<th></th>
<th>South</th>
<th>Missouri</th>
<th>German</th>
<th>Irish</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>60 (13.9%)</td>
<td>60 (13.9%)</td>
<td>44 (10.2%)</td>
<td>24 (5.5%)</td>
<td>40.311</td>
<td>&lt;.001</td>
<td>.305</td>
</tr>
<tr>
<td>TB skeletal</td>
<td>6 (1.4%)</td>
<td>2 (0.5%)</td>
<td>0</td>
<td>1 (0.2%)</td>
<td>2.922</td>
<td>* .239</td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>54 (12.5%)</td>
<td>24 (5.5%)</td>
<td>3 (0.7%)</td>
<td>5 (1.2%)</td>
<td>19.025</td>
<td>&lt;.001</td>
<td>.210</td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>9 (2.1%)</td>
<td>18 (4.2%)</td>
<td>2 (0.5%)</td>
<td>1 (0.2%)</td>
<td>11.63</td>
<td>* .012</td>
<td>.165</td>
</tr>
<tr>
<td>Dental Caries</td>
<td>157 (36.3%)</td>
<td>94 (21.8%)</td>
<td>48 (11.1%)</td>
<td>19 (4.4%)</td>
<td>10.123</td>
<td>.018</td>
<td>.153</td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>53 (12.3%)</td>
<td>46 (10.6%)</td>
<td>15 (3.5%)</td>
<td>7 (1.6%)</td>
<td>3.498</td>
<td>.321</td>
<td></td>
</tr>
<tr>
<td>LEH</td>
<td>72 (16.7%)</td>
<td>34 (7.9%)</td>
<td>22 (5.1%)</td>
<td>7 (11.6%)</td>
<td>6.975</td>
<td>.073</td>
<td></td>
</tr>
</tbody>
</table>
Table 5.9 Chi-square analyses of skeletal pathological indicators in African American individuals born in Missouri and migrants from the South

<table>
<thead>
<tr>
<th></th>
<th>South</th>
<th>Missouri</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>60(22.8%)</td>
<td>26(9.9%)</td>
<td>1.055</td>
<td>.304</td>
<td></td>
</tr>
<tr>
<td>TB skeletal</td>
<td>6(2.3%)</td>
<td>2(0.8%)</td>
<td>0.004</td>
<td>*1.000</td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>54(20.5%)</td>
<td>14(5.3%)</td>
<td>1.511</td>
<td>.219</td>
<td></td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>9(3.5%)</td>
<td>10(3.8%)</td>
<td>7.732</td>
<td>*1.011</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>157(59.7%)</td>
<td>54(20.5%)</td>
<td>0.228</td>
<td>.633</td>
<td></td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>53(20.2%)</td>
<td>29(11%)</td>
<td>5.132</td>
<td>.023</td>
<td>+.140</td>
</tr>
<tr>
<td>LEH</td>
<td>72(27.4%)</td>
<td>20(7.6%)</td>
<td>1.478</td>
<td>.224</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.10 Chi-square analyses of skeletal pathological indicators in African American males born in Missouri and migrants from the South

<table>
<thead>
<tr>
<th></th>
<th>Southern Males</th>
<th>Missouri Males</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>37(24.8%)</td>
<td>12(8.1%)</td>
<td>.232</td>
<td>.630</td>
<td></td>
</tr>
<tr>
<td>TB skeletal</td>
<td>6(4%)</td>
<td>1(0.7%)</td>
<td>.263</td>
<td>*1.000</td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>38(25.5%)</td>
<td>7(4.7%)</td>
<td>1.625</td>
<td>.202</td>
<td></td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>6(4.1%)</td>
<td>4(2.7%)</td>
<td>1.940</td>
<td>*2.31</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>102(68.5%)</td>
<td>28(18.8%)</td>
<td>.219</td>
<td>*7.67</td>
<td></td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>39(26.2%)</td>
<td>18(12.1%)</td>
<td>4.762</td>
<td>.029</td>
<td>+.179</td>
</tr>
<tr>
<td>LEH</td>
<td>43(28.9%)</td>
<td>12(8.1%)</td>
<td>.005</td>
<td>.941</td>
<td></td>
</tr>
</tbody>
</table>
Table 5.11 Chi-square analyses of skeletal pathological indicators in African American females born in Missouri and migrants from the South

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Southern Females</th>
<th>Missouri Females</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>23(20.2%)</td>
<td>14(12.3%)</td>
<td>0.993</td>
<td>.319</td>
<td></td>
</tr>
<tr>
<td>TB skeletal</td>
<td>0</td>
<td>1(0.9%)</td>
<td>2.248</td>
<td>* .310</td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>16(14%)</td>
<td>7(6.1%)</td>
<td>0.017</td>
<td>.895</td>
<td></td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>3(2.7%)</td>
<td>6(5.4%)</td>
<td>6.103</td>
<td>* .022</td>
<td>.233</td>
</tr>
<tr>
<td>Dental Caries</td>
<td>55(48.2%)</td>
<td>26(22.8%)</td>
<td>0.035</td>
<td>.852</td>
<td></td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>14(12.3%)</td>
<td>11(9.6%)</td>
<td>2.287</td>
<td>.130</td>
<td></td>
</tr>
<tr>
<td>LEH</td>
<td>29(25.4%)</td>
<td>8(7%)</td>
<td>2.514</td>
<td>.113</td>
<td></td>
</tr>
</tbody>
</table>
5.2.3 Within Group Analyses – Individuals of European Ancestry

To assess the degree of difference in skeletal manifestations of pathology between individuals of European ancestry, several different comparisons were tested. First, Euro-American individuals born in Missouri were compared against a combined group of European immigrants (Table 5.12). Then the origin groups were compared by sex (Tables 5.13 and 5.14). The divisions were then repeated to compare Euro-American Missourians to the individual German and Irish immigrant groups (Tables 5.15-5.20).

Table 5.12 Chi-square analyses of skeletal pathological indicators in Euro-American Missourians and European immigrants

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Missouri</th>
<th>Europe</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>34(20%)</td>
<td>68(40%)</td>
<td>7.453</td>
<td>.006</td>
<td>.209</td>
</tr>
<tr>
<td>TB skeletal</td>
<td>0(0%)</td>
<td>1(0.6%)</td>
<td>0.729</td>
<td>*1.000</td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>10(5.9%)</td>
<td>8(4.7%)</td>
<td>1.574</td>
<td>.210</td>
<td></td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>8(4.8%)</td>
<td>3(1.8%)</td>
<td>4.477</td>
<td>*.055</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>40(23.7%)</td>
<td>67(39.6%)</td>
<td>1.959</td>
<td>.162</td>
<td></td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>17(10.1%)</td>
<td>22(13%)</td>
<td>0.098</td>
<td>.754</td>
<td></td>
</tr>
<tr>
<td>LEH</td>
<td>14(8.3%)</td>
<td>29(17.2%)</td>
<td>1.867</td>
<td>.172</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.13 Chi-square analyses of skeletal pathological indicators in Euro-American Missourian males and European immigrant males

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Missouri Males</th>
<th>European Males</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>18(16.5%)</td>
<td>58(53.2%)</td>
<td>6.594</td>
<td>.010</td>
<td>.246</td>
</tr>
<tr>
<td>TB skeletal</td>
<td>0</td>
<td>1(0.9%)</td>
<td>.458</td>
<td>*1.000</td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>6(5.5%)</td>
<td>8(7.3%)</td>
<td>1.018</td>
<td>* .395</td>
<td></td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>4(3.7%)</td>
<td>3(2.8%)</td>
<td>2.223</td>
<td>*.205</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>23(21.3%)</td>
<td>57(52.8%)</td>
<td>.474</td>
<td>*.486</td>
<td></td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>13(12%)</td>
<td>18(16.7%)</td>
<td>2.654</td>
<td>.103</td>
<td></td>
</tr>
<tr>
<td>LEH</td>
<td>10(9.3%)</td>
<td>25(23.1%)</td>
<td>.096</td>
<td>.757</td>
<td></td>
</tr>
</tbody>
</table>
The combined group of European immigrants have significantly more incidences of trauma than the individuals of European ancestry born in Missouri (sig=.006, v=.209). The only pathological indicators that Euro-American Missourians have in higher numbers than the European immigrants are TBCOD and vitamin D deficiency (Table 5.12). When these areas of origin are divided into sex categories and compared, similar trends are seen for the males. European males have significantly more trauma visible in their skeletons (sig=.010, v=.246) as well as higher frequencies of all pathologies except for vitamin D deficiency (Table 5.13). The opposite is seen among the females. Missouri females have more pathology than European females in all categories, except for skeletal tuberculosis, abscesses, and LEH where the frequencies are equal between the two groups (Table 5.14). These differences are not statistically significant.

Table 5.14 Chi-square analyses of skeletal pathological indicators in Euro-American Missourian females and European immigrant females

<table>
<thead>
<tr>
<th></th>
<th>Missouri Females</th>
<th>European Females</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>16(26.2%)</td>
<td>10(16.4%)</td>
<td>0.015</td>
<td>.903</td>
<td></td>
</tr>
<tr>
<td>TB skeletal</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>4(6.6%)</td>
<td>0</td>
<td>2.777</td>
<td>*.147</td>
<td></td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>4(6.6%)</td>
<td>0</td>
<td>2.777</td>
<td>*.147</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>17(27.9%)</td>
<td>10(16.4%)</td>
<td>.108</td>
<td>.742</td>
<td></td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>4(6.6%)</td>
<td>4(6.6%)</td>
<td>.438</td>
<td>*.700</td>
<td></td>
</tr>
<tr>
<td>LEH</td>
<td>4(6.6%)</td>
<td>4(6.6%)</td>
<td>.438</td>
<td>*.700</td>
<td></td>
</tr>
</tbody>
</table>

Comparing the Missouri-born and German immigrants, only TBCOD varies significantly between the two (sig=.047, v=.168). Otherwise, there is no trend in which group has more pathological indicators. Germans have higher frequencies of trauma, caries, and LEH whereas Euro-American Missourians have higher frequencies of
TBCOD, vitamin D deficiency, and abscesses (Table 5.15). There are no cases of skeletal tuberculosis in either origin group.

There are no statistically significant results between Missouri and German females, but women from Missouri have more trauma, TBCOD, vitamin D deficiency, and dental caries; they have equal numbers of abscesses and LEH as German women (Table 5.16). German males have more instances of trauma (sig=.038, v=.229), dental caries, and LEH (Table 5.17). Missouri males have more TBCOD and abscesses.

Table 5.15 Chi-square analyses of skeletal pathological indicators in Euro-American Missourians and German immigrants

<table>
<thead>
<tr>
<th></th>
<th>Missouri</th>
<th>German</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>34(24.3%)</td>
<td>44(31.4%)</td>
<td>3.577</td>
<td>.059</td>
<td></td>
</tr>
<tr>
<td>TB skeletal</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>10(7.1%)</td>
<td>3(2.1%)</td>
<td>3.938</td>
<td>.047</td>
<td>.168</td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>8(5.8%)</td>
<td>2(1.4%)</td>
<td>3.607</td>
<td>.097</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>40(28.8%)</td>
<td>48(34.5%)</td>
<td>2.308</td>
<td>.129</td>
<td></td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>17(12.2%)</td>
<td>15(10.8%)</td>
<td>.127</td>
<td>.721</td>
<td></td>
</tr>
<tr>
<td>LEH</td>
<td>14(10.1%)</td>
<td>22(15.8%)</td>
<td>2.557</td>
<td>.110</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.16 Chi-square analyses of skeletal pathological indicators in Euro-American Missourian and German females

<table>
<thead>
<tr>
<th></th>
<th>Missouri Females</th>
<th>German Females</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>16(27.6%)</td>
<td>8(13.8%)</td>
<td>.146</td>
<td>.702</td>
<td></td>
</tr>
<tr>
<td>TB skeletal</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>4(6.9%)</td>
<td>0</td>
<td>2.438</td>
<td>* .286</td>
<td></td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>4(6.9%)</td>
<td>0</td>
<td>2.438</td>
<td>* .287</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>17(29.3%)</td>
<td>9(15.5%)</td>
<td>.052</td>
<td>.820</td>
<td></td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>4(6.9%)</td>
<td>4(6.9%)</td>
<td>.764</td>
<td>*.443</td>
<td></td>
</tr>
<tr>
<td>LEH</td>
<td>4(6.9%)</td>
<td>4(6.9%)</td>
<td>1.764</td>
<td>*.444</td>
<td></td>
</tr>
</tbody>
</table>
Table 5.17 Chi-square analyses of skeletal pathological indicators in Euro-American Missourian and German males

<table>
<thead>
<tr>
<th></th>
<th>Missouri Males</th>
<th>German Males</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>18(22%)</td>
<td>36(43.9%)</td>
<td>4.307</td>
<td>.038</td>
<td>.229</td>
</tr>
<tr>
<td>TB skeletal</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TBCOD</td>
<td>6(7.3%)</td>
<td>3(3.7%)</td>
<td>2.646</td>
<td>.153</td>
<td>.153</td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>4(4.9%)</td>
<td>2(2.5%)</td>
<td>1.622</td>
<td>.232</td>
<td>.232</td>
</tr>
<tr>
<td>Dental Caries</td>
<td>23(28.4%)</td>
<td>39(48.1%)</td>
<td>1.454</td>
<td>.228</td>
<td>.228</td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>13(16%)</td>
<td>11(13.6%)</td>
<td>2.546</td>
<td>.111</td>
<td>.111</td>
</tr>
<tr>
<td>LEH</td>
<td>10(12.3%)</td>
<td>18(22.2%)</td>
<td>.448</td>
<td>.503</td>
<td>.503</td>
</tr>
</tbody>
</table>

Between Euro-American Missourians and Irish immigrants, the Missourians have a higher frequency of all skeletal pathological indicators than Irish immigrants (Table 5.18). This difference may be due to the low Irish sample size or to living or working conditions in which the Missourians found themselves. Trauma is the only category where the relationship is significant (sig=.003, v=.297). Among the males of these two groups (Table 5.19), Irish males have a higher frequency of trauma (p=.020, v=.298). The only case of skeletal tuberculosis observed among European immigrants is in an Irish male. Tuberculosis as a cause of death, vitamin D deficiency, caries, abscesses, and LEH
are more frequent in Missouri males. There are no statistically significant differences between Missouri and Irish females, though the Missouri females have higher frequencies of every pathology present (Table 5.20).

Table 5.19 Chi-square analyses of skeletal pathological indicators in Euro-American Missourian and Irish males

<table>
<thead>
<tr>
<th>Pathology</th>
<th>Missouri Males</th>
<th>Irish Males</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>18(29.5%)</td>
<td>22(36.1%)</td>
<td>5.430</td>
<td>.020</td>
<td>.298</td>
</tr>
<tr>
<td>TB skeletal</td>
<td>0</td>
<td>1(1.6%)</td>
<td>1.280</td>
<td>*.443</td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>6(9.8%)</td>
<td>5(8.2%)</td>
<td>.008</td>
<td>*1.000</td>
<td></td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>4(6.7%)</td>
<td>1(1.7%)</td>
<td>1.209</td>
<td>*.377</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>23(38.3%)</td>
<td>18(30%)</td>
<td>.063</td>
<td>.802</td>
<td></td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>13(21.7%)</td>
<td>7(11.7%)</td>
<td>1.212</td>
<td>.271</td>
<td></td>
</tr>
<tr>
<td>LEH</td>
<td>10(16.7%)</td>
<td>7(11.7%)</td>
<td>.140</td>
<td>.708</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.20 Chi-square analyses of skeletal pathological indicators in Euro-American Missourian and Irish females

<table>
<thead>
<tr>
<th>Pathology</th>
<th>Missouri Females</th>
<th>Irish Females</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>16(40%)</td>
<td>2(5%)</td>
<td>.615</td>
<td>*.579</td>
<td></td>
</tr>
<tr>
<td>TB skeletal</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>4(10%)</td>
<td>0</td>
<td>.360</td>
<td>*1.000</td>
<td></td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>4(10%)</td>
<td>0</td>
<td>.360</td>
<td>*1.001</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>17(42.5%)</td>
<td>1(2.5%)</td>
<td>.178</td>
<td>*1.000</td>
<td></td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>4(10%)</td>
<td>0</td>
<td>.360</td>
<td>*1.000</td>
<td></td>
</tr>
<tr>
<td>LEH</td>
<td>4(10%)</td>
<td>0</td>
<td>.360</td>
<td>*1.001</td>
<td></td>
</tr>
</tbody>
</table>

The final comparisons were between the German and Irish immigrant groups and their subdivisions (Tables 5.21-5.23). There are no statistically significant differences between the two European immigrant groups (Table 5.21). Germans have a higher frequency of trauma, vitamin D deficiency, dental caries, abscesses, and LEH. The Irish have higher frequencies of both forms of tuberculosis examined here.
Table 5.21 Chi-square analyses of skeletal pathological indicators in German and Irish immigrants

<table>
<thead>
<tr>
<th>Indicator</th>
<th>German</th>
<th>Irish</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer's V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>44(44.4%)</td>
<td>24(24.2%)</td>
<td>2.561</td>
<td>.110</td>
<td></td>
</tr>
<tr>
<td>TB skeletal</td>
<td>0(1%)</td>
<td>1(1%)</td>
<td>2.290</td>
<td>*.306</td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>3(3%)</td>
<td>5(5.1%)</td>
<td>4.272</td>
<td>* .053</td>
<td></td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>2(2.1%)</td>
<td>1(1%)</td>
<td>.017</td>
<td>*1.000</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>48(48.5%)</td>
<td>19(19.2%)</td>
<td>2.290</td>
<td>* .306</td>
<td></td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>15(15.2%)</td>
<td>7(7.1%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEH</td>
<td>22(22.2%)</td>
<td>7(7.1%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additionally, analyses between immigrants and first-generation individuals of that group are represented in Tables 5.22 and 5.23. Although the immigrants and first-generation individuals of the same ethnicity have been combined thus far because they were racialized the same, it is important to see if there are significant differences between them. However, small sample sizes likely skewed test results. The difference in vitamin D deficiency between German immigrants and first-generation German-Americans is statistically significant (Fisher’s Exact Test=.046, v=.327). There are no significant differences between Irish immigrants and first generation Irish-Americans (Table 5.23). These two groups have equal observations of trauma. First generation individuals have
the only skeletal tuberculosis and vitamin D deficiency cases. Irish immigrants have more TBCOD and all forms of dental disease.

Table 5.23 Chi-square analyses of skeletal pathological indicators in Irish immigrants and first-generation Irish-Americans

<table>
<thead>
<tr>
<th></th>
<th>Irish</th>
<th>1st generation</th>
<th>Chi-Square</th>
<th>Sig.</th>
<th>Cramer’s V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>12(40%)</td>
<td>12(40%)</td>
<td>.536</td>
<td>*.657</td>
<td></td>
</tr>
<tr>
<td>TB Skeletal</td>
<td>0</td>
<td>1(3.3%)</td>
<td>.905</td>
<td>*1.000</td>
<td></td>
</tr>
<tr>
<td>TBCOD</td>
<td>3(10%)</td>
<td>2(6.7%)</td>
<td>.429</td>
<td>*.624</td>
<td></td>
</tr>
<tr>
<td>Vitamin D Def.</td>
<td>0</td>
<td>1(3.4%)</td>
<td>.967</td>
<td>*1.000</td>
<td></td>
</tr>
<tr>
<td>Dental Caries</td>
<td>11(36.7%)</td>
<td>8(26.7%)</td>
<td>2.635</td>
<td>.105</td>
<td></td>
</tr>
<tr>
<td>Dental Abscesses</td>
<td>4(13.3%)</td>
<td>3(10%)</td>
<td>.403</td>
<td>*.675</td>
<td></td>
</tr>
<tr>
<td>LEH</td>
<td>4(13.3%)</td>
<td>3(10%)</td>
<td>.403</td>
<td>*.675</td>
<td></td>
</tr>
</tbody>
</table>

**5.3 Summary**

The results presented here demonstrate patterns of disease among German, Irish, and Southern African American migrants to historic St. Louis as well as the individuals native to the state of Missouri. African Americans overall generally have the highest frequencies of skeletal indicators of pathology, except for trauma. The German immigrants and white Missourians have similar frequencies, while the Irish immigrants have the fewest instances of skeletal pathology. In order to make meaning from these patterns, the next chapter situates the results within the history of St. Louis and the biocultural, structural violence, embodiment, and intersectionality frameworks to explain why they support or refute this dissertation’s hypotheses.
CHAPTER 6

DISCUSSION

The people in the Terry Collection experienced structural violence during life and after death. Their place in the collection is the embodiment of systemic inequality and the hegemonic attitudes manifested in legal statutes. These hegemonic practices entail the racist and classist mentalities held by the dominant group, white native-born American citizens, that ostracized African Americans and European immigrants. The result of these attitudes was social marginalization and job discrimination that interfered with the ability to earn a living wage, secure adequate housing, and access medical or dental care. Differential exposure to these forms of structural violence based on racialization varied the embodiment of disease among African American migrants from the South, German and Irish immigrants, and both African American and Euro-American natives of Missouri.

Intersectionality theory views identity as the intersection of many mutually constituted and reciprocally constructed layers that are lived simultaneously and therefore inseparable (Bauer 2014; Bowleg 2012; Collins 2015; Davis 2008; Yaussy 2019). At the level of individual experience, the meeting of multiple social categories provides insight to numerous interrelated systems of privilege and oppression that accompany identity (Bowleg 2012; Hankivski et al. 2010). In the context of this dissertation research, a group’s place along the continuum of whiteness related to axes of advantage or disadvantage, which had positive or negative multiplicative effects on lived experience
and health outcomes (Veenstra 2011; Yaussy 2019). The intersections of ancestry, racialization, migrant status, SES, and region of origin constituted identities through which migrants and Missouri-born groups in this study experienced and embodied structural violence.

Embodiment theory understands the body as the synthesis of lived experience, including structural violence, and the environment (Martin et al. 2013; Zuckerman et al. 2014). Social disparities in health are therefore the result of the somatic incorporation of environmental circumstances, involving biological, ecological, and social factors (Krieger 2005; Zuckerman et al. 2014). In the context of this research, disparities in disease distribution among groups, as recorded from observed skeletal evidence of pathology, are directly related to circumstances specific to the context of late nineteenth and early twentieth century (im)migration to historic St. Louis and the intersectional identities of the migrants. The effects of structural inequality in the biohistorical environment were mitigated or compounded by axes of advantage or disadvantage within those identities and embodied as skeletal pathology.

6.1 Hypotheses Regarding African American Individuals

6.1.1 Hypothesis 1: African American individuals will have a higher frequency of all skeletal pathological indicators than any other group in this sample

The high frequency of tuberculosis, trauma, vitamin D deficiency, and dental disease and disruption present in the observed African Americans indicates the influence of racialization on risk of violence and disease exposure. Individuals of African ancestry, from both Missouri and the South combined, had higher numbers of all skeletal pathological indicators, with the exception of trauma, than individuals of European ancestry (Table 5.5). The higher frequency of trauma in Euro-Americans changed when
the two aggregate ancestry groups were broken down into individual origin categories. Black Southerners had the most individuals with evidence of trauma, followed in descending order by Germans, white Missourians, Black Missourians, and Irish individuals (Tables 5.8, 5.19, 5.12). Trauma presence among the individual origin groups is more in line with the expectations of Hypothesis 1. However, the fact that Germans and white Missourians have a higher frequency of skeletal trauma than Black Missourians is still unexpected. This outcome will be discussed further in sections 6.2 and 6.3.

In addition to high frequencies of pathological indicators, analyses of mean age at death within the sample indicate that African Americans, regardless of region of origin, were dying at younger ages than any other Euro-American or European group in this sample (Tables 5.1-5.3). Southern migrants have the youngest mean age at death (46.83 years), though it is only a few years below that of African American Missourians (49.93 years). African American Missourians were also dying at significantly younger ages than Euro-American Missourians. These findings support Hypothesis 1. The differences in average age at death are also reflected in past and present life expectancy data. In 1900, the life expectancy for African Americans was 33.0 years and for Euro-Americans was 47.6 years (National Center for Health Statistics 2018), while in 1910, those life expectancies increased to 35.86 years and 51.93 years, respectively (Glover 1921). In the first half of the twentieth century, life expectancy increased rapidly due to advances in treatment and eradication of numerous parasitic and infectious diseases, especially among children (Shrethsa 2005). In recent years, the life expectancy for African Americans has grown due to decreases in mortality from heart disease, cancer, and HIV/AIDS.
(Kochanek et al. 2015; Kochanek et al. 2019; Shreths 2005). Though the gap has narrowed considerably, differences in life expectancy between African Americans and Euro-Americans persist to present day (Kochanek et al. 2015; Kochanek et al. 2019). In 2017, the life expectancy for the non-Hispanic white population in the U.S. was 78.5 years whereas the expectancy for the non-Hispanic Black population was 74.9 years (Kochanek et al. 2019). Females still had a higher life expectancy than males in 2017, and the intersections of sex and race found that Black males have the lowest life expectancy (71.5 years) compared to white males (76.1 years), Black females (78.1 years), and white females (81.0 years) (Kochanek et al. 2019).

It is unsurprising that African Americans have a low mean age at death and more instances of almost all skeletal pathology than their Euro-American and European counterparts, even among individuals of the same SES. Their position on the extreme non-white end of the continuum of whiteness exposed them to a proportionally higher risk of disease and trauma through the biological results of structural violence. Though not the only sources of stress, slavery and the Jim Crow period that followed emancipation targeted only African Americans, creating a vast disparity in experience between them, European immigrants, and Euro-Americans. Enslavement was not experienced by all Black individuals in this sample; however, the ways of thinking that perpetuated slavery and segregation were deeply rooted in all aspects of life in America. These systems of institutional racism, a form of structural violence, reflected the entrenched nature of discrimination in American society that was embodied by African Americans and left an indelible impression on their skeletal remains. Institutional racism did not end when the legal statues behind it did. Instead, the intergenerational effects of
slavery, segregation, poverty, and marginalization have perpetuated African American economic and health disparities even up to the present day (Gaskin et al. 2004; Graff 2014; Headlee 2004).

6.1.2 Hypothesis 1.1: African American migrants from the South will have a higher frequency of skeletal pathological indicators than African Americans born in Missouri

There are two groups of African American individuals with two distinct regions of origin in this sample. Migrants to St. Louis left the rural South primarily during the Great Migration. It is possible that African Americans recorded as Missouri natives were born in St. Louis, but they also could have migrated to the city from nearby parts of the state. Individuals in both groups were likely enslaved or direct descendants of enslaved people. However, it is probable that a higher proportion of Southern migrants than Missouri-born individuals experienced slavery because the South was the focal point of plantation slavery. St. Louis also had a large established free community present almost since the territory’s inception (Holland 2003; Sandweiss 2003).

Disparities in the presence of skeletal pathologies existed between African Americans born in the South and in Missouri. Southern migrants had overall higher frequencies of tuberculosis, trauma, and dental disease and disruption. Additionally, Southern-born individuals had comparable rates of vitamin D deficiency to the Missouri-born (Table 5.9). The same pattern extended to between group comparisons by sex (Tables 5.10, 5.11). The results for Southern Black migrants and Black Missourians reflect the systems of structuralized inequality that excluded them from multiple aspects of life in St. Louis.
6.1.2.1 Employment, Housing, Discrimination, and Disease

A myriad of social, economic, and environmental factors caused and compounded the skeletal pathology observed among African Americans. The primary contribution to skeletal manifestations of disease stemmed from a belief system that defined all individuals of African ancestry not only as inferior but less than human (Graff 2014). The subsequent exclusion of African Americans from most areas of economic participation for wages and housing restrictions was embodied due to higher rates of disease risk and poverty.

African Americans’ were racialized and placed on the extreme non-white end of the continuum of whiteness. Their continuum placement both added to and reinforced the long-standing social attitudes and cultural beliefs regarding the perceived inferiority of any individual with African ancestry. Scientific racism sought superficial physical and internal anatomical differences between races to explain the immutable inferiority of anyone who was not white (Roberts 2009). Science that upheld racist beliefs led to stigmas that African Americans had poor hygiene, sanitary, and dietary habits and would defy medical authority (Roberts 2009). Additionally, African Americans were stereotyped negatively as lazy, shiftless, inefficient, and ignorant (Grossman 1989; Roberts 2009). These views permeated all facets of life in the U.S. and were used as evidence for the structural violence in the form of institutional inequality that underpinned legal segregation and economic exclusion.

Jim Crow meant that African Americans were shut out of most wage-labor positions. Only the most low-status and low-paying jobs were available, and, even then, employment discrimination ensured that they were paid less than Europeans or Euro-
Americans in the same positions (Headlee 2004). Additionally, unions would not admit Black members (Corbett 1999; Rudwick 1972; Wilkerson 2010). African American workers, especially men, had a hard time refuting stereotypes of laziness, ignorance, and inefficiency (Grossman 1989; Headlee 2004; Roberts 2009). Black women were employed at higher rates, usually as domestic servants, than Black men, who competed for manual labor jobs (Corbett 1999; Judson 2012; Holland 2003). The live-in nature of many domestic service positions offered the chance for access to better accommodations and nutrition than other occupations (Diner 1983; Kenny 2000; Pearlstein 2015). Manual labor was physically taxing, low-wage, and had more chance of injury. Part of the higher prevalence of trauma and pathology in African American males as compared to females may be attributed to occupational differences.

Another occupation factor for the high trauma prevalence among African Americans has to do with strike-breaking. Southern Black migrants were frequently recruited to break labor strikes, which could also account for the highest frequency of trauma evident in that group. Missouri African Americans could also receive strikebreaker jobs, but they did so less frequently (Rudwick 1972). The striking unions were unsympathetic to the African Americans’ need for employment, even if temporary until the strike ended, in a scarce job market and responded harshly (Grossman 1989; Rudwick 1972; Troen and Holt 1977). Strikebreakers were often provided a police escort into hostile work environments and communities that were exclusively Euro-American, which exacerbated tensions (Whatley 1993). Violence, which took the form of fistfights, rock or brick throwing, and gunshots, was instigated by the view that union members were losing jobs to strikebreakers (The Atlanta Constitution 1906; Grossman 1989;
Whatley 1993). Violence was not only directed at the strikebreakers but sometimes anyone who was of the same racialized category (Grossman 1989). A major example of such violence is the East St. Louis Race Riot, when tensions over the recruitment of Southern Black workers and strikebreakers erupted into mob violence directed against the Black neighborhood in East St. Louis (Rudwick 1972; Troen and Holt 1977).

Furthering employment discrimination that limited income, legal segregation artificially restricted the housing available to African Americans in the city (Corbett 1999; Judson 2012; Zelner et al. 2017). Segregation combined with the massive influx of new arrivals to St. Louis during the Great Migration created housing shortages (de la Cova 2011; Primm 1998; Roberts 2009; Zelner et al. 2017). Shortages meant that landlords could charge expensive rent, which was difficult to afford with primarily low-wage positions available to African Americans (Headlee 2004). The result was severe overcrowding inside poor quality rooms and tenement buildings with meager ventilation and little sanitation (de la Cova 2011; Judson 2012; Primm 1998; Zelner et al. 2017). The African American areas of the city also had a higher than average population density (Holland 2003; Roberts 2009). Around the turn of the twentieth century, the African American population averaged 82 people per acre whereas the St. Louis average was only 12 people per acre (Holland 2003:75). These conditions combined to provide an ideal environment for tuberculosis transmission, which is achieved through airborne bacilli, so quick and widespread infection is possible (Roberts 2012; Roberts and Buikstra 2003; Zelner et al. 2017). Tellingly, outside of a single case in an Irish male, skeletal evidence of tuberculosis was only observed in African American individuals; African Americans also had the most TBCOD.
Similar amounts of tuberculosis were found by other studies investigating African Americans, including de la Cova (2011), Rankin-Hill (1997), and Watkins (2003, 2012). Analyses of post-Reconstruction African Americans from the Cedar Grove Historic Cemetery indicated high rates of other types of infection and stress (Rose 1982; Rose and Hartnady 1991; Martin et al. 1987). All of these studies suggest that the burden of infectious disease in urban settings during the nineteenth and early twentieth centuries disproportionately affected African Americans. Densely populated urban environment, the Great Migration, and structural violence, through employment and housing discrimination, were implicated as the causal factors for differential infection rates (de la Cova 2011; Rankin-Hill 1997; Watkins 2003, 2012).

It is possible that the change in environment associated with the Great Migration, movement from the rural South to crowded urban North, instigated some tuberculosis infection. Southern migrants may have spent their early years in less populated areas where disease did not spread as rapidly, which limited exposure. Thus, moving to an urban environment like St. Louis would have exposed them to new diseases like tuberculosis (de la Cova 2011; Zelner et al. 2017). While Southern Black migrants have the highest frequencies of tuberculosis, both skeletal and archival, in the sample, they were not the only individuals to move from rural to urban settings. Therefore, if the change in environment was the primary cause of tuberculosis, higher numbers would be expected among other groups, such as Irish immigrants, as well. Instead, it is the African Americans in the sample that have the most of signs of tuberculotic infection.

Overcrowded, poor quality housing was likely the main cause of the high instances of both skeletal tuberculosis and TBCOD among all African Americans in this
The structures of segregation and restrictive housing covenants ensured that they could not find better housing, and therefore were continuously exposed to exogenous tuberculosis in densely populated, segregated neighborhoods (Corbett 1999; Judson 2012; Roberts 2009; Zelner et al. 2017). Those systems were embodied in higher tuberculosis mortality and infection rates among individuals of African ancestry. Even when public health and sanitation improvements lowered the mortality levels of tuberculosis of the country and white Americans, the levels for Black Americans stayed the same or even increased (Roberts 2009). Mortality rates from tuberculosis fell between 1910 and 1933; however, during the same time period, the rate of new infections among African Americans increased and their mortality rate was as much as four to five times higher than that of whites (Zelner et al. 2017).

Medical care was also less accessible for African American residents of St. Louis. There were private hospitals that would treat Black patients, but they required immediate payment for services. The City Hospital No. 2 was the only public facility for people of color. The building was in disrepair, and it usually housed almost double the number of patients as beds present (Lipsitz 1991; Wright 2002). Furthermore, dental care was expensive and likely not seen as an essential service, which may have played a role in the high instances of dental caries and abscesses among African Americans, especially from the South. However, a starchy diet, likely high in the Southern staples of corn, molasses, and pork for migrants (Owsley et al. 1987), and genetic factors were likely the primary factors that were exacerbated by lack of treatment.

African Americans from the South had the most instances of LEH, which is likely due to a higher proportion of individuals who experienced the early childhood periods of
stress through the destitution that accompanied slavery and later the sharecropping system. Steckel and Rose (2002) found that African Americans also had the highest frequency of LEH when compared to Euro-Americans in their aggregated analysis of multiple sites in North America (Steckel and Rose 2002). A sample from Philadelphia’s First African Baptist Church also presented high frequencies of enamel hypoplasias, indicating high stress in utero and childhood (Rankin-Hill 1997). The New York African Burial Ground project suggested that subadult stress, as indicated by LEH, malnutrition, infectious disease, and delayed growth and development, was more severe for Black children who were born in New York than those who born in African and taken to New York later in life (Blakey and Rankin-Hill 2009). These results suggest that the experience of early life stress was widespread among individuals of African ancestry in the United States.

The presence of vitamin D deficiency, with the majority of cases being residual rickets, in African Americans from the South and Missouri could also suggest childhood nutritional stress. However, as most of the vitamin is synthesized in the skin through sunlight exposure, it is more likely that the amount of time spent in the sun is behind the cause (Åkeson et al. 2016; Chaplin and Jablonski 2013; Holick and Chen 2008; Holick and Adams 1998; Clemens et al. 1982; Robinowitz 2009). The latitude of southern states and St. Louis is not so high that it would affect UVB exposure. In fact, much of the South lies around or below 34 degrees north latitude, at which point vitamin D synthesis is possible all year round (Robinowitz 2009). It is not possible to know the specific circumstances that each individual experienced during childhood that led to the development of rickets.
If UVB availability was not the cause of vitamin D deficiency in this sample, environmental conditions or cultural practices may have contributed to the observed cases of residual rickets and osteomalacia. Hookworm infections are one factor likely associated with childhood nutritional deficiencies as they were rampant in the American South (Beardsley 1990). Hookworms are intestinal parasites that absorb nutrients from their victim’s bloodstream, causing lethargy, growth stunting, anemia, cognitive impairment, and nutritional deficiencies if reinfection is long-term (Bleakley 2007). The parasite is acquired through skin contact with the ground, such as walking barefoot, in unsanitary conditions (Bleakley 2007). Since young people were the most common victims (Beardsley 1990), it is not unreasonable for hookworm prevalence and vitamin D deficiency rickets to be connected when discussing migrants from the South.

Enslavement in rural areas was more agriculturally focused whereas the domestic realm or artisanal work was more the focus in urban settings (Angel et al. 1987; Owsley et al. 1987). The two foci may have meant variable amounts of time spent outdoors in the sun. Together with higher amounts of melanin present in African Americans, insufficient sunlight exposure from domestic work or urban areas may explain the amount of residual rickets in these groups. Additionally, black codes did not permit free movement, among many activities, of Black persons, which could have restricted time out of doors (Cohen 1976; Wormser 2003).

Tibial bowing as an indicator of healed rickets was noted among enslaved samples (Kelley and Angel 1987) as well as free Black samples (Angel et al. 1987). The enslaved individuals displayed more evidence of residual rickets (Kelley and Angel 1987). The instances between African American migrants and Missourians in this study
were almost equal, so no differential causation may be proposed. Based on similar results, de la Cova (2011) suggested that groups sharing frequencies of rickets experienced comparable rates of biological stress in early childhood.

The conditions described here that may have affected development of rickets in childhood for individuals of African ancestry in the Terry Collection may also contributed to osteomalacia in adults. Two cases of osteomalacia identified in Southern migrants. Osteomalacia is most prevalent in females, and all individuals with osteomalacia in this dissertation sample, including these two, were female (Ives and Brickley 2014; van der Merwe et al 2018). Van der Merwe et al. (2018) found that nineteenth and early twentieth century psychiatric hospital practices contributed to osteomalacia presence in female patients. Meals low in vitamin D and treatments that kept long-term patients permanently inside affected women from the Meerenberg psychiatric hospital in the Netherlands (van der Merwe et al. 2018), and similar treatments may have affected individuals in this dissertation sample. It is known that some individuals in the Terry Collection were institutionalized before death. The relationship between institutionalization and osteomalacia in historic St. Louis should be further explored in future research.

6.1.2.2. Community and Social Support

The comparatively high frequency of skeletal pathology in African Americans could suggest a lack of community or social networks that could provide support against the stresses of everyday life in St. Louis. Recent research has found that receiving of perceived or actual social support from a social network can have positive health outcomes through decreased risk of morbidity and mortality (Holt-Lunstad 2010; House
et al. 1988; Lyyra and Heikkinen 2006; Uchino 2006). However, history shows that strong social networks and the support of the community, social, and religious organizations were present among African Americans in Missouri.

Missouri was a slave-holding state, but there was also a long-standing free Black community that had been present since the original French settlement that created St. Louis (Holland 2003; Jack 2007; Judson 2012; Sandweiss 2003; Troen and Holt 1997; Wright 2002). This deeply rooted foundation built a strong African American community network that supported itself through social organizations, political organizations, churches, newspapers, schools, and businesses (Holland 2003; Jack 2007; Wilkerson 2010; Wright 2002). These institutions required leadership and coordination from many groups in the community, including women’s and professional clubs, religious leaders, and entrepreneurs (Lipsitz 1991).

Churches were some of the earliest African American organizations formed in the area, including the First African Baptist Church, African Methodist Church, St. Paul African Methodist Episcopal Church, and St. Elizabeth’s Parish (Wright 2002). These institutions are also intimately tied with education since many held clandestine schools for free and enslaved African Americans (Wright 2002). Once the laws restricting their education changed after the Civil War, African Americans still struggled for access to public education because of segregation (Lipsitz 1991). The community lobbied and secured property for elementary, high, and vocational schools that would serve the advancement of African American students (Holland 2003; Wright 2002). Some, like Sumner High School, were the first schools for African Americans west of the Mississippi River (Lipsitz 1991). The schools were supervised by community leaders that
sat on the Board of Education for Colored Schools (Wright 2002). Beyond the board, the schools were closely connected with the community they served and functioned to solidify the ties of members at all levels (Morris 1999).

In addition to schools, a number of African American owned businesses arose that catered almost exclusively to segregated clientele (Holland 2003; Wright 2002). Among these businesses were community newspapers that covered topics important to their readership and sought to increase solidarity in the face of oppression (Holland 2003). Branches of the YMCA and YWCA were opened specifically for African American St. Louisans who were excluded from existing facilities that catered to Euro-Americans (Wright 2002). As a demonstration of the political and organizational power of the St. Louis African American community, a committee of African American physicians, with the help of Black voters, convinced city officials to build Homer G. Phillips Hospital. The facility, opened in 1937, replaced City Hospital No. 2, which was overcrowded and in disrepair but the only public hospital for Black patients. As a full-service healthcare facility, Homer G. Philips Hospital treated and employed community members in addition to serving as a national training center for African American physicians and healthcare professionals (Lipsitz 1991; Wright 2002). These are a few of the many examples of the endurance and strength of African American society in St. Louis.

The long-standing African American community in St. Louis benefitted many new migrants from the South in addition to the long-time local residents. As early as the Exoduster migration directly post-Reconstruction, the African American community came together to house, feed, and supply the many Exodusters who often made it to St. Louis, the transition point of the journey, with nothing but the clothes on their backs
(Jack 2007; Holland 2003; Wright 2002). Those supporting the Exodusters were usually not any better off economically than the migrants, but they understood the horrors and poverty the Exodusters were fleeing and committed to help (Jack 2007). Most of the money raised for the Exodusters came from African American churches (Holland 2003; Wright 2002). Additionally, the community formed the Colored Relief Board, an organization that assumed responsibility for the needs of the migrants (Holland 2003; Wright 2002). Many St. Louis residents encouraged the Exodusters to continue their journey to Kansas in the face of negative reports and discouragement offered by opponents of the movement (Jack 2007).

African Americans leaving the South during the Great Migration were different from the Exodusters of 1879. First, the number of people moving was vastly larger during the Great Migration and focused not on one destination but many across multiple regions of the U.S. While many came to St. Louis, more still landed in other urban industrial cities as well as small towns, rural farmland, different regions of the South, and in rural and urban centers across the West (Trotter 1991; Wilkerson 2010). Second, the migrants, while still impoverished, were better off than the Exodusters upon their arrival in St. Louis or any other destination due to planning, funding, and other aid offered by family and social networks before, during, and after the journey (Gottlieb 1991; Wilkerson 2010).

Southern Black churches provided aid for congregation members moving north. Family relationships also played a major role in the migration, providing encouragement, funding, security, and familiarity in a strange city (Gottlieb 1991; Lewis 1991; Wilkerson 2010). These relationships also supported returns to the South for temporary visits to
combat loneliness or homesickness or take part in family and community celebrations. Sometimes the trips back were permanent due to loss of work or extended recovery from injury or illness (Gottlieb 1991).

The support of family, social networks, and community provide an additional dimension of benefit for the migrants beyond direct aid and connection to home. There is a relationship between perceived or received social support and risk of morbidity and mortality (Holt-Lunstad 2010; House et al. 1988; Lyyra and Heikkinen 2006; Uchino 2006). People who are socially isolated or not integrated into community or family networks are less psychologically and physically healthy and therefore have a higher risk of mortality (House et al. 1988; Lyyra and Heikkinen 2006). The presence of family, close friends, and networks of relationships that give individuals a sense of support and the ability to obtain assistance have a positive effect, lowering their risk of morbidity and mortality (Holt-Lunstad 2010; Uchino 2006). However, the positive benefits of social ties could not outweigh the negatives of systemic oppression, as evidenced by the frequencies traumatic and pathological lesions observed and low age at death of individual of African ancestry in this sample.

Though similar in their racialized place on the continuum of whiteness, the African Americans in the study sample were not a homogeneous group with uniform life experiences. Results also indicate that differences in skeletal pathology existed within the African American sample by region of origin (Table 5.9). These differences may be attributed to tensions along class and culture lines between Black migrants from the South and the established St. Louis African American community. Long-term residents provided support to newly arrived migrants to St. Louis, but the two groups were also
often at odds with each other. Tensions arose between St. Louis African American society and the Southern African American transplants over cultural assimilation and competition for employment (de la Cova 2010; Gottlieb 1991; The Chicago Defender 1918, 1919; Wilkerson 2010). The resulting rift in the community may have translated into the observed higher frequencies of trauma, tuberculosis, TBCOD, dental caries, abscesses, and LEH among Southern migrants when compared to African American Missourians (Tables 5.9-5.11).

6.1.2.3 Tensions between Migrants and St. Louis African American Community

Among those moving to a new area, regardless of within the same country or to a new country, the desire to keep the memory of home alive is strong as is the tendency to seek familiarity of language and customs with others who have the same background. Southern migrants worked to keep the customs and traditions of home alive in their new areas of residence (Gottlieb 1991; Grossman 1989; Wilkerson 2010). The circulation of migrants between South and North preserved strong ties with Southern culture (Gottlieb 1991; Wilkerson 2010). The maintenance of Southern culture and formation of social groups around people known from home riled the long-time St. Louis residents and created a rift within the African American community in St. Louis. Newcomers from the South were looked down upon as lower-class because of their accents or other mannerisms, lack of education, and background in manual labor (de la Cova 2010; Gottlieb 1991; Grossman 1989; Wilkerson 2010).

The rift within the community was not only over different cultural traditions. The class divisions between newcomers and long-time residents were put into a spotlight because all African Americans were forced to live in the same areas and housing types by
color-lines and other restrictive housing laws (Holland 2003; Wilkerson 2010). Resentment rose as the middle-class and those with professional jobs tried unsuccessfully to separate themselves geographically from the migrants, often unskilled laborers. The resentment stemmed from the fear that the migrants would jeopardize their hard-won status (Wilkerson 2010).

Established residents, especially those of the small but present Black middle-class, saw the migrants as a threat to their respectability and to the chance of social and economic improvement (Grossman 1989; Wilkerson 2010). The accents and mannerisms of the new arrivals were conspicuous, calling attention to perceived bad manners or uncouth behaviors that, in the eyes of broader white society, reflected poorly upon the entire African American community (Grossman 1989). In an effort to control migrant behavior, facilitate their assimilation into ‘respectable’ cultural norms, and avoid the reproach of the white community, some newspapers ran lists of “do’s and don’ts” and organizations, like the Chicago Urban League, ran meetings that were supposed to aid Southern migrants in integrating into the culture of their new city (The Chicago Defender 1919; Wilkerson 2010; Grossman 1989). The guidance provided included rules such as “don’t use vile language in public places”, “don’t appear on the street with old dust caps, dirty aprons and ragged clothes”, “don’t sit around in the yard and on the porch barefoot and unkempt”, and “don’t wear handkerchiefs on your head” that were intended to prevent migrants from drawing attention to themselves (The Chicago Defender 1918:16, 1919:20).

Some advice, like “don’t live in insanitary [sic] houses, or sleep in rooms without proper ventilation” (The Chicago Defender 1919:20), highlighted the nature of the
housing market for African Americans during the Great Migration. Though the newspaper’s suggestion was valid, the reality of housing shortages and dense population influenced the rate of tuberculosis infection among African Americans, especially those migrating from the South. Additional instructions focused on getting a job, keeping a clean house, courteous interpersonal interactions, sending children to school, and supporting African American businesses and artists (Grossman 1989: 146-7; Wilkerson 2010: 291; The Chicago Defender 1918: 16, 1919: 20). The results were mixed, and the tendency to keep the reminders of home present through mannerisms, speech, or food held.

The influx of Southern migrants also created higher competition for the unskilled jobs that were open to African Americans. Since Southern migrants were often used as strikebreakers during (all white) union strikes, the competition for jobs also created tensions between African American and Euro-American communities (Corbett 1999; Rudwick 1972; Wilkerson 2010). These tensions, which were likely an attributing factor in the amount of skeletal trauma among Black migrants, were not unique to St. Louis. Newspaper articles from multiple U.S. cities report the negative attitudes regarding the arrival Southern Black migrants and their employment (i.e. The Atlanta Constitution 1906, 1917; Chicago Daily Tribune 1917a, 1917b; The Chicago Defender 1930). The Atlanta Constitution (1906: 4) stated “the trouble grew out of the importation of southern negroes to take the place of striking Italians” in an article about an outbreak of violence that left one man shot. A Chicago Daily Tribune (1917b: 2) headline read “[Labor leader] sees grave danger in vast influx of Blacks” and warned of the danger of riots due to Chicago companies’ hiring of African American women, children, and migrants as
inexpensive labor for factory work and strike-breaking. This practice resulted in “thousands of white men being thrown out of employment” (Chicago Daily Tribune 1917b: 2).

Despite tensions, the presence of a large and flourishing Black community in St. Louis was centrally important to residents of the Gateway City and new migrants alike. The African American community, in addition to family and friend connections during the Great Migration, helped facilitate the movement of thousands of people out of the South and resettlement into areas with better economic opportunities. However, such networks were not able to counteract the weight of structural violence that restricted living environments and employment opportunities embodied by St. Louis residents of African ancestry, whether native to the state or from the South (Rankin-Hill 1997). Even African Americans who attained economic prosperity and opportunities not available in the South could not escape the constraints placed on them by white society due to their skin color.

The multitude of negative interactions that African Americans experienced could have adverse effects on physiological functions and potentially outweighed positive support provided by significant others, close family, or friends (Krause 2006; Ryff and Singer 1998). The differences in early life experiences, indicated by higher LEH prevalence in migrants, and the tensions, both cultural and economic, between long-time residents and newcomers within the African American community in St. Louis support the differences in the skeletal data found between African American migrants to St. Louis and those born in Missouri.
6.1.2.4 Sample Size

As discussed throughout section 6.1, there is evidence in the historical literature that supports the differential distribution of skeletal pathology observed between African and European ancestry groups as well as between African Americans of the two origin groups in this sample. However, it must be noted that sample sizes among the groups vary. There are 194 Black migrants from the South versus 69 Black Missourians.

6.2 Hypotheses Regarding European Immigrants

6.2.1 Hypothesis 2: European immigrants from Germany and Ireland will have a lower frequency of skeletal pathological indicators than African Americans but more than Euro-American Missourians

European immigrants in the research sample have less skeletal pathological indicators than African Americans as predicted. However, when compared with the Euro-American Missourians, all groups that would at present be considered on the white end of the continuum, the results are mixed. European immigrants generally have a higher frequency of skeletal pathologies when the two immigrant groups are combined (Table 5.12). Two exceptions are vitamin D deficiency and TBCOD, though the differences are quite small.

The cases of vitamin D deficiency in European immigrants are only residual rickets. Individuals with residual rickets are three first-generation German and Irish males (Tables 5.22 and 5.23), therefore they experienced insufficient levels of vitamin D during their childhoods in the U.S. These results contradict Veselka et al.’s (2018) findings that female nonadults were more frequently affected by vitamin D deficiency. One reason for the divergence of Terry Collection findings may be that Veselka et al.’s (2018) sample originated from nineteenth century rural Netherlands and were influenced by a gender-
based division of labor that exposed males to more sunlight than females. Another article by Veselka and coauthors (2019) reported that, while males and females had similar chances of developing rickets in two Dutch samples, males had more severe periods of deficiency.

No cases of residual rickets or osteomalacia were observed in German or Irish immigrants. Many immigrants came from rural areas in their home countries (Cunz 1953; Kamphoefner 2003; Kenny 2000; Luebke 1990), so sunlight exposure may have been more accessible than in the overcrowded urban environment of St. Louis. Cases among Euro-American Missourians are primarily residual rickets, but evidence of osteomalacia was observed in three females. There is further variation that does not support Hypothesis 2 when the combined European immigrant group subdivided by sex (Tables 5.13, 5.14). For example, comparing European immigrant and white Missourian women showed Missourians leading in almost all indicator categories.

In individual immigrant group comparisons, the Missourians have more evidence of almost all skeletal pathology than the Irish individuals (Tables 5.18). The only deviance from this pattern is the single case of skeletal tuberculosis found among the Irish; there is no skeletal evidence of tuberculosis among Euro-American Missourians or Germans. The German-Euro-American Missourian comparisons are less straightforward. Of the six present categories of pathological indicators between Germans and Missourians, three categories show higher frequencies in one group and the remaining three are higher in the other group. Germans have more instances of trauma, dental caries, and LEH whereas Missourians have more of TBCOD, vitamin D deficiency, and dental abscesses (Table 5.15).
The German and Irish groups also have the highest mean ages at death of any groups in this sample, at approximately 67 and 61 years, respectively. Even when taking only the Euro-American Missourians into account, the mean age at death of the European immigrants is still higher by 4 to 10 years. Pearlstein (2015) also found that the mean age at death for Irish and German immigrants, 54.2 years and 51.2 years respectively, was higher than Euro-Americans (44.5 years) in the Huntington Collection. However, an average age at death in the 60s is also high compared to census records. In 1900, the life expectancy of foreign-born white males was 52.7 years and for females was 54.2 years (Glover 1921). In 1910, foreign-born white males were expected to live for 54.2 years and females for 56.3 years (Glover 1921). The 1910 census did not record life expectancy for country or region-specific immigrants, which may explain some of the variation between these numbers and the individuals in this research.

6.2.2 Hypothesis 2.1: Irish immigrants will show higher levels of skeletal pathological indicators than German immigrants

The results of analyses do not support Hypothesis 2.1. Among European immigrants, German individuals generally present with more cases of the studied pathological indicators (Table 5.2). German immigrants also have a higher mean age at death. There are several possible explanations for these unexpected results pertaining to both Hypothesis 2 and 2.1. First, the attitudes of Americans towards European immigrants and their ability to find employment affected the quality of life in the New World. Additionally, the role of social support is important when making a home in a new and often hostile city, and both Germans and the Irish created strong communities in St. Louis (Holt-Lunstad 2010; House et al. 1988; Lyyra and Heikkinen 2006; Moren-
Cross and Lin 2006; Uchino 2006). Finally, the osteological paradox and sample size also likely contributed to the results and are discussed in sections 6.2.2.3 and 6.2.2.4.

6.2.2.1 Reception in the New World and Employment

Germans emigrated from more varied circumstances than the Irish, but many came from rural areas (Cunz 1953; Kamphoefner 2003; Luebke 1990). Those who left their homes for the U.S. did so primarily in search of political and religious freedom and better economic prospects (Cunz 1953; Luebke 1990). Large numbers of low-class apprentices, day laborers, and farm workers as well as middle-class artisans and small farm owners emigrated in search of better opportunities during the economic downturn and political restructuring that occurred in the region during the mid- to late-nineteenth century (Bodnar 1987). These opportunities included increased job availability and more land for establishing farms. Additionally, after a series of failed revolutions, some Germans left in search of a more democratic state (Cunz 1953; Luebke 1990). Lower class German immigrants were likely low SES and therefore faced stress in their home country, especially during early childhood, which possibly contributed to the higher number of individuals with LEH as compared to white Missourians.

Germans were able to find jobs in St. Louis with relative ease. Over one-third brought a background in skilled trades to the city (Luebke 1990). Those without specialized skills had less competition for labor or service jobs in part due to their skin color (Kamphoefner 2003; Luebke 1990). The high employment rate of German immigrants could have influenced the frequency of trauma observed in that group due to increased exposure to factory machinery and associated workplace accidents. A similar case could be made for the amount of trauma recorded in the white Missourian sample.
How Germans were viewed by white Missourians also contributed to their ease of finding jobs (Kamphoefner 2003; Luebke 1990). German immigrants were generally perceived in positive stereotypes—thought of as industrious, intelligent, reliable, honest, and thrifty, which matched well with the American value system (Luebke 1990). This view of Germans improved their assimilation into American society and placed the group near the white end of the continuum of whiteness (Cunz 1953). Despite a generally good reception, Germans did face periods of anti-immigrant sentiment, and sometimes violence that occurred during the nineteenth century (Kamphoefner 2003).

The overall positive reception of individuals with German heritage changed as anti-German hostility rose in the period during the first World War (Luebke 1990). The fact that Germany was on the opposite side of the U.S. in the war increased discrimination against German immigrants and German-Americans (Cunz 1953; Luebke 1990). Germans were forced to decide between suppressing their cultural heritage, use of the German language, and pride in their native country due to the onslaught of negativity or be seen as anti-American (Kamphoefner 2003; Luebke 1990). The negative attitudes towards Germans and German-speaking residents of St. Louis likely affected their employment opportunities and community organizations, perhaps discouraging participation in the more conspicuous German festival or cultural activities.

After Germans, the second most common immigrant group in St. Louis were the Irish. Irish immigrants came predominantly from rural areas (Kenny 2000). The potato blight and the Great Famine that followed induced further poverty, starvation, and death in Ireland. The famine destroyed the future prospects of Irish citizens and had biological and emotional consequences (Geber 2014; Geber and Murphy 2012; Kamphoefner 2003;
Skeletal evidence from an Irish workhouse that was vastly overcrowded by people seeking relief from the famine showed very high rates of scurvy, LEH, Harris lines, and growth stunting (Geber 2014; Geber and Murphy 2012). A weakened immune system resulting from starvation and vitamin C deficiency would have made affected individuals more susceptible to infectious diseases (Geber and Murphy 2012). Migrants to America during the famine period were poor but land-holding farmers while those in the post-famine period were of the poorest and lowest classes (Kenny 2000). All experienced physiological and psychological stress from living through the Great Famine.

Unlike the German immigrants, Irish arrivals in St. Louis had less means and few if any marketable job skills (Diner 1983; Kenny 2000). Irish immigrants often worked alongside African Americans or competed with them for the most undesirable, menial, low-wage jobs (Kenny 2000). The association with African Americans meant that Irish immigrants were pushed further towards the non-white end of the continuum of whiteness. Irish women overwhelmingly worked as domestic servants, jobs viewed as undesirable by other white American and immigrant women (Diner 1983; Kenny 2000). Despite long hours and hard work, these jobs provided cleaner and less crowded accommodations, access to better food, and the ability to save large sums of money to send back to Ireland or support a family after marriage (Diner 1983; Kenny 2000). If their savings could support a family that may be one reason Irish immigrants displayed less skeletal pathology than white Missourians or German immigrants. The financial benefit of these positions may also contribute to the low number of Irish females in the Terry Collection.
 Though they spoke English, the Irish immigrants were less accepted than their German counterparts. They were viewed with overwhelmingly with disdain and negativity. A large part of this perspective stemmed from the Irish being Catholic in a majority Protestant country and the high rates of alcoholism in the Irish community (Ignatiev 1995; Kenny 2000).

Employment opportunities were correlated with the skill brought from the home country as well as how Americans perceived immigrants’ effectiveness in the workplace. Germans, even during the wave of hostility surrounding the first World War, were better able to support themselves and their families through their ease of employment. The jobs allowed them to move into better quality housing and avoid the risk of disease that accompanied the overcrowded tenements that new immigrants often found themselves in (Detjen 1985). The Irish had a harder time in the job market. They worked in dangerous and unsanitary conditions for lower wages that kept them exposed to low-quality, overcrowded tenement housing.

Both the jobs held by European immigrants and the dwellings where they lived exposed them to risk of disease, injury, and death. The physical nature of the jobs and risk of workplace injury influenced evidence of trauma in German and Irish males, which were higher than that found in white Missourian males (Tables 5.17, 5.19). Furthermore, structural violence in the form of economic marginalization through employment discrimination related to housing options available to Irish immigrants and risk of infectious disease.

Low quality, overcrowded housing increased the risk of tuberculosis infection, and therefore should have increased the frequencies of tuberculosis and TBCOD among
Irish individuals. Irish immigrants present with a single case of skeletal tuberculosis, which is completely absent among German immigrant and Euro-American Missourians. Conversely, the frequencies of TBCOD are comparable between Irish and German groups, and Missourians have more cases of non-skeletal tuberculosis than either immigrant group. These results do not fit with the historical narrative or the results of other skeletal studies. Higgins et al. (2002) found that the majority of the inmates of the Monroe County Almshouse were foreign born, with the highest proportion coming from Ireland. The impoverished and marginalized state of Irish immigrants left them vulnerable to infectious disease in the almshouse and the surrounding urban environment (Higgins et al. 2002). The deviation of the results in this dissertation from other literature may be the result of sample size or strong ethnic communities.

6.2.2.2 Community

Foreign-born status was used to racialize the immigrants as less-than-white Others and exclude members of primarily the Irish but also the German communities. Among members of those immigrant communities, though, being German or Irish was a source of pride. The communities created by these immigrant groups in St. Louis provided tangible and intangible support, contributed to the resilience of their members, and kept cultural ties with the Old World (Luebke 1990; Kenny 2000; Kamphoefner 2003).

Irish immigrants likely had the tightest knit community, having forged an Irish identity in the face of conflicts with the British at home and against hardships and discrimination in the U.S. (Diner 1983; Kenny 2000). Similar religion and cultural values strengthened the cohesiveness of the community. The overwhelming majority shared the same Catholic faith. Irish Catholic parishes and churches kept faith traditions alive and
were centers for community organization (Diner 1983; Faherty 2001; Kenny 2000). Additionally, Irish hospitality, in Ireland and the New World, was reportedly legendary within the community, even among those who had almost nothing to give (Diner 1983:41). Poor and destitute Irish immigrants and Irish-Americans benefitted informally from Irish hospitality and more formally from Irish and Catholic charitable organizations that stepped in where Protestant organizations would not (Diner 1983; Faherty 2001; Ignatiev 1995; Kenny 2000).

Germans shared a common language but, unlike the Irish, did not have a unified country that they emigrated from, and hence they varied more in religion and regional identity (Cunz 1953; Luebke 1990; Kamphoefner 2003). However, Germans were proud of their heritage and created multiple language- and culture-specific organizations, such as Turnvereins (gymnastics clubs), Schuetzenvereins (marksmen clubs), German-language instruction in public and private schools, beer gardens, newspapers, and churches, which kept German traditions and language alive (Cunz 1953; Kamphaefner 2003; Luebke 1990). Many traditions like the Christmas tree, the song Silent Night, and culinary dishes even made it into American culture (Cunz 1953). The German community provided a place for leisure, physical exercise, and social network building, working to keep its members in good health and good spirits. The commitment to physical exercise through organizations like Turnvereins added another possible reason why Germans had the second highest frequency of individuals with trauma among any group in this sample. However, as Germans have the highest average age at death and trauma is cumulative throughout life, it is likely that the high frequency of trauma observed in the German sample has more to do with their longevity than any particular
activities. Work on the Erie County Poorhouse sample also found that impairment ratings increased in older age groups (Byrnes 2015).

The German and Irish community building that took place in historic St. Louis was composed of strong cultural, political, and religious facets. The same point that was made in the first hypothesis section applies here – that strong communities provide emotional and tangible support that benefits not only their members’ success but also their mental and physical well-being (Holt-Lunstad 2010; House et al. 1988; Lyyra and Heikkinen 2006; Moren-Cross and Lin 2006; Uchino 2006). The European immigrants encountered varied levels, Germans lower than Irish, of economic marginalization and discrimination than African Americans, which detracted less from the effects of community-provided support.

A unified community of faith, values, and commitment to helping fellow members may explain why average age at death of Irish immigrants was higher than the Euro-American Missourian average. Irish immigrants were living longer even though the lower frequency of pathological indicators in skeletal remains indicates that Irish individuals died more quickly upon encountering adverse health conditions (Wood et al. 1992). German immigrants had an even higher mean age at death and therefore displayed more evidence of skeletal lesions associated with pathology, as some conditions like trauma accumulate throughout life. The focus on leisure and a healthy lifestyle within the German-speaking portion St. Louis society may have contributed to the high mean age at death of the German immigrants, who were living longer and also surviving pathological conditions or living with them long-term, indicating a more robust immune response.
Beyond supporting their members into advanced age, both tightknit communities may also have been a contributing factor to the low number of German and Irish individuals in the Terry Collection. The dedication of the Irish to the Catholic faith, which has the traditions of anointing the sick and providing last rites as well as specific burial rituals and rules, especially played a role. It does not seem out of the realm of possibility that either community facilitated the claiming of their members after death, even in cases with no immediate family present, and assisted with burial costs.

6.2.2.3 Osteological Paradox

The research results indicate two interesting patterns. First, the Irish immigrant sample has relatively less observed skeletal evidence of pathology and a lower mean age at death than the German immigrant group. They also have less recorded skeletal pathological indicators as well as a higher average age at death than white Missourians. These results seem to contradict historical evidence that Irish immigrants were poorer, viewed negatively by American society, and achieved economic mobility at a slower rate. The second pattern shows that German immigrants have similar levels of pathological indicators as the white Missourians but more than Irish individuals. They also have the highest average age at death of any group in this sample. These results appear to oppose historical reports stating that Germans immigrated with more means and job skills, had higher rates of economic mobility, and were positively perceived by American society.

In the face of a harsh reception and physically stressful environment, European immigrants, especially Germans, were living longer on average than their native-born white counterparts. Their longer lifespan suggests that they were better able to mount an immune response to overcome pathological insults than the white Missourians (DeWitte
and Stojanowski 2015; White et al. 1992). Several examples in the results of the German and Euro-American Missourian comparisons illustrate this concept. A higher number of German immigrants presented with LEH suggesting they survived periods of stress during early childhood abroad, which may have better prepared them to face adversity as adults. Missourians had no evidence of skeletal tuberculosis, like the Germans, but higher frequencies of TBCOD. This difference suggests that white Missourians were more likely to succumb quickly to tuberculosis, perhaps representing an inability to mount a sufficient immune response.

That the Irish have fewer skeletal lesions than the Missourians or the German immigrants could indicate that these individuals were not living long with their contracted illnesses and had a higher mean age at death than white Missourians. Dying more immediately after disease onset could mean a less effective immune response and that skeletal lesions did not have time to form (DeWitte and Stojanowski 2015; Wood et al. 1992; Wright and Yoder 2003). Therefore, it is possible that the Irish had worse physiological resistance to disease and stress than the Euro-American Missourians and also than the Germans, as predicted by Hypotheses 2 and 2.1. If this is the case, then the lower resistance was likely an embodiment of structural inequalities in the form of economic and cultural discrimination.

6.2.2.4 Sample Size

The general trend of the combined group of European immigrants having more pathology in their skeletal remains than native-born white Missourians is present, but Hypotheses 2 and 2.1 are unsupported for several reasons. It is possible that deviations from expectations are due to the sample size of particularly the Irish but also the German
immigrants available in the Terry Collection. Data were recorded from all individuals in both groups present in the collection. However, the number of individuals is still limited when compared to the sample sizes of Southern migrants or Missourians. European immigrant women are especially limited in the Terry Collection and therefore also this sample. There are almost double the number of White Missourian females than European immigrant females in the sample. Additionally, there are more than twice as many German as Irish individuals in the Terry Collection.

6.3 Hypothesis Regarding Euro-American Missourian Individuals

The third and final hypothesis of this study predicted that native-born Euro-American Missourians would have the least amount of skeletal pathological indicators present. The results do not support Hypothesis 3. Discussion of the previous hypotheses has demonstrated several instances where white Missourians display more skeletal pathological indicators than the other groups within the study sample. White Missourians have more instances of skeletal pathology than the entire Irish sample and more trauma than African American Missourians. When compared with the German sample, they have higher frequencies of TBCOD (neither group has skeletal evidence of tuberculosis), vitamin D deficiency, and dental abscesses (Table 5.15).

White Missourians have a higher frequency of vitamin D deficiency, both residual rickets and osteomalacia, than European immigrants. There are five cases of residual rickets, all but one in males, and three cases of osteomalacia, all in females, among Euro-Americans born in Missouri. The variables that likely contributed to lack of sunlight exposure and therefore vitamin D deficiency during childhood or adulthood have already been discussed in sections 6.1.2.1 and 6.2.1. The fact that many European immigrants
came from rural environments in their countries of origin allowed for more UVB exposure than would have been found in the urban environment of St. Louis Euro-American Missourians experienced. White female Missourians with osteomalacia reflect the documented demographic most commonly affected by the disease. It is reported that long-term treatment in a psychiatric hospital contributed to cases of osteomalacia in the nineteenth and twentieth centuries (van der Merwe et al. 2018). It is possible that institutionalization also played a role in historic St. Louis.

African Americans from the South have the most individuals with evidence of trauma of any origin group, as predicted. That Euro-American Missourians have a larger number of individuals with trauma in their skeletal remains than African American Missourians is unexpected because of the documented cases of violence against all African Americans. Some, like the East St. Louis Riot, were large scale occurrences that affected entire communities and involved the destruction of property as well as physical harm to people while others were quotidian cases of interpersonal violence. Additionally, African Americans were used to break strikes which led to instances of violence between the strikebreakers and the striking unions (Corbett 1999; Rudwick 1972; Whatley 1993). However unexpected, the result has precedence in the bioarchaeological literature.

The amount of trauma among individuals of European ancestry in this study mirrors the high frequency of trauma de la Cova (2010) found in Euro-Americans as compared to African American males from St. Louis, Cleveland, and Washington, D.C. Steckel and Rose (2002) also indicated that Euro-Americans had higher instances of trauma compared to African Americans in their multi-site aggregate analyses of health in North America. Relatedly, Pearlstein (2015) found that the white U.S.-born cohort had
more evidence of trauma than the European immigrant groups in the Huntington
Collection. These studies all cite interpersonal violence, primarily bare-knuckle boxing or
street fighting, and occupational accidents as reasons for the results.

Boxing, especially the bareknuckle prizefighting that took place in saloons and
other informal settings, was a way for overworked males who did not feel in control of
their circumstances to rise above poverty and discrimination (Ross 2014; Sammons
1990). The sport was most popular among Euro-Americans and the Irish; Germans took
part as well in smaller numbers (Ross 2014). While European immigrants found
community cohesiveness in religious or cultural institutions, Euro-Americans appear to
have created that cohesion in pugilistic activity, a socially acceptable form of violence
used to settle disputes, defend honor, and protect territory (de la Cova 2010; Brickley and
Smith 2006; Pearlstein 2015; Walker 1997). The popularity of informal and formal
fighting venues likely contributed to the high levels of trauma seen in Euro-American
Missourians as well as the males of the European immigrant groups (de la Cova 2010;

It is also possible that employment was a contributing cause to the higher rate of
trauma in Missourians of European ancestry than African ancestry. Euro-American
Missourians had the privilege of being the most employable of the groups due to their
status as native-born and their place on the whitest end of the continuum. However, the
majority were not skilled laborers. This was especially true of individuals who migrated
to St. Louis from the surrounding rural areas of Missouri in search of better pay
(Pearlstein 2015). Therefore, they competed with immigrants and other migrants of the
same skill level for jobs that exposed them to long hours, dangerous machines, and
unsanitary factory conditions (Kamphoefner 2003). Manual labor and machine-centered factor work came with the added risk of traumatic injury due to workplace accidents or stress on joints, ligaments, and muscles. If white Missourians were employed at a higher rate than any other group in this study, they would have filled a higher proportion of unskilled, manual labor jobs.

Additionally, the low wages associated with unskilled jobs affected living conditions and access to dental care. Housing options on that budget were not of much better quality than was available to the European immigrant groups, though it may have been in a better area. Crowded, unsanitary conditions and close living quarters contributed to more instances of TBCOD noted in white Missourians than German and Irish immigrants.

Low income may have influenced the number of dental abscesses found among white Missourians. Access to dental care could have been restricted due to cost, and thus contributed to the number of caries left untreated to become destructive abscesses. Higgins et al. (2002) also related high frequencies of dental disease among individuals of European ancestry in the Monroe County Almshouse to unaffordable dental care. Dental work was present in some individuals in the Terry Collection indicating healthcare access at some point during adulthood. However, the presence of caries and abscesses in white Missourians and other groups indicates that a combination of diet, genetics, and access to dental care affected oral health.

High levels of dental disease could also stem from a cultural lack of emphasis on dental hygiene or diet. Steckel and Rose (2002) found that Euro-Americans had the worst dental health in the multi-site combined sample comparing African Americans to Euro-
Americans in North America. They link the result to a diet that emphasized sugar and starch that increased the risk of caries (Steckel and Rose 2002).

6.4 Limitations of the Study

As discussed throughout this chapter, but specifically in sections 6.1.2.4 and 6.2.2.4, sample size is a limiting factor in this study’s comparisons. The number of Irish individuals present in the Terry Collection is comparatively small and likely influenced the study’s results. The sample size is small for Irish and German individuals compared to that of the other origin cohorts. Additionally, the sample size of Southern African American migrants is disproportionately large compared to the number of African American Missourians.

There are many details of an individual’s life that cannot be garnered from their skeletal remains. The presence of additional documentation for the Terry Collection and historic literature helped to infer a group’s general experiences throughout history and relative position along the continuum of whiteness. However, a specific individual’s precise position along the continuum and exact circumstances throughout life are unknowable, as are their precise pre-(im)migration experiences and the path of (im)migration they took before reaching St. Louis.

Furthermore, since all individuals in the Terry Collection were of low SES at the time of their death, it is easy to assume, incorrectly, that they were throughout their entire lives. While this was likely the case of many of the individuals in the collection, it did not hold true for everyone. For some people, low SES may only have occurred in the final segment of life while others may have experienced several oscillations between SES groups in their lifetime.
It is also important to note that all individuals in the dissertation sample vary in their risk of and susceptibility to disease in ways which are unknown to the researcher (DeWitte and Stojanowski 2015; Wood et al. 1992; Wright and Yoder 2003). This hidden heterogeneity of frailty, which can include age, sex, social, or genetic factors, hampers the translation of osteological observations into inferences of population health. In bioarchaeological studies, only the dead from a specific time are being studied, which constitute a subgroup of the population itself. Additionally, researchers have no way of knowing exactly why their subjects succumbed to death at that particular point over any other during their life course (DeWitte and Stojanowski 2015; Wood et al. 1992; Wright and Yoder 2003). While some sociohistorical information, such as social grouping, migration status, and historical events, is available to better illuminate some aspects of heterogeneous frailty among skeletal samples, others, such as genetic and epigenetic variation, are less accessible (DeWitte and Stojanowski 2015).

**6.5 Summary**

The intersections of ancestry, region of origin, immigration or migration status, and SES created variable experiences of racialization and structural violence. Although African American, European immigrant, and Euro-American residents of St. Louis embodied marginalization differently, the skeletal pathological evidence does not correspond with presumptions determined by traditional societal hierarchies, which are ascribed via a continuum of whiteness. Therefore, the results of this dissertation do not fully support the hypotheses developed as part of this study.

The data upheld the hypotheses regarding the presence of pathology among individuals of African ancestry. A supportive and well-established African American
community benefitted Black St. Louisans but could not counteract the enormity of oppression and violence that they faced daily, which became embodied as a low mean age at death and high frequencies of skeletal pathologies. Contrastive early life experiences and class divisions existed within the African American community as evidenced by higher frequencies of skeletal pathological conditions among migrants from the South as compared to Black Missourians.

American society’s perceptions of German and Irish immigrants demonstrated that the two groups were placed at two distinct spots along the continuum of whiteness. However, the results do not support the differences in economic mobility and discrimination that were documented in the historical literature as resulting from those placements. High mean ages at death and low numbers of both ethnic groups in the Terry Collection indicate that the benefits of strong community ties were more helpful in the presence of the negative aspects of St. Louis life. While selective mortality may have caused the unexpected variation in frequencies of pathological indicators, advanced age is more likely.

Euro-American Missourians should have benefitted the most from their racialized category. However, many were still low SES, which diminished their place in the social hierarchy. A lower hierarchy position exposed them to similar hazards of long hours, low-pay, and machine-oriented factory work as groups farther down on the continuum. Therefore, white Missourians embodied the environmental consequences of poverty as disease frequencies similar to migrant groups. Euro-American Missourians also created their own community cohesiveness through the socially acceptable, ritualized violence in
the form of boxing, which increased the number of individuals with skeletal evidence of trauma (Brickley and Smith 2006; de la Cova 2010; Pearlstein 2015; Walker 1997, 2001).
CHAPTER 7

ETHICS AND ANATOMICAL SKELETAL COLLECTIONS

The Robert J. Terry Anatomical Skeletal Collection is one of the most well-known documented skeletal collections in the United States. These collections are regularly used in research and education. They have therefore played a role in advancing biological anthropology, anatomy, and related disciplines (de la Cova 2019, In Press; Muller et al. 2017). However, the overrepresentation of marginalized communities in these collections and the circumstances of their assemblage present unique ethical considerations for anthropologists and other researchers. The Terry Collection primarily consists of low SES individuals. This status exposed them to an overcrowded urban environment, industrial pollution, dangerous factory work, interpersonal violence, and poverty thereby increasing their risk of violence and disease. The designation of low SES is not homogenous; the category is made up of people of different ethnicities, regions of origin, and experiences. Low SES did, however, contribute to one definite experience shared by all individuals in the Terry Collection: postmortem anatomical dissection and collection. This commonality indicates that individuals in the Terry Collection were marginalized from society and subjected to a unique form of structural violence regarding their postmortem treatment (de la Cova 2019, In Press; Muller et al. 2017). The consideration of past anatomical practices and legislation that led to these individuals’ curation in a skeletal collection and discussion of the origins of bioarchaeological ethics is important to the growth of bioarchaeology.
7.1 Ethics in Bioarchaeology

Bioarchaeological ethics are based on some common philosophical principles that provide the foundation for ethical models across most professional disciplines. An ethical model provides an overall perspective and moral principles that inform ethical problems, in this case within a specific discipline and research context. Professional ethics, a subset of applied ethics, is derived from ethical theories and principles, and is focused on the rules and decisions concerning best practices, methods, policies, and research of a discipline’s membership (Turner 2012). A code of ethics or conduct defines a professional organization’s understanding of the responsibilities and obligations of the society and its members. In the case of an individual, it sets out limits and guidelines for their professional life (Turner et al. 2018).

Some common philosophical or religious tenets influence all modern codes of ethics and best practices. These include utilitarian and deontological theories (Turner 2012). Utilitarian theories are consequence based, stating either that people should act to produce the greatest amount of good over evil (situational; act utilitarian theory) or follow the rule that produces the greatest balance of good over evil (non-situational; rule utilitarian theory) (Turner 2012; Turner et al. 2018). Deontological theories are not solely consequence based since they consider some acts to be obligatory regardless of consequences, such as the duty to not lie, not to kill an innocent person, and to keep promises, which relate to a respect for persons (Turner 2012). Contributing as well to bioarchaeological ethics regarding deceased individuals is the evolution of religious beliefs about proper treatment of the dead. These views at time conflicted with the value
scientists placed on the empirical information gained through investigation of and research on human remains, especially in regard to anatomy (Walker 2000).

In addition to these philosophical and religious underpinnings, bioarchaeology is situated presently and historically between medicine, especially gross anatomy, and anthropology. Therefore, this discipline has two different but related origins to its knowledge production and ethics (Walker 2000). The ethical roots of bioarchaeology are in situated in two areas: 1) bioethics, and 2) the Belmont report (Turner 2012; Turner et al. 2018).

Bioethics is a branch of applied ethics that is concerned with biological and medical research. This field got its start after World War II. The Nuremberg Code, written in the wake of Nazi medical experimentation, specifically lays out the principle of voluntary consent of human participants and requirements of what the researcher must define for the participant. The World Medical Association later upheld and elaborated on these principles in the Helsinki Code (Turner 2012; Turner et al. 2018).

Another major contribution to the origins of bioarchaeological ethics and professional ethics is the Belmont report (Turner 2012, 2014). The Belmont report identifies the basic ethical principles that should underlie the conduct of biomedical and behavior research involving human subjects with the purpose of developing guidelines to ensure ethical research. These basic principles are respect for persons (also called autonomy), beneficence, and justice. Respect for persons acknowledges that all people should be treated as autonomous agents and that those with diminished autonomy are entitled to protection. The autonomy principle covers voluntary informed consent. Beneficence refers to acts of kindness and charity that go beyond obligation and, in the
case of human subject research, refers to not only protecting research subjects from harm but also securing their well-being. Beneficence incorporates the two principles of “do not harm” and “maximize possible benefits and minimize possible harms” (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research 1979; Turner et al. 2018). Justice addresses the fairness of distribution of research benefits and burdens. While seen in the past as more relevant to social practices than scientific research, history shows many examples of unjust benefit and burden assignments. For instance, the burden of serving as research and dissection subjects primarily fell to poor patients, often Black, whereas the benefits of improved medical care were primarily bestowed upon upper-class private patients, usually White (Savitt 1982, 2007; Halperin 2007). Therefore, the principle of justice must be carefully considered in human subjects research. All research involving human subjects, alive or dead, should uphold these three principles through using proper informed consent procedures, assessing the risks and benefits of the research, and when selecting subjects (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research 1979).

These philosophical and historical codes regarding human subjects research discussed above contribute to the codes of ethics currently used by anthropologists and bioarchaeologists. Among these, and most relevant to bioarchaeology, are the statements of the Society for American Archaeology (SAA) and the American Anthropological Association (AAA), which were used in the formulation of the biological anthropology specific ethics code of the American Association of Physical Anthropologists (AAPA).
The SAA (1996) code of ethics guidelines are recommendations for all archaeologists to use when engaging in archaeological endeavors or research. The preamble specifies that archaeologists have complex responsibilities to archaeological resources and to all people who have an interest in these resources or are affected by archaeological practice (Society for American Archaeology 1996). The nine principles cover a broad range of academic, non-academic, field, and professional principles and are provided in three languages (English, Spanish, and French). These principles are stewardship, accountability, commercialization, public education and outreach, intellectual property, public reporting and publication, records and preservation, training and resources, and safe educational and workplace environments (Society for American Archaeology 1996).

The AAA statement on ethics, last updated in 2012, presents the core principles of anthropological work that are shared across subfields and contexts of practice, despite the wide variety of research conducted and work done by anthropologists. The AAA document is a general statement mindful of the diversity of anthropology, so anthropologists must be willing to carefully consider, clarify assumptions, and make decisions that best fit with these guidelines. Decisions are rarely simple and easily answerable (American Anthropological Association 2012). The guiding principles briefly discussed in this statement are do no harm, be open and honest regarding research, obtain informed consent and necessary permissions, weigh competing ethical obligations, make results accessible, protect and preserve records, and maintain respectful and ethical professional relationships (American Anthropological Association 2012).
The AAPA ethics code was adapted from the AAA ethics statement to be used by the AAPA membership and others in biological anthropology (American Association of Physical Anthropologists 2003; Turner et al. 2018). It provides guidelines for making ethical choices in conducting work within the discipline because it supports the generation of knowledge in an ethical manner in teaching, research, and applied settings. In all of these areas, the guidelines primarily relate to those laid out by the AAA and the Belmont report. Like the others, this document acknowledges that no code or set of guidelines can anticipate every type of circumstance that could possibly be encountered, so biological anthropologists must make carefully considered and informed ethical choices and be prepared to explain their decisions. Therefore, it is important that they receive training in ethics multiple times throughout their careers and definitely during graduate and undergraduate education (American Association of Physical Anthropologists 2003).

Bioarchaeologists should be familiar with all of these codes, the relevant literature and history of their research sites or subjects in order to be prepared to handle any ethical dilemmas that arise during their research. Bioarchaeologists must keep current with the wide array of literature that addresses ethics in biological anthropology. Some of these are listed on professional organizations’ websites as tools for further ethics education. This literature provides similar background and principles as the professional codes but goes beyond the scope of these codes to provide specific ethical opinions or case studies. Case studies are another useful instrument in the education of students, researchers, or other practitioners because they give some insight into what ethical issues and the decision-making process could look like (Caplan 2003; Turner 2005; Whiteford and
Trotter 2008). However, these case studies are often on the more severe end of the spectrum and therefore less often encountered; bioarchaeologists are more likely to face more subtle, ordinary, and daily situations that require ethical consideration than the hot-button issues or debates presented (Lambek 2010; Silverman 2003). Ethics literature is also a source of discussion of new and emerging ethics issues in the discipline (e.g. Arbruster and Lærke 2008; Caplan 2003; Fluehr-Lobban 2003; Kingsolver et al. 2003; Lambert 2012; Turner 2012, 2014).

Using this foundation of literature and professional codes, bioarchaeologists should be reflexive in their consideration of ethics by acknowledging how personal and contemporaneous morals and politics affect perceptions of professional and personal ethics. Historically, early anthropologists attempted to ‘put on blinders’ to conduct politically neutral and value-free research, which was impossible in practice (Mills 2003). Anthropology’s commitment to cultural relativism to overcome ethnocentrism and encourage tolerance can be problematic because it makes ethical codes redundant (Nugent 2003; Walker 2000). The fact that our professional ethics codes draw on basic conventions of human rights has unavoidable political connotations (i.e. the idea of a right is founded on basic principles of equality) (Mills 2003; Strang 2003). Ethical codes must take culturally diverse values into account if they are not to be another western colonial authority, but only up to the point of universal human rights (Strang 2003). A strong commitment to cultural relativism also restricts anthropology from making worthwhile contributions to the world (Scheper-Hughes 1995). Anthropologists must move beyond their traditional role of neutral, dispassionate, rational, objective observer (“fearless spectator”) to be more politically and morally committed. It is assumed that
once anthropologists become activists they can no longer be anthropologists, but that is not the case. Political, moral, and ethical engagement requires activism (Scheper-Hughes 1995). Anthropologists, and bioarchaeologists specifically, are in a unique position to be advocates and activists for the peoples that they work with. Thus, researchers who work with anatomical skeletal remains should do just that for the people in the collections.

Part of fulfilling the commitment to activism is being aware of the larger context of one’s anthropological research. Human remains research requires engagement at every contextual level that the remains exist within. Levels of engagement include “descendant populations, local communities, county, state, and national legislation, government and local statues, and repositories and museums that house related materials” (Martin et al. 2013:23). Bioarchaeologists must consider the involvement and wishes of the descendant communities. Such consideration includes actions mandated by NAGPRA but also should apply beyond it (Blakey and Rankin-Hill 2009; DeWitte 2015; Lambert 2012; Larsen 2015; Larsen and Walker 2005; Martin et al. 2013; Walker 2000). Research on human remains that share an identity with living groups can have negative effects, especially when reporting on certain diseases or types of violence, because the behavior of ancestral people is seen to reflect on the descendants (Lambert 2012). Bioarchaeologists need to involve descendant communities in their research whenever possible, at minimum informing the communities of the research intentions, methods, and results.

In addition to being cognizant of modern descendant communities, bioarchaeologists also need to understand the historical context of the remains that they are engaging with and, in the case of skeletal collections, how the remains came to be
curated. Doing so helps bioarchaeologists see the people in the skeletons rather than viewing the skeletons as objects and a means to a scientific end. This perspective will also facilitate better ethical engagement with the collections. The intersecting historical axes of racialization, discrimination, and structural violence during the development of anthropology and medicine should be accounted for regarding the Terry Collection.

The effects of structuralized inequalities in health and anatomization are evident in the Terry Collection. Analyses indicate that over three-quarters of the individuals with known places of origin in the total collection were migrants from a different state or country (77.3%; 1501/1728). The majority of migrants had domestic origins in either the Northeast or the South (66.5%). Foreign immigrants are also represented but in a smaller than expected proportion (10.9%) considering that by 1850 over one-third of St. Louis’ population was German or Irish (Detjen 1985:9; Kamphoefner 2003). German and Irish immigrants, the two largest immigrant groups to the city, make up about half of the foreign-born individuals found in the Terry Collection (4.6%). It is not surprising that such a large part of the Terry Collection is comprised of individuals not native to Missouri. The large distances traveled, the transitory nature of migration, and a small claim interval before one’s body was sent to a medical school for dissection made migrants susceptible to being claimed by the state anatomy board after death.

Additionally, studies by de la Cova (2010, 2011, 2012, 2014) reported that institutionalized individuals made up over a third of her sample. These people were extremely ostracized during their lives, and the stigma that came with institutionalization made them vulnerable to anatomical legislation. She also demonstrated that individuals with African ancestry are more numerous and dying at younger ages compared to
European-descended individuals. The demographics of this dissertation sample mirror that finding. African Americans died at significantly younger ages than Euro-Americans. The average African American age at death was about 48 years old, whereas the Euro-American average was about 57 years old. Additionally, individuals of African ancestry presented with high frequencies of all skeletal pathology compared to other groups. Both this study and de la Cova’s work (2011, 2014) link increased prevalence of tuberculosis to structural violence that excluded African Americans from jobs and restricted them to overcrowded, poor quality housing.

7.2 Ethics and the Terry Collection

Act utilitarian theory, which states that one should act to produce the most good in a given situation, could be used to view anatomy act legislation and resulting skeletal collections as ethical (Turner 2012). The legality of using unclaimed human remains and the necessity of those remains in medical education are the main points in defense of anatomy acts by doctors, medical students, legislators, and the patients receiving medical care or benefiting from the advancements made (Ferber and Wilde 2016). Another point that could be made in defense of anatomy act legislation is that, due to the negative associations with dissection, people were not likely to donate their bodies voluntarily (not an option in this country until later in the twentieth century) if the acts were not in effect. Therefore, medical training and care would suffer as a result due to the lack of cadavers and skeletal collections to learn from. Relevantly, English philosopher Jeremy Bentham was the originator of utilitarianism, the basis of act utilitarian theory, and went against the norms of his time to donated his body for dissection and display in 1832 (Winkelmann 2016; University College London 2020).
Despite the proclaimed benefits of the anatomy acts and subsequent skeletal collections, there are problems with this system of body procurement by today’s standards. Anatomy legislation was influenced by beliefs about the inferiority of non-white races and the poor (R. Jones 2016; Richardson 2001; Sappol 2002). The laws reinforced biased and racist views of marginalized groups. The burden of involuntary dissection, curation, and access to the benefits of medical training and care were unequally distributed. Additionally, opposition to cadaveric dissection, even of institutionalized individuals, existed, so effort was taken to avoid public scrutiny, during procurement and removal of cadavers from medical schools as much as possible (Ferber and Wilde 2016; MacDonald 2016). This clandestine behavior suggests that anatomists were aware of the disapproval of their practices but continued anyway.

The cadaver procurement system that gave rise to the Terry Collection also lacked expressed consent of its subjects. Unclaimed did not always mean that there were no relatives to claim the body. More often, unclaimed meant that the next of kin were too poor to pay for burial. Dissection without consent and despite being claimed violated the agency and personhood of the deceased and disrupted the postmortem rituals that were afforded to all other members of society (Crossland 2009). The custom of using unclaimed decedents, who did not give expressed consent to body donation, in medical dissection is still legally practiced currently, though at lower rates than in historic St. Louis (Bernstein 2016a; Friesen 2009; North Carolina General Assembly 2018a, 2018b).

The professional codes of ethics that exist today are built upon multiple sources, many of which did not exist until the middle of the twentieth century. While some might say it is unfair to judge past practices by today’s standards, it is also not beneficial to
overlook the issues of the past completely. The practices that went into building anatomical skeletal collections like the Terry Collection were not subject to the medical ethics of the twenty first century. If they were, the protocols would conflict with the Belmont report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research 1979), best practices for body donation from the American Association of Anatomists (AAAnat) (2009) and the American Association of Clinical Anatomists (AACA) (2008), and codes of ethics from anthropological professional organizations (AAA 2012; AAPA 2003; SAA 1996). Reflecting on those ethical principles allows recognition of the ways that we, as researchers working with anatomical skeletal collections and as a discipline, can improve our interactions with these collections going forward. It is important for scholars working with anatomical skeletal collections to be aware of the history of that collection due to the dichotomy between past legalities and current guidelines. Professional codes of ethics should inform interactions with Terry Collection individuals just as knowledge of the collection’s past should inform research questions. In this way, future researchers will be more ethically engaged with anatomical skeletal collections.

7.3 Summary

Clearly, the legality of the practices at the time the Terry Collection was amassed does not exempt it from having associated ethical baggage, especially given the people that were targeted and the circumstances of their collection. The ethical issues that surround this and other documented skeletal collections are not often addressed, nor are the individuals who are curated within them, despite broad use within biological anthropology (de la Cova 2019, In Press; Muller et al. 2017; Watkins and Muller 2015).
For these reasons it is important to raise awareness of the history of and ethical issues
surrounding the formation of the Terry Collection. All scholars who work with the
individuals in the Terry Collection should know the collection’s history to better
understand the implications of their research at present and in the future. This knowledge
can motivate bioarchaeologists to investigate questions that provide additional
dimensions to the historical record as well as rehumanize silenced individuals.
CHAPTER 8

CONCLUSION

The aim of this dissertation was to investigate whether the skeletal presentation of trauma, tuberculosis, vitamin D deficiency, and dental disease and disruption reflected the history of racialization and marginalization that accompanied migration status. Historic St. Louis was a fast-growing industrial city that attracted German and Irish immigrants from Europe as well as African Americans moving out of the post-Reconstruction South. Residents of the Gateway City experienced the health risks typical of large cities during the industrial era. The intersections of racialization, identity, migration status, and sex compounded exposure to existing stressors and differentially distributed structural violence and discrimination among the poor and marginalized, migrants included. While strength of community offered some protection, in the form of social support, against the effects of oppression, it could not buffer against all insults; some of these stressors were embodied in a way that is visible in individuals’ skeletal remains within the Terry Collection. This study hypothesized that the frequency of skeletal indicators of stress among German immigrant, Irish immigrant, African American migrant, and Missouri-born African American and Euro-American groups would mirror their rank along the continuum of whiteness. The results indicated that not all hypotheses were supported.

- **Hypothesis 1:** African American individuals will have a higher frequency of all skeletal pathological indicators than any other group in
this study. Hypothesis 1 is supported. Individuals of African ancestry in this sample had a higher frequency of all pathologies, except trauma, than individuals of European ancestry combined. They also had a lower mean age at death.

- **Hypothesis 1.1**: *African American migrants from the South will have a higher frequency of skeletal pathological indicators than African Americans born in Missouri.* Hypothesis 1.1 is supported. African American migrants from the South had a higher frequency of all pathological indicators than any African American Missourians. They also had a lower mean age at death than Black Missourians. Finally, the African American migrants from the South had more of every pathological indicator than Euro-American Missourians and the European immigrants.

- **Hypothesis 2**: *European immigrants from Germany and Ireland will have a lower frequency of skeletal pathological indicators than African Americans but more than Euro-American Missourians.* Hypothesis 2 is not supported. Euro-American Missourians have higher frequencies of all pathological indicators than the Irish immigrant sample. German immigrants and Euro-American Missourians split the present pathological indicator categories evenly between them. The German immigrant sample has more trauma, dental caries, and LEH than the Euro-American Missourians, whereas the Missourians have more tuberculosis listed as a cause of death, cases of vitamin D deficiency, and dental abscesses.
**Hypothesis 2.1:** Irish immigrants will show higher levels of skeletal pathological indicators than German immigrants.

Hypothesis 2.1 is not supported. German immigrants have higher frequencies of all pathological indicators with the exception of skeletal evidence of tuberculosis and tuberculosis listed as a cause of death.

**Hypothesis 3:** Native-born Euro-American Missourians will have the least amount of skeletal pathological indicators present. Hypothesis 3 is not supported. Euro-American Missourians have a higher frequency of trauma than African American Missourians. As indicated in Hypothesis 2.1, Euro-American Missourians have more skeletal pathology than the Irish immigrant sample and mixed results when compared with the German immigrant sample.

### 8.1 Broader Relevance of the Study

This research contributes to the growing body of interdisciplinary anthropological literature influenced by history, paleopathology, and the new bioarchaeology (Mant and Holland 2016), the goal of which is to “transcend the skeletal body into the realm of lived experience and to make a significant contribution to our understanding of social processes and life in the past” (Agarwal and Glencross 2011:3). Furthermore, input from biomedical sources make the observations about disease in this study relevant to modern health disparities. Some skeletally discernable diseases from the past, such as dental caries, tuberculosis, and vitamin D deficiency, are still major global health concerns in the present (CDC 2012; Palacios and Gonzalez 2014; CDC 2017).
Additionally, structural violence, racialization, and negative perceptions of immigrants that existed in the nineteenth and twentieth centuries persist at present. The groups perceived as Other have changed but many of the sentiments – about job competition, negative stereotypes, lack of assimilation – have not. Racism is still present in healthcare, the criminal justice system, education, and most other facets of everyday life (Farmer 2005; Farmer et al. 2006). This dissertation shows that the marginalization of people, whether they are migrants, immigrants, or are perceived as racially different, have real results in terms of disease exposure and outcomes. African Americans, especially migrants from the South, were the most Othered group in this research sample; they displayed the highest frequencies of skeletal pathology of any group. Additionally, results indicate that low SES also increases risk of infection and violence. More recently, the major health problems in the U.S. have shifted towards chronic disease instead of infectious disease, but health disparities are still evident, with the negative health outcomes disproportionately affecting marginalized and racialized communities (Bourgois et al. 2017; Dresser et al. 2005; Farmer 2005; Gravelle 2009; Kochanek et al. 2015; Kuzawa and Sweet 2009; Zuckerman 2014).

8.2 Future Research

The work described here provides the foundations for future research in several areas. An important goal is to bolster the sample sizes of the origin groups, particularly those of Irish immigrants. Contemporaneous documented skeletal collections, such as the Hamann-Todd Human Osteological Collection and the George S. Huntington Skeletal Collection, have similar demographic composition to the Terry Collection. A larger sample size with more numbers equally distributed between origin groups will enable
stature and temporal analyses. Beyond broadening the sample, incorporating methods such as osteobiography will continue the goal of highlighting the experiences of the people in anatomical skeletal collections. Future work will also persist in exploring the interplay between migration and urbanization and their effects on skeletal pathological indicators.

Additionally, the levels of trauma among the origin groups presented here went against the predictions. These unexpected results may be influenced by sample size, but they may also reflect underlying patterns beyond those discussed in chapter 6. A future investigation will analyze the distribution of fractures to better understand how the location of trauma relates to possible etiologies and mechanisms of injury. This investigation may give further insight into how much of the observed trauma could be attributed to boxing, workplace injuries, domestic violence, and interpersonal violence. Additional causes may also be uncovered.

Finally, tuberculosis as a cause of death was analyzed to compare with skeletal observations of the disease. Future research should expand on the analyses of causes of death provided on morgue records. These investigations will illuminate the presence of pathologies that do not affect bone and enrich the picture of history through skeletal remains.

8.3 Final Observations: Where Do We Go From Here?

Race is not a biological concept; it is a cultural concept based on only superficial physical characteristics. However, as this dissertation and other research has shown, the process of assigning people into racial categories has real biological consequences (Farmer 2005; Farmer et al. 2006; Gravelee 2009). The migrants were already under
stress from the factors that pushed them to leave their home regions and living in a new
environment; racialization compounded that stress by exposing those groups to violence,
both structural and direct.

While it is possible that the individuals at the center of this study were
differentially exposed to pathology and trauma, the results do not align neatly with the
social hierarchy known to be present historically. This difference may be due to the low
SES that most Terry Collection individuals experienced, at least around the time of their
death. The results, especially regarding white Missourians, indicate that low SES creates
commonalities in lived experiences that are not suggested in the historical literature.

The deviance from historical evidence may also be due to the fact that most of the
historical information focuses on attitudes towards and interactions between ethnic
groups. While Germans, Irish, African Americans, and Euro-Americans were racialized
and treated differently groups, it was individuals who experienced everyday interactions.
People from separately racialized groups may have had more analogous experiences of
social or environmental conditions, which then could result in similar patterns of skeletal
trauma and disease, like those seen in this dissertation and Pearlstein (2015). Thus, the
results of skeletal observations of individuals may vary from predictions made based on
the aggregate group experience reported in the historical literature (i.e. Mays 2018).

The history of any city, region, or people is most often reported from the
perspective of the dominant. Therefore, sources of information that can enrich or deviate
from the historical narrative, such as human skeletal remains, are critical. However, as
much as data collection methods and statistical analyses are integral in conducting
skeletal research, it is vital that bioarchaeologists not lose sight of the people behind the
numbers (Knudson and Stojanwoski 2008; Pearlstein 2015; Watkins and Muller 2015). The individuals in anatomical skeletal collections were repeatedly overlooked, silenced, and stripped of personhood during life and after death; this silencing should not be perpetuated again through research.

Relating to personhood, the question remains of how best to engage ethically with anatomical skeletal collections currently and in the future. This question is a difficult one that does not have a clear or easy answer. However, knowing the context of these collections and the structural inequalities in the past and presently, taking no action is a disservice to the individuals in the Terry Collection and other anatomical skeletal collections. Evaluating the distribution of risks and benefits of research must be done through the lens of sociopolitical history and present disparities, acknowledging the exploitation and marginalization of peoples in the past and presently (Turner et al. 2018). Being informed about the history and circumstances surrounding the series, along with acknowledging the darker roots of our discipline, is a first step and one we, as researchers, still struggle with. Therefore, the following are several recommendations to better address the ethical inequity caused by past practices.

The majority of research that has taken place on anatomical skeletal collections has used the skeletons as a means to a scientific end without acknowledging the people in the collection or the history that lead to their dissection and curation. Therefore, the prevailing assumption seems to be, very much in the spirit of the anatomists that collected these series, that “skeletal samples” exist to better comprehend human variation and generate new identification methods. While this is one goal, all bioarchaeologists, as well as researchers from any discipline, who engage with anatomical skeletal collections
should also be familiar with and acknowledge the problematic practices in the past that allow us to study such collections today. Bioarchaeologists who engage with these collections must be aware of the power of their position and should strive to be more ethically and critically mindful of their research sources (Muller et al. 2017). The contextualized biocultural approach can give voice back to these individuals and insight into their lived experiences, which has important implications for our understandings of past and present health disparities (de la Cova 2019, In Press; Muller et al. 2017).

A limited number of publications address who the people were that comprise these collections despite their broad use throughout the discipline. A few early publications on these collections done by their amassers describe demographics or collection methods. Additionally, a small number of scholars have addressed the ethical issues associated with anatomical collections (e.g. de la Cova 2019, In Press; Muller et al. 2017; Nystrom 2011, 2014, 2017; Watkins and Muller 2015). Finally, there is a small but growing body of bioarchaeological work that is delving into the structural violence of anatomical dissection and curation based on bioarchaeological evidence from human remains excavated from hospital and medical school cemeteries and anatomical skeletal collections (e.g. Blakely and Harrington 1997; Davis 2017; de la Cova 2012, 2014, 2017, 2019, In Press; Ferber and Wilde 2016; Flies et al. 2017; Lans 2017; Mitchell 2012; Mitchell et al. 2011; Muller and Butler 2017; Nystrom 2011, 2014, 2017; Pearlstein 2015; Watkins 2017).

Beyond directly building up areas of scholarship about the individuals in anatomical skeletal collections in addition to methodological work, recognizing the history of collections like the Terry Collection means recognizing that they are comprised
of vulnerable sections of the population. Following Schepet-Hughes’ (1995) assertion that moral and ethical engagement requires activism, research on anatomical collections should be used to inform the political present as social marginalization and structural violence experienced in the past still exists in present-day society. Bioarchaeologists are able to be advocates for such populations in the past and present because they are able to apply interpretations of past disparities to current inequalities (de la Cova 2017).

The people in the Terry Collection, and thousands like them, were predisposed to a place on a dissecting table before being stripped of all tissue so that their bones could be stored indefinitely for research purposes. This legal practice occurred before the shift in attitudes, followed by legislation, towards a positive outlook on body donation. The Uniform Anatomical Gift Act of 1968 made body donation legal and possible throughout the U.S. It is tempting to think that this law made the use of unclaimed human remains for anatomical dissection obsolete. That is not the case.

Most states still have laws in effect that allow medical schools and other such educational institutions the right of first refusal of unclaimed bodies (Bernstein 2016a; Friesen 2009). Oregon (Friesen 2009), North Carolina (North Carolina General Assembly 2018a, 2018b), and New York (Bernstein 2016a) are among the many states that continue to use unclaimed persons for educational purposes despite lack of consent. In the decade between 2006 and 2016, New York City alone offered at least 4,000 individuals to educational programs of which 1,877 were selected, used, and then buried on Hart Island, the city’s potter’s field where over one million people have been buried over about 150 years (Bernstein 2016a, 2016b). The legislation changed in 2016 following an investigation into the systemic and institutional failures that lead to people being
incorrectly sent to medical schools or buried on Hart Island (Bernstein 2016a). The bill faced opposition from the state’s medical schools and New York City’s only mortuary school, which does not have a body donation program. The main criticism by these institutions was the perceived shortfall in cadavers if the source from unclaimed individuals was cut off. The New York medical schools later withdrew opposition to the measure citing a focus on expanding their private donation programs (Bernstein 2016b, 2016c). Progress in modern anatomical practices and legislation has been made, but there is still a long way to go as long as laws that ignore consent and use unclaimed people for educational purposes are in effect. Thus, this is an area that can benefit from bioarchaeological contributions of activism.

In addition to being informed and open about procedures for acquiring cadavers, bioarchaeologists should make efforts to acknowledge and humanize the individuals in the collection who have been silenced during life and after death (de la Cova In Press; N. Jones 2011; Muller et al. 2017). Scientific writing is often impersonal and objective, removing the researcher from the language and distancing the subject. Few considerations are shown for who these people were in publications, leaving them to only be represented by their bones, evidence of trauma, pathological lesions, and catalogue numbers. The choice of vocabulary can impose greater levels of respect or distance between researcher and research subject (Cassman et al. 2007). Choosing terms such as skeleton, cadaver, object, element, or specimen imply greater distance whereas individual, person, or human remains convey a sense of connection or regard (Cassman et al. 2007:1). Writing more personally about the individuals in these collections is one way to better acknowledge their contribution to the research.
Finally, the unique position of anatomical skeletal collections should be addressed in codes of ethics across anthropology. Though collections like the Terry Collection do not fall under the jurisdiction of the Native American Graves Protection and Repatriation Act (NAGPRA), similar protocols should be considered for addressing relations with descendant communities. Though information about the curated individuals is often known, working with descendant communities is an area that is absent from research on anatomical skeletal collections. Such work is already being done in other areas of bioarchaeology (Blakey and Rankin-Hill 2009; DeWitte 2015) and should be applied to anatomical skeletal collections as well. Additional discussions should involve repatriation and better public outreach. Reviewing these protocols, discussing how they can be improved, and addressing these new aspects into the discipline’s codes of ethics and procedures now will prepare researchers and museums for the future and continue the progress of biological anthropology, specifically bioarchaeology and paleopathology. This dissertation shows that small changes – acknowledging collection history and its relationship with ethics, terminology shifts, upholding the personhood of the sample – can convey the respect and awe that we feel when working with human skeletal remains in our published work.
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